



PowerMAN Power Manager 5.1

Installation and Administration Guide

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About Data Synergy



Data Synergy is a British company based in Sheffield. We have over 10 years' experience developing and supporting software solutions for enterprise PC deployment and management. We do not resell other vendors' products and do all our development, sales and support from our UK base.

Our products have evolved through listening to customer ideas and applying our unrivalled knowledge of PC internals. If you have a suggestion for a new product or feature we would love to talk to you.

Data Synergy UK Ltd
Cooper Buildings
Sheffield Technology Parks
Arundel Street
Sheffield
S1 2NS

Website: www.datasynergy.co.uk
Email: sales@datasynergy.co.uk
Telephone: 08456 435 035

Registered in England and Wales
Company Number 06682095
VAT Registration GB 939 7559 56

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PowerMAN Overview



PowerMAN Power Manager is an advanced software product giving organisations of all sizes a simple and effective solution to manage PC running costs. PowerMAN complements the built-in power management features of Microsoft Windows® by providing:

- Comprehensive, centralised, configuration of PC power management
- Web-based, organisation-wide reporting of PC usage and costs

PowerMAN's innovative approach allows PC power features to be simply managed using familiar Windows tools. This dramatically reduces implementation time and delivers rapid results. PowerMAN's unique web-reporting system allows both IT and non-IT staff to monitor progress and identify areas for improvement.

PowerMAN is very lightweight and scales very well. The client software (power policy implementation) is configured using standard registry based settings or Windows Group Policy. This does not normally require any additional server resources and will scale to the largest Windows based networks with ease. The PowerMAN reporting (server) software is only used for reporting and can handle > 50,000 computers on a single server. PowerMAN has minimal bandwidth requirements and is designed to work alongside exist proxy and firewall systems. Typically, less than 500 bytes of network traffic is generated per client PC per day and around 1MB of data is logged per PC per year.

This document explains how to install and configure PowerMAN Power Manager. This document is intended for a system / network administrator.

PowerMAN and PowerMON Products

Data Synergy distributes the PowerMAN client software in two forms - PowerMAN and PowerMON.

The full software product is known as PowerMAN. This allows power management policies to be applied and power usage information to be monitored. PowerMON is a limited feature version of the same software that is used only for power monitoring. The same executable is used for both products. The term PowerMAN is generally used in the documentation. The supplied license key and ADM file are different. Some sections in this document refer to features only available in PowerMAN.

PowerMAN Basics

PowerMAN offers many power management and reporting features. This section explains the key features and terminology used throughout the rest of this document:

Advantages over Windows built-in power management – Why PowerMAN?

Microsoft Windows includes a basic, built-in, power management system. This can be used to configure the computer to enter a low-power mode after a period of time. This feature has evolved with each version of Windows but remains limited. PowerMAN adds several important extensions:

- Central configuration of all power management features
- Policies per user or computer
- Specific policy when nobody is logged on
- Scheduled sleep, hibernate, shutdown or wake-up policies
- Option to logout or shutdown on idle
- Powerful, enterprise-wide, power management reporting

PowerMAN unique benefit is that it places all of these features in one place and allows them to be used in any appropriate combination. This allows effective power management strategies to be created for every organisation that meet user requirements and maximize energy saving. The inclusion of a built-in reporting suite means that progress can be monitored and policies fine-tuned as necessary.

Low power modes - Shutdown, Hibernate and Sleep (S1-S5)

Modern PCs can offer several different power-saving modes. The PowerMAN site reporting tool can be used to find which states are available on each PC. Not all modes are available on all systems and each has some advantages:


- **Shutdown (Power Off)** – The most efficient (and extreme!) method of power saving. This is generally not appropriate for situations where a user is logged on as it will result in loss of the user's session. Some environments, such as shared access areas, may invoke a complete shutdown after sufficient warning to deter users from leaving computers on and unattended
- **Hibernate (S4)** – This consumes the same amount of power as shutdown but allows the user session to be restored with a short delay (usually about 30 seconds). This is appropriate for computers that are used long term by the same user and where it would be inconvenient to shut down the PC. Typically this policy would be used in an office environment.
- **Sleep (S1-S3)** – This consumes slightly more power than hibernate but allows the user to become productive again after only few seconds delay. Typically a PC in this state requires less than 5% of the operating energy. Three different sleep modes (S1-S3) are available. Each offers increased levels of energy saving. In most cases the available options may be changed by using the appropriate BIOS setting.

In order of decreasing energy consumption the available states are as follows:

S1 Sleep (Smaller saving)	System appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode. To maintain the user's session the power supply must remain connected.
S2 Sleep	System appears off. The CPU has no power; RAM is refreshed; the system is in a lower power mode than S1. To maintain the

	user's session the power supply must remain connected.
S3 Suspend (Bigger saving)	System appears off. The CPU has no power; RAM is in slow refresh; the power supply is in a reduced power mode. This mode is also referred to as 'Save To RAM'. To maintain the user's session the power supply must remain connected.
S4 (Hibernate) (Biggest saving)	System is off. The CPU and RAM have no power. This mode is also referred to as 'Save to Disk'. The power supply may be disconnected without any loss to the user's session.
S5 (Shutdown)	System is off. There is no user session. NB: A system in the shutdown state may still consume some energy if connected to the mains supply. In most systems there is no measurable difference in power consumption between hibernate and shutdown. In some cases support for Wake-on-LAN can slightly increase S4 power consumption.

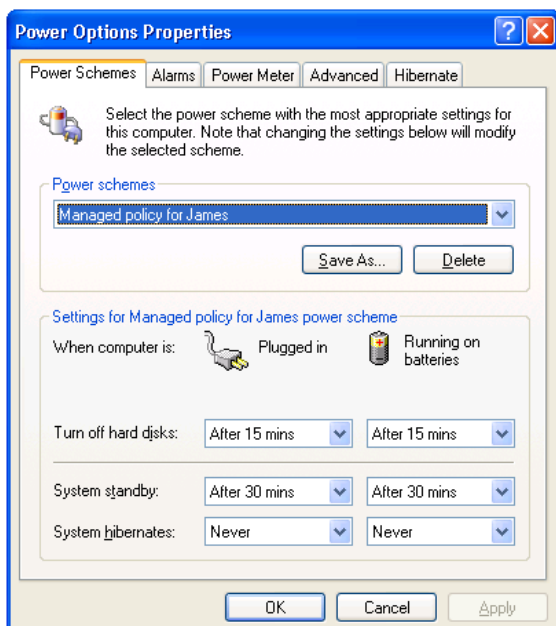
The hibernate and sleep low-power modes **do not log out the current user**. This can result in the next user being unable to logon as the workstation is locked by the previous user. Therefore these methods are not appropriate for systems in public access areas unless combined with an enforced user logout policy. PowerMAN will use the most energy efficient state supported by the hardware. S3 is more efficient than S1



DMCMOS32.EXE
Application

Data Synergy also supplies an enterprise tool for deploying BIOS settings. If you require this utility to quickly deploy hardware settings to multiple computers please contact your sales representative.

Idle-based power management versus scheduled power management



PowerMAN allows power management actions to be triggered in two different ways:

- When the system is **idle**
- At a specific **scheduled time**

Basic idle based power management is available from the Windows Control Panel. This can be used to configure the computer to enter a low-power state (sleep or hibernate) after a pre-set period of idleness.

PowerMAN extends this to provide different policies for different users and additional idle actions (shutdown and reboot).

The computer is idle when no user activity occurs (keyboard or mouse activity) for a pre-set time and no important programs are running.



Scheduled power management allows the system to enter a low-power state or resume to a working state at a pre-set time.

Idle and scheduled can both be useful. Some organisations select an idle driven approach whilst others are more comfortable with a scheduled system.

Remember: Idle-based approaches generally offer greater energy savings because they allow each computer to respond dynamically to its usage environment. Scheduled approaches are more appropriate for environments with a rigid and predictable operating pattern. A timetabled school classroom is a common example.

In some cases it may be beneficial to use a mixture of approaches. PowerMAN fully supports this.

Default User, No User, and specific-user idle policies

PowerMAN provides several different types of idle-based policies. Each has a specific use:

- **Default User policy** – Applies whenever another policy is not applicable. This is ideal if only one policy is required or to define a fall-back policy for use when no other is relevant
- **No User policy** – Applies specifically when no user is logged on. This may be used to define a more aggressive power management strategy for this scenario. If a 'no user' policy is not present then the default policy applies
- **Specific user policy** – Applies when a specific user or user group member is logged on. This allows a policy tailored for the user to apply. If no user policy is defined then the default policy applies.

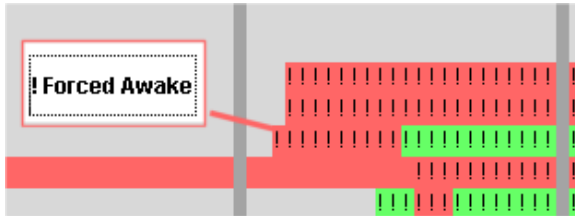
Policy enforcement feature (Anti-Insomnia)

Windows uses an idle countdown timer to track the last significant system activity. When this timer reaches zero the computer normally enters a low-power state (suspend). Activity such as keyboard/mouse or CPU usage can reset this timer and postpone the low-power state.

The Windows timer can also be inhibited or reset by applications. Applications legitimately do this when performing a critical task (such as an update) or when it would be inconvenient to the user for the system to enter a different power state. For instance, the idle timer is disabled when Microsoft PowerPoint is performing a slideshow.

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In some circumstances applications may make excessive use of this feature. This is sometimes known as PC 'insomnia' and results in the selected power management policy not performing as expected. This will reduce system energy efficiency and increase operating costs. Depending upon the installed applications this phenomenon may almost never happen or may be a constant problem. PowerMAN includes a powerful policy enforcement feature that can be used to overcome this undesirable behaviour.



The PowerMAN reporting system marks periods spent in this 'forced awake' state with an exclamation mark (!) symbol. This will result in increased energy consumption if it occurs during otherwise inactive (red) periods.

There are several signs that policy enforcement may be required:

- Computer power settings often fail to behave as configured
- Power Management event log reports event #2003: **'The computer is being prevented from entering the idle state by an unknown program'**
- The historic report for a computer include significant periods marked 'forced awake' – indicated with the exclamation mark (!) symbol character

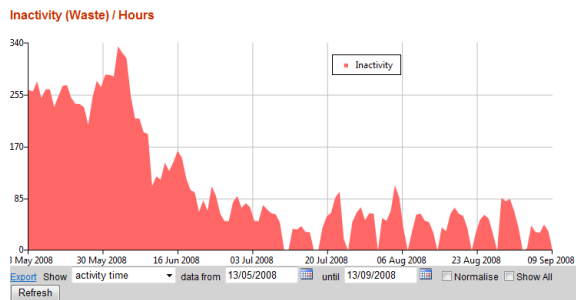
The PowerMAN Policy Enforcement feature allows you to configure a further 'grace period' timeout in **addition** to the standard timeout setting. When this time has expired PowerMAN will force the configured power action to occur. This works alongside the Protected Programs/Files feature and will not enforce a power action whilst protection is active.

The Policy Enforcement feature is enabled by default with a grace period of 15 minutes. This means that the assigned idle policy is forced to happen a maximum of 15 minutes after the last user activity. We recommend that this feature is not disabled to ensure maximum compliance. If necessary this feature may be configured or disabled.

Monitoring progress with PowerMAN reporting

PowerMAN allows PC operating information to be logged on a per-computer basis. This information is aggregated for each site and may be used to understand the usage profile of managed PC equipment, create a tailored management policy and monitor the on-going effectiveness of the policy. This process is fully described in a separate PowerMAN Server Platform guide. This section is designed to give you a brief overview of the features available.

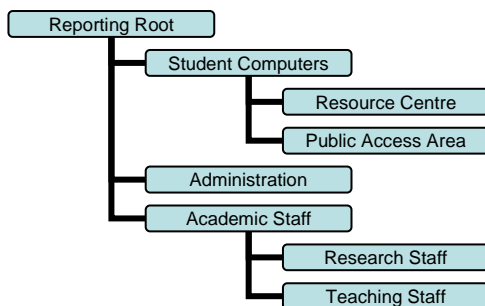
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Sub-Sites

	Inactive Hours	Active Hours	Inactive	User Active	Other Active
Sales Area	18810.75	8286.00			
Admin Area	7989.00	3763.25			
Logistics Area	4910.75	3860.75			
Development Area	729.50	370.00			

Export Show worst 10 sub-sites from 15/01/2009 until 04/04/2009 Refresh



The PowerMAN reporting platform is available as either stand-alone, PowerMAN Enterprise Server, software or as a hosted service. Both product editions offer the same reporting features.

The system presents PC power related information in a variety of graphical and tabular formats. The reporting system has the following key features:

- Rank computers by inactivity level and highlight the most and least wasteful computers
- Group similar computers, display summary information and drill-down to individual PCs
- Minimal network overhead at <0.5KB per PC/day. Only anonymous data is logged
- Download data in Excel compatible format

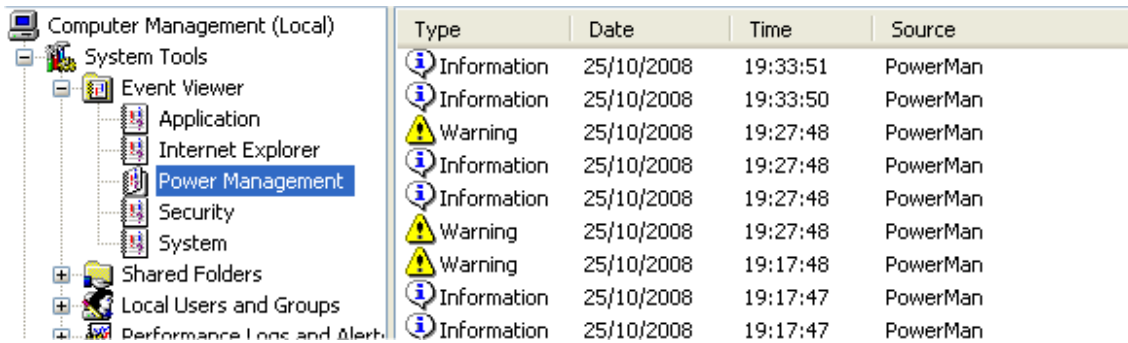
Tip: We recommend that each physical or functional area is reported on separately. We also recommend that each area with a distinct power management strategy is reported on separately. This will allow the effect of the strategy to be clearly measured.

Information is collected in an **anonymous format** that cannot be used to identify a specific user or the activity the user was performing. The information is uploaded in XML format using the industry standard HTTP POST protocol. The protocol of the transmitted data is available, upon request, from PowerMAN Technical Support.

The statistics for a site can be viewed by visiting a specific URL on the PowerMAN logging server. The default hosted server provided with PowerMAN is www.pmstats.org. Detailed logs are normally retained for at least three months and after this period summary information is retained for at least a further year

Power Management Event Log

PowerMAN incorporates a powerful power management event logging feature. This can be accessed with the standard Windows event viewer tool **Eventvwr.exe**. The event log combines relevant power related events together with PowerMAN activity in chronological order. This information can be extremely useful when investigating power management problems or fine tuning settings. There is a summary of the most commonly logged events in an appendix at the end of this document.



Type	Date	Time	Source
Information	25/10/2008	19:33:51	PowerMan
Information	25/10/2008	19:33:50	PowerMan
Warning	25/10/2008	19:27:48	PowerMan
Information	25/10/2008	19:27:48	PowerMan
Information	25/10/2008	19:27:48	PowerMan
Warning	25/10/2008	19:27:48	PowerMan
Warning	25/10/2008	19:17:48	PowerMan
Information	25/10/2008	19:17:47	PowerMan
Information	25/10/2008	19:17:47	PowerMan

PowerMAN can be configured to log additional information using the appropriate option under Advanced/Event Logging. The PowerMAN service must be restarted or the computer rebooted for this change to become effective.

In Windows Vista and Windows 7 the Power Management event log is located under Applications and Services Logs.

Separate AC (mains) and DC (battery) policies

PowerMAN provides separate power management policies for systems running on AC (mains) and DC (battery) power. This feature is commonly used to provide for greater power saving on battery powered systems. PowerMAN uses the term AC to refer to mains power and DC to refer to battery power.

Tip: DC policies are ignored by default. This feature may be enabled by using the policy located under in the miscellaneous section. This feature may be ignored for desktop

Installation Prerequisites

PowerMAN supports the following platforms:

- **Client** – Windows XP Professional, Windows Vista and Windows 7
- **Reporting Server (optional)** – Windows Server 2003 and 2008

PowerMAN provides a common executable (EXE) on all supported versions of Windows. In most cases the product offers identical features on each version of Windows. There are some minor differences between operating systems due to operating system design. Where necessary these are highlighted in this guide. In all other circumstances features and configuration are identical.

PowerMAN is designed to integrate seamlessly with a **Windows Active Directory / Group Policy (GPO)** infrastructure and can, in many cases, be configured and deployed in less than one hour.

Alternatively, PowerMAN may be installed with a variety of alternative deployment and configuration methods. Common examples are:

- ZENworks
- LANDesk
- RM Community Connect
- Altiris
- HP OpenView
- SMS
- SCCM
- XCOPY style installation (single self-installing EXE)

The following sections explain the two most common deployment methods using Windows GPO and an XCOPY style installation. It also explains how the registry settings may be created, without an Active Directory infrastructure, using a standard Windows XP or later client computer. The appendices at the end of this guide cover more specific installations for ZENWorks and RM Community Connect.

Product Installation

Preparation

Before starting on a PowerMAN deployment there are a few essential steps to prepare:

1. **Obtain a unique product key** – There are two different types of product keys available:
 - **PowerMON (Reporting Mode)** – PC power usage information is reported a logging server for analysis and display. This is ideal for environments with an existing power management system or for long-term audit purposes.
 - **PowerMAN (Full Product)** – In addition to the reporting features above, all power management features are enabled. PowerMAN can apply and manage all power policies.

PowerMAN **evaluation product keys** are designed to expire. When this happens PowerMAN stops applying new power settings and stops reporting usage information to the reporting server (if applicable). The PowerMAN service continues to run and internally cache PC usage information. In a normal configuration the log data is retained, by default, for 28 days. If a new product key is applied PowerMAN resumes normal operation following the next system reboot.

There is **no user pop-up** when the product key expires and the process is transparent to the user. PowerMAN continues to report in the event log.

2. **Identify a group or multiple groups of PCs for deployment** – Each group of related PCs is known as a PowerMAN 'site'.

An **ideal site** is a group of similar PC's within a defined environment such as an office, department or computer room. A typical site can have from 20 to several hundred computers and will be **suitable for managing as a single entity**. After deployment you should try not to change the scope of the site (it is easy to create another one) as this may reduce the quality of the report data gathered.

You can easily create additional sites to logically divide your estate of managed computers. There is no limit on the number of sites supported.

3. **Allocate a unique SiteGUID for each site** - This is a unique identity used to track a group of computers for reporting purposes. A GUID may be generated on the PowerMAN server platform using the **Add/Move Site** link:

First Data	20/11/2007
Last Data	16/11/2008
Total Computers	244 Export
Total Sub-Sites	5 Export Add/Move Site
Estimated kWh / PC 	0.22 kW Configure
Electricity Cost / kWh 	£ 0.12 Configure

It may also be generate by using the `makeguid` command built-in to PowerMAN:

```
D:\>POWERMN MAKEGUID
```

```
{f2822500-7128-48ac-89c4-f9a15274afbd}
```

The SiteGUID value is used to ensure that your chosen site is unique. It is, of course, also possible configure a more friendly description for your site statistics on the management reporting server. This setting is only required by PowerMAN during the initial registration with the reporting server. After this initial registration the computer can be freely moved between sites using the features available on the monitoring website.

Tip: PowerMAN software evaluations are usually supplied with an initial **Root SiteGUID**. This may be used directly to use the basic reporting system. In this case you do **not** need to create a new SiteGUID. If you wish to create a hierarchy of sub-sites then each must have a separate SiteGUID.

4. **Decide on deployment method** – PowerMAN may be deployed using a variety of methods. The two most common approaches, using Windows Group Policy and an XCOPY style deployment are described in the following sections. The appendices at the end of this document contain worked examples for other installation methods.
5. **Decide on a deployment strategy** – PowerMAN works best if it is used gradually to achieve power savings. The recommended approach for a new site is as follows:
 - Initially deploy to site with monitoring enabled but no active power management
 - Wait several weeks for a usage pattern to emerge (two complete weeks is usually sufficient)
 - Activate some modest power settings. Typically these may include turning off PC's that are not logged on and turning off monitors after a few minutes. Wait another period to observe the effect of these changes before proceeding. Settings such as these should probably not be noticeable to users.
 - Apply some stricter policy settings. There are a number of approaches to this depending on the operation scenario. For example, some organisations hibernate computers that are not being actively used after 30 minutes. In a public access area, where a user should not be left logged on for prolonged period of inactivity it may be appropriate to shut down the computer (with suitable warning) after 10 minutes.
 - If appropriate consider communicating the strategy and on-going progress to the users. Some sites have reported that user participation may itself contribute significantly to real energy savings. It is even possible to create league table of the most wasteful users or departments!
 - Consider applying other settings that may be beneficial to users such as automatically starting PCs at a certain time in the morning. Please remember, of course, that in some scenarios with irregular usage patterns (such as libraries) this may result in a significant increase in energy consumption
 - Consider supplying the user 'override' tool **PowerCONFIG** to specific users. This tool may be used to disable power management in situations where the PC is required to remain active for prolonged periods.
 - Continue to monitor the site periodically and ensure that the current settings are working effectively.

Microsoft Windows Group Policy Deployment Method

The most common way to deploy PowerMAN is using Windows Group Policy. This feature is available on any network running Windows 2000 Server or later. The example below uses the Group Policy Management Console (GPMC) which is available from Microsoft as a free download (this is built into later versions of Windows 2003 Server and later). If GPMC is not available then the older GPEDIT tool (which is built in to Windows) may also be used.

Group Policy Management Console (GPMC) is available from:

<http://www.microsoft.com/downloads/details.aspx?FamilyID=0A6D4C24-8CBD-4B35-9272-DD3CBFC81887&displaylang=en>

PowerMAN is supplied with two core files. These are the only files you need to perform an installation:

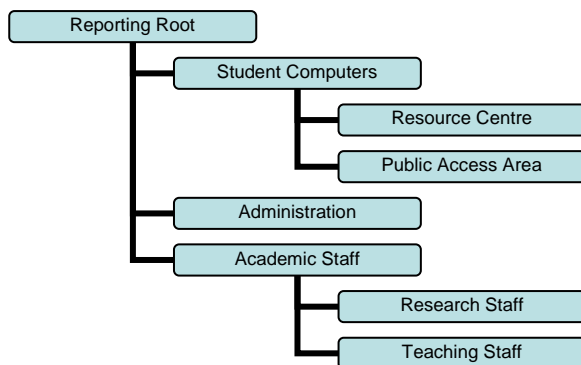


PowerMAN Setup.msi contains the PowerMAN program in a deployable form. This may be installed manually or via Windows GPO. This file also deploys the separate PowerSTART application that may be used to launch programs that require the system to remain active.



PowerMAN5.adm / PowerMON5.adm is an Administrative Template that is loaded onto the Windows Server and used to configure the PowerMAN or PowerMON software.

The supplied ADM file can be used for both deployment and configuration. The basic example below assumes that there is only a single Organisation Unit (OU). However, PowerMAN fully supports operation in a diverse, multi-OU, network.



The ADM file may be used to create several Group Policies to deploy settings at different OU levels.

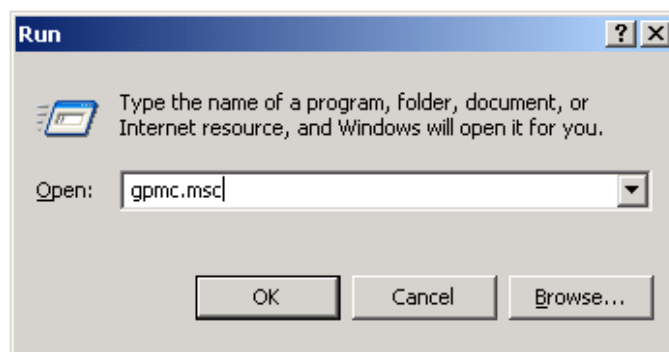
A common approach is to deploy the software and common settings (for instance the PID key) at the top level and apply more specific policies for child OUs.

Policies may be freely mixed in this way. **The only requirement is that a specific policy setting must only be applied once.**

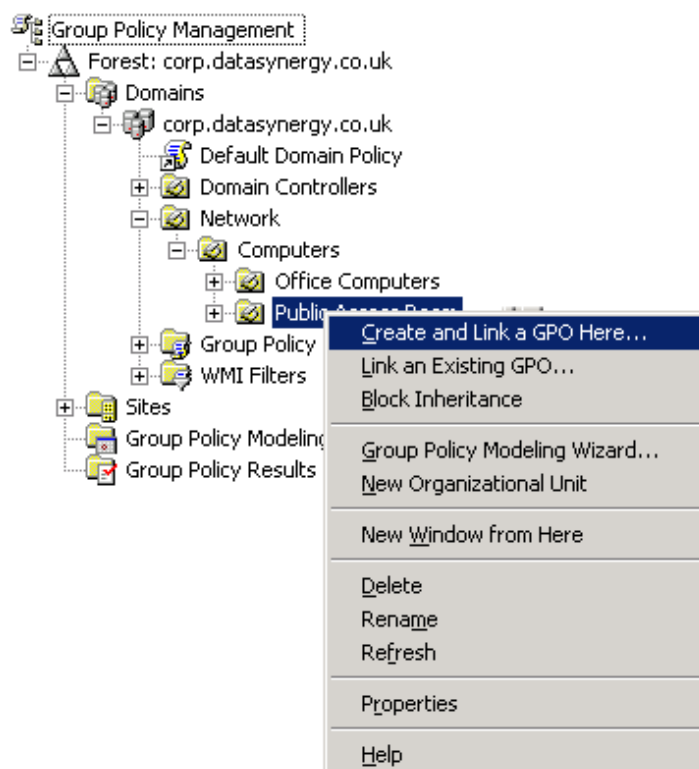
Group Policy Package Deployment

To install PowerMAN using GPO on Windows 2003 Server proceed as follows. The procedure for Windows 2008 Server is almost identical:

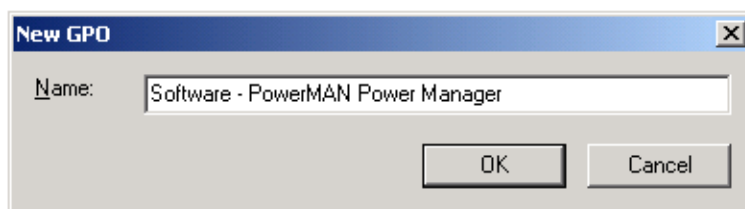
1. Open the Group Policy Management Console (GPMC.MSC):



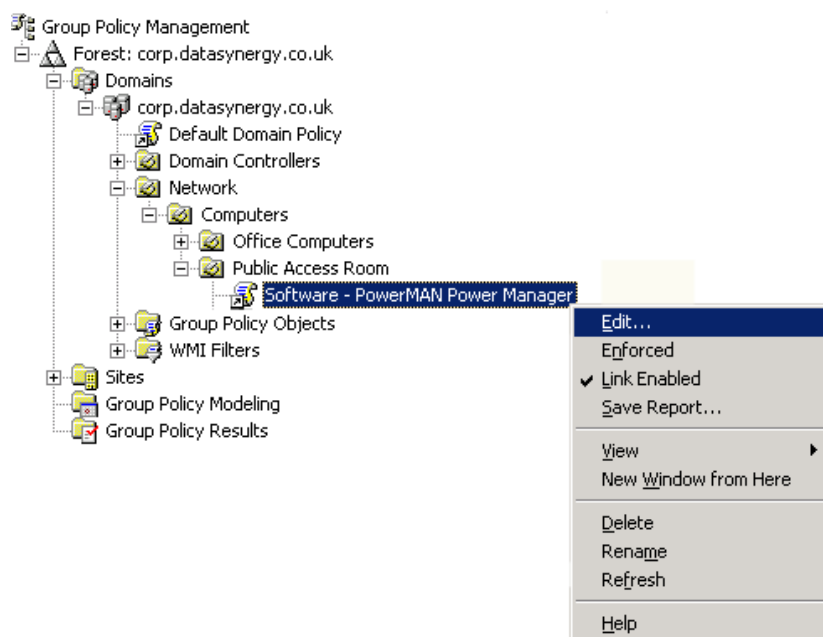
2. Locate the **Organizational Unit (OU)** that you wish to deploy the software to. The example deploys the software to a OU called **Public Access Room**



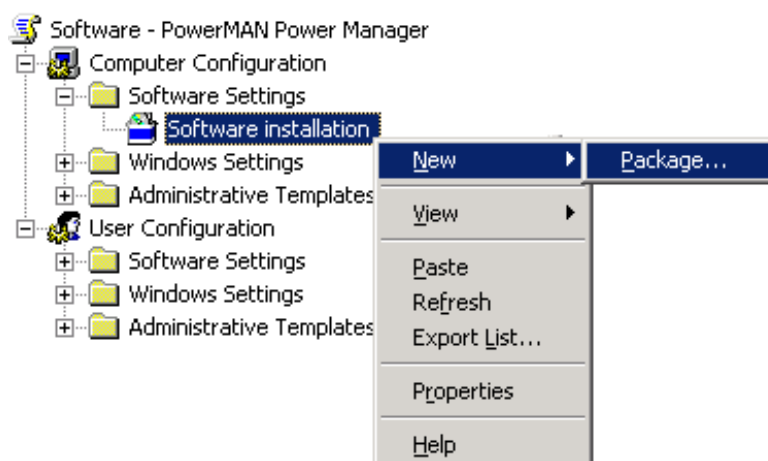
3. Right click the OU and select **Create and Link a GPO here**
4. Enter a name of the new policy and click **Ok**. The example creates a policy called **Software – PowerMAN Power Manager**.



5. Select the newly created policy, right click and select **Edit**

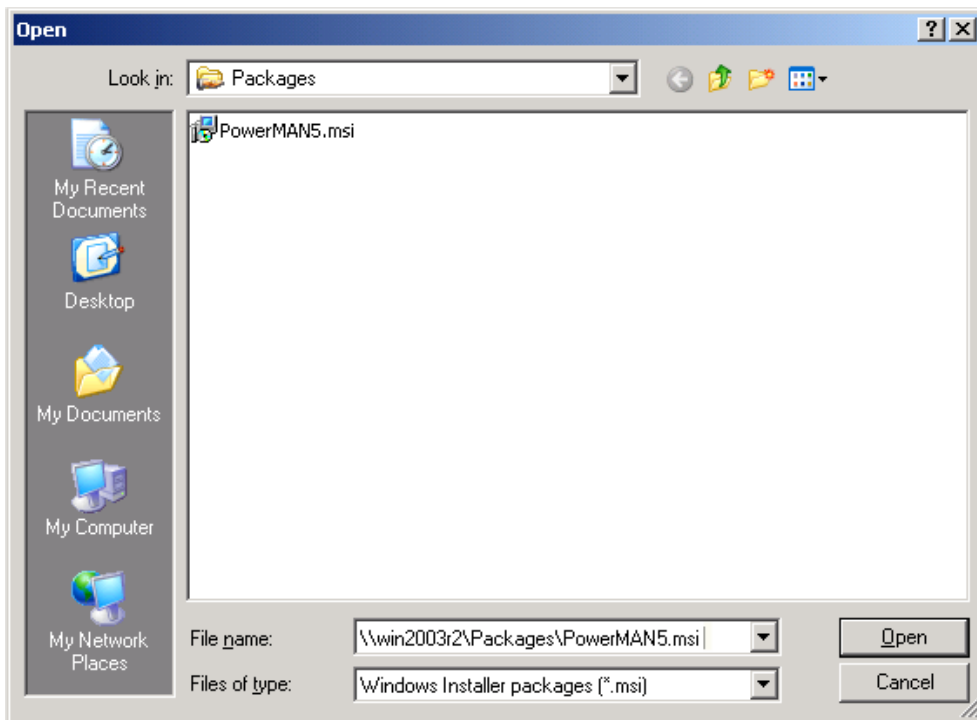


6. The **Group Policy Object Editor** should open. This is used to configure the deployment. Navigate to the **Computer Configuration** section and expand **Software Installation**. Right click and select **New/Package**:



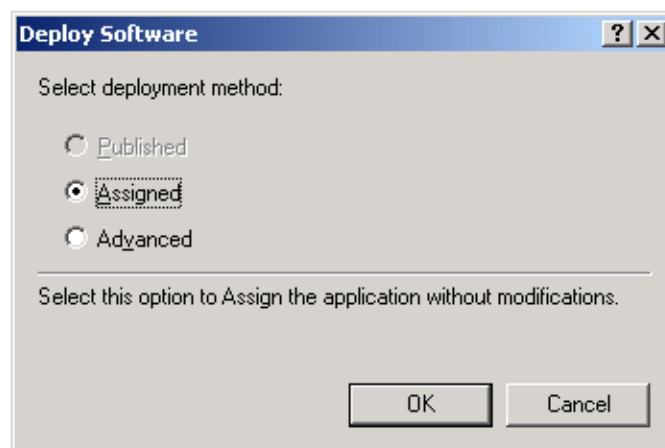
Remember: Most PowerMAN settings are made in the Computer Configuration section of the Group Policy Editor. This is because the software must be deployed to a computer (and not a specific) user. It is possible to assign individual policies to specific users or groups of users but this should only be done in an advanced installation. It is normally possible to achieve very good results without this extra complication.

7. Browse to the network share that contains the **PowerMAN Setup.msi** file and press **Open**.



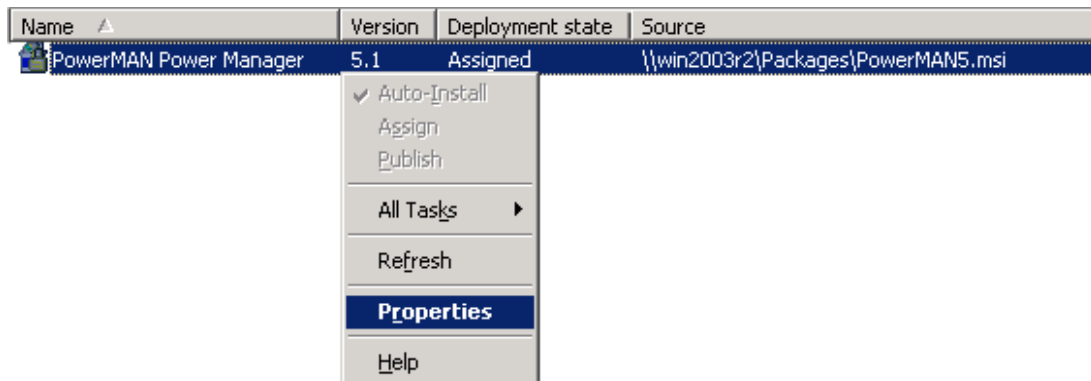
Remember: The MSI file should be placed in a **share** on the server that is accessible to the destination computers. A common technique is to grant **Domain Computers** read access of the share and underlying file system. This is explained further in the troubleshooting section below

8. Select **Assigned** as the deployment method. PowerMAN is a system application and therefore it is not appropriate to 'publish' it to users:

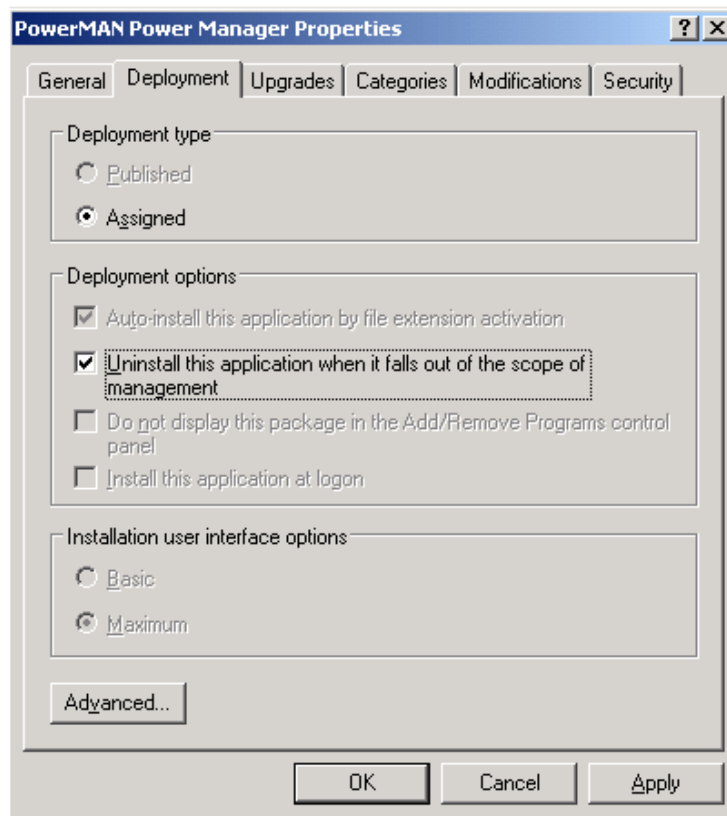


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9. Right click on the newly created package and select **Properties**:

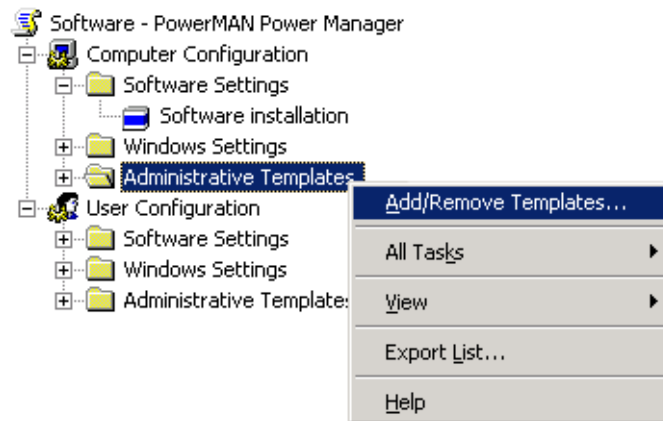


10. Select the **Deployment** tab (Advanced in some earlier service pack revisions) and tick **Uninstall this application when it falls out of the scope of management**. Click **Ok**:

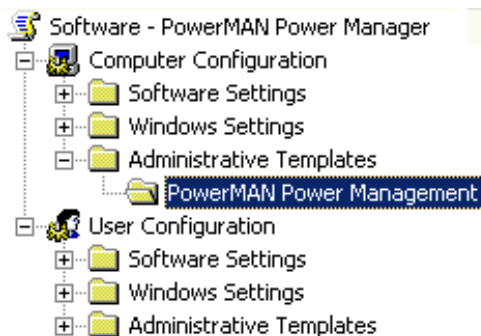


11. Navigate to the **Computer Configuration / Administered Templates**, right click and select **Add/Remote Templates**:

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12. Click **Add** and locate the **PowerMAN5.adm** file supplied. When this is completed click **Close**. It may be helpful to remove the other administrative templates present using the **Remove** button. These are not required for PowerMAN.
13. The **Administrative Templates** section should now contain a section for **PowerMAN Power Management** (other sections may be present depending on server configuration). Select the **PowerMAN Power Management** section.



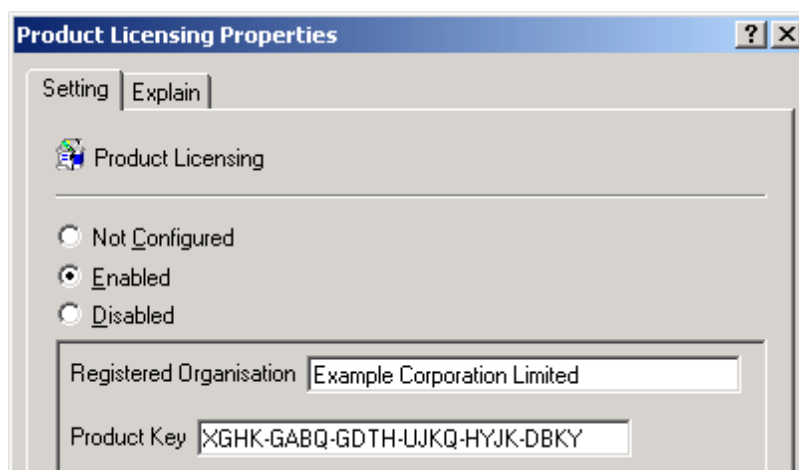
14. The right hand pane displays a list of the available policy settings:

Setting	State
Product Licensing	Not configured
Power Management and Monitoring	Not configured
Seperate DC Settings	Not configured
Hide Power Management Tools	Not configured
Hibernate (Suspend to disk)	Not configured
Keep Awake Server Service	Not configured
Ignore User Power Settings	Not configured
Scheduled Wake	Not configured
Scheduled Shutdown/Sleep	Not configured
Resume Configuration	Not configured
Protected Programs	Not configured
Protected Files	Not configured
Custom Suspend Actions	Not configured
Advanced	Not configured
Enforcement / PC Insomnia	Not configured
Global Power Settings	Not configured
No User Power Settings	Not configured
Default User Power Settings	Not configured

PowerMAN Configuration

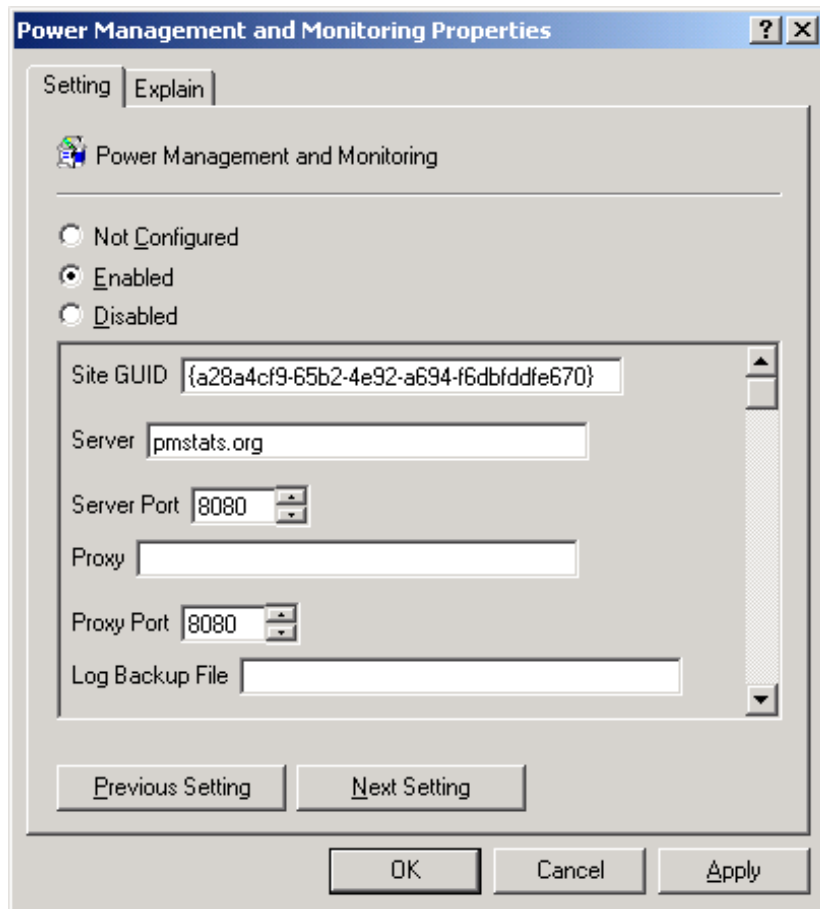
Section	Meaning
Product Licensing	Product key settings. These are required for PowerMAN to fully function.
Power Management and Monitoring	Site configuration information and report server settings
Separate DC Settings	Allow separate DC (battery) settings. This is only required for portable computers
Hide Power Management Tools	Hide standard Windows tools from users
Hibernate (Suspend to disk)	Configure hibernate (S4) feature
Keep Awake Server Service	Prevent computer from sleeping when Server service is running
Ignore User Power Settings	Ignore user specific power settings and only user Default and No user settings
Scheduled Wake	Configure scheduled wake feature
Scheduled Shutdown/Sleep	Configure scheduled shutdown/sleep feature
Resume Configuration	Configure system behaviour after automatic resume (auto wake-up or Wake-on-LAN)
Protected Programs	Settings to configure a list of protected programs that, when running, ensure the system remains active.
Protected Files	Settings to configure a list of protected files that, when present, ensure the system remains active.
Advanced	Advanced configuration and debug settings used to investigate problems
Policy Enforcement / PC Insomnia	Settings to ensure other programs or Windows cannot override the selected power policy
Global Power Settings	Power settings that apply to all users
No User Power Settings	Power settings that apply to the logon prompt user (when nobody is logged on)
Default User Power Settings	Power settings that apply to all users unless a user specific policy applies

1. Open the PowerMAN Group Policy previously created
2. Select **Product Licensing**, right click and select **Properties**
3. Select **Enabled**, carefully enter the product details supplied with the software, and click **Ok**



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4. Select **Power Management and Monitoring**, right click and select **Properties**
5. Select **Enabled** and configure the basic site and reporting settings:



The image shows the 'Power Management and Monitoring Properties' dialog box. It has two tabs: 'Setting' and 'Explain'. The 'Setting' tab is active. Inside the dialog, there are three radio buttons: 'Not Configured', 'Enabled' (which is selected), and 'Disabled'. Below these, there are several input fields: 'Site GUID' with the value '{a28a4cf9-65b2-4e92-a694-f6dbfddfe670}', 'Server' with the value 'pmstats.org', 'Server Port' with the value '8080', 'Proxy' (empty), 'Proxy Port' with the value '8080', and 'Log Backup File' (empty). At the bottom, there are three buttons: 'Previous Setting', 'Next Setting', and 'OK'. There are also 'Cancel' and 'Apply' buttons at the very bottom right.

A basic PowerMON, or PowerMAN operating in reporting-only mode, installation requires **only five** settings:

- Registered organisation name
- Registered product identification key (PID key)
- Site GUID – You can generate this with the **MAKEGUID** command
- Logging server name – The standard server is **pmstats.org**
- Logging server port – The standard server port is **8080**

Some installations may also require the following settings:

- Proxy server name
- Proxy server port
- Log Backup File

These settings may be ignored if they are not required. Please remember to ensure that your site firewall / proxy server will allow **http protocol** traffic to the logging server.

To complete the basic configuration click **Ok**

6. Close the Group Policy Object Editor and test the policy works by restarting a computer in the relevant Organisation Unit.

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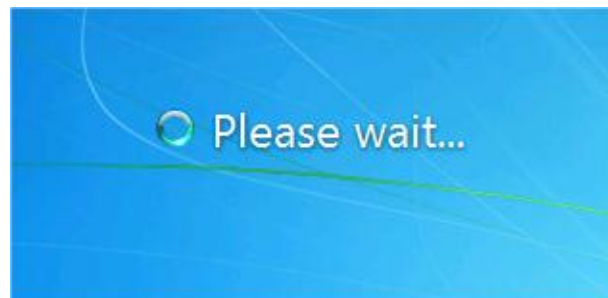
- As the computer starts you should see the PowerMAN Power Management application install prior to the display of the logon prompt. If this does not happen please consult the troubleshooting section below.

Tip: Depending upon server configuration, timing and any other pending updates a second reboot may sometimes be necessary for the agent to complete installation. This is completely normal.

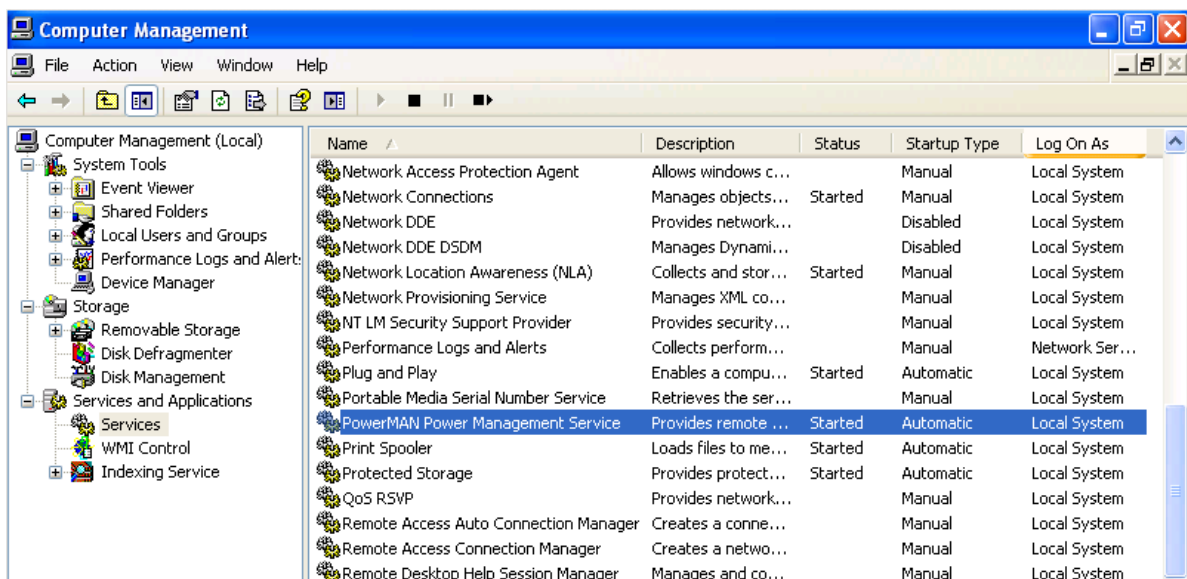
On Windows XP, for example, the following dialogue is displayed:



Whilst on Windows 7 the following dialogue is displayed during installation:

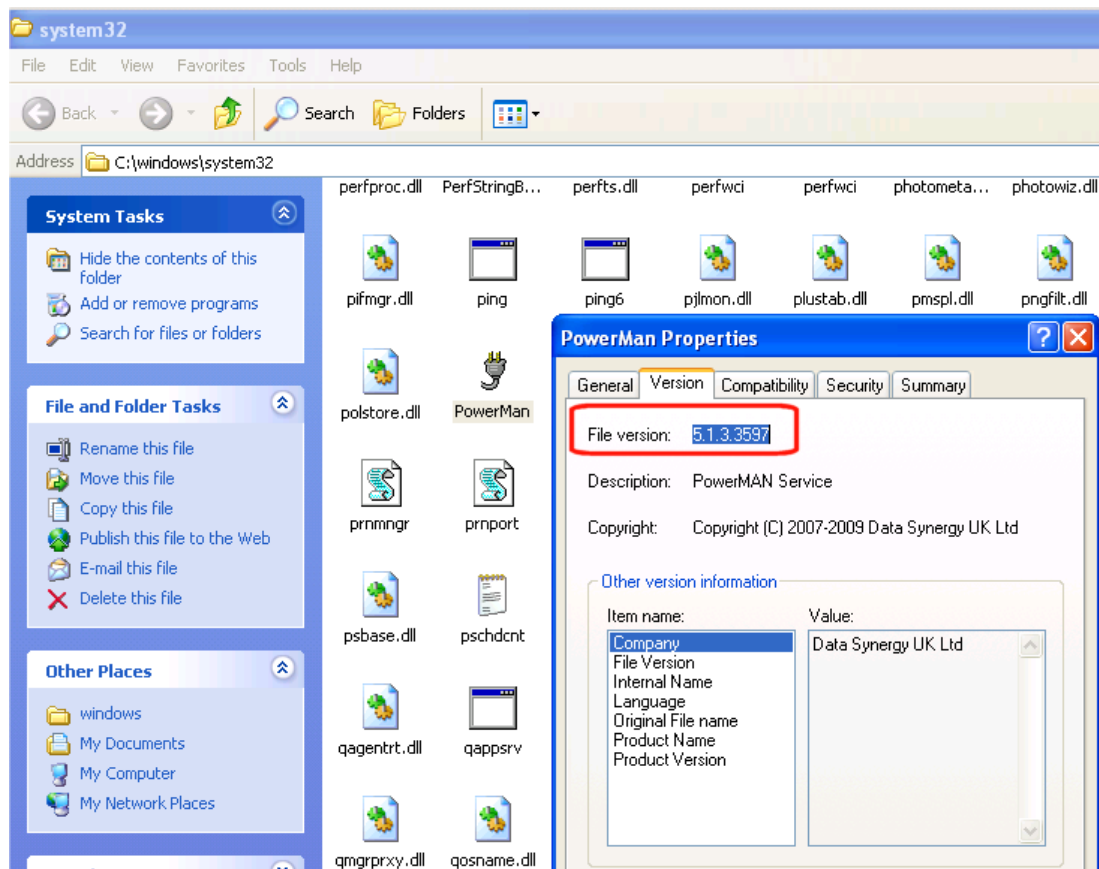


- Confirm that the service has fully installed by opening the Computer Management Console (compmgmt.msc) and checking the status of the **PowerMAN Power Management** service. The service should be already **Started** as shown below:



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- If necessary you can always verify the version of the PowerMAN service by locating the program in the **Windows\System32** folder:



Alternative SMS / XCOPY Deployment Method

PowerMAN supports a variety of deployment methods. The so-called **XCOPY** method describes the most basic, manual, technique for installing the program. This may be adapted for environments such as SMS as required. This section explains the key features of such a deployment

1. Obtain the PowerMAN Setup.msi file and install PowerMAN on the required PC. There are several alternative ways for an Administrator level user to do this:
 - Double click the MSI file and follow the on-screen prompts



- Install the silently with the following command line:

```
MSIEXEC /I:"PowerMAN Setup.msi" /qb
```
- Extract the PowerMAN.exe file from the MSI file (this may be extracted from the supplied MSI file by double clicking on the file, following the on-screen instructions and locating the installed \Windows\System32\PowerMan.exe file) and copy it to the \Windows\System32 folder on the destination computer



This last method requires the service to be separately installed. This is only required the first time. Log on with an account that has administrative rights and execute the following command:

```
POWERMAN START
```

The PowerMAN.exe file is the **ONLY** file required on the client computer.

You may optionally wish to use the separate PowerStart.exe program. This can be installed by simply copying it to the \Windows\System32 folder.

Remember: The PowerMAN service must be installed by a user with local administrative rights. It is not possible to install PowerMAN using a logon script (which runs as a user). It is possible to install PowerMAN with a computer start-up script. See the following web page for an example:

[http://technet.microsoft.com/en-us/library/cc779329\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc779329(WS.10).aspx)

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Deploy the required configuration settings using the Windows **Local Group Policy**, **REG.EXE** or **REGEDIT** tools. The section 'Alternative Configuration Method - Local Group Policy / Registry Settings' at the end of this document explains how this may be done. As noted above the minimal settings are:

- Registered organisation name
- Registered product identification key (PID key)
- Site GUID – You can generate this with the **MAKEGUID** command
- Logging server name – The standard server is **pmstats.org**
- Logging server port – The standard server port is **8080**

Deploying PowerMAN in a pre-built software image 'Ghost'-style deployment

PowerMAN fully supports deployment in a pre-built software image. This is sometimes known as a 'Ghost'-style deployment. Typically, in this scenario, PowerMAN is manually installed on a master computer and configured with the desired settings. This computer is then cloned on to multiple destination computers. There is one important thing to remember when performing such a deployment:

Remember: The `ClientGUID` setting is used to uniquely identify each computer. This is automatically generated and should not be cloned from one computer to another. If this field is removed PowerMAN will generate a unique new `ClientGUID`. If the same `ClientGUID` is present on multiple computers this will prevent the reporting feature from operating correctly. Please remember to remove the `ClientGUID` prior to creating the master software image. The easiest way to do this is to stop the PowerMAN service and then use the `RegEdit` tool to delete the setting from the `HKLM/Software/PowerMAN` registry key. This step should be performed just prior to creating the software image.

PowerMAN Configuration

PowerMAN provides support for a wide variety of power related settings. The following sections provide a summary of the supported configuration features.

Product Licensing

The **Product Licensing** settings are used to configure the unique organisation product license. These **MUST** be configured for PowerMAN to function:

Setting	Meaning
RegisteredOrganisation	The organisation that PowerMAN is licensed to. This must be spelled exactly as supplied. e.g. Example Corporation Limited
RegisteredProductKey	The unique product key (PID) required to activate the software. This is exactly six groups of four characters separated by five dashes. e.g. XGHK-GABQ-GDTH-UJKQ-HYJK-DBKY

Power Management and Monitoring Monitoring

The **Power Management and Monitoring** settings are used to configure the reporting server. These can be disabled if reporting is not required. This is, however, not recommended, because it will mean there is no direct way to measure site performance or fine tune the configuration.

Remote Management and Monitoring	Meaning
Site GUID	<p>Unique site identity used to track a group of computers that are managed as a single entity. This value can be generated with the <code>Makeguid</code> command line option.</p> <p>e.g. {5c952c78-832f-4b68-bbf3-9986262e55ed}</p>
Server	The address of the logging server. This can be blank if management reporting information is not required. The standard logging server is pmstats.org
Server Port	The port number of the logging server. This is usually either 80 or 8080. The pmstats.org server port is 8080 .
Proxy	The address of the local proxy server that PowerMAN must use to send management information to the logging server. This can be blank if a proxy server is not required.
Proxy Port	The port number of the proxy server. This is typically 8080. This value has no effect if a proxy server address is not defined.
Log Backup File	<p>Some sites frequently re-install (sometimes called re-image) workstations to ensure a smooth user experience. In such sites the most recent power usage information can be lost during a re-installation. This can be avoided by configuring PowerMAN to store a backup of the usage information. It is the responsibility of the system administrator to ensure that this file is protected during the reinstallation process by either excluding it from being over-written or by moving it to a safe location. This setting must refer to a <i>local</i> path.</p> <p>e.g. %windir%\system32\logfiles\PowerUsage.xml</p> <p>Tip: If the workstation is not frequently re-installed this setting may be left blank.</p>

Default User and No User Power Settings

The **Default User Power Settings** section provides the simplest way to quickly configure the power management policies that apply to **all** users (including when no one is logged on).

In many situations it may be desirable to employ a separate, often stricter, policy when no user is logged into the computer. For instance, it is generally fine to shut down a computer when no user is present although this may be unacceptable for a user is logged in. The **No User Power Settings** section allows you to configure a separate policy for this situation. The No User settings have the same meanings as the Default User Settings. The majority of the settings are comparable to those available in the Windows XP control panel applet (Powercfg.cpl).

The following settings are not available in the No User configuration:

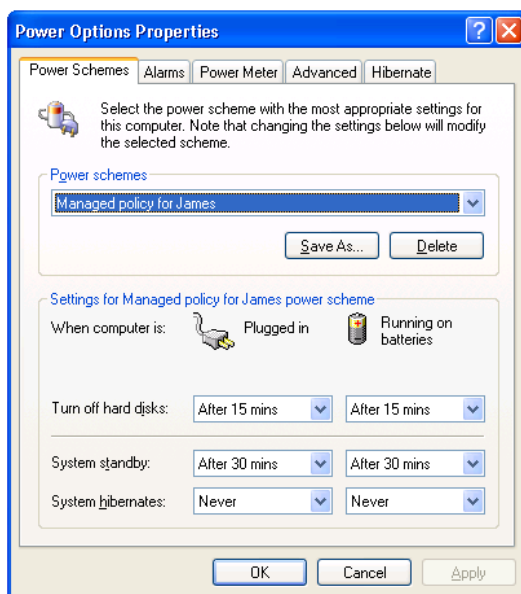
Default User Power Settings	Meaning
Logout Timeout AC	The inactive time in minutes, when running on AC (mains Power), that will trigger the user to be logged out.
Logout Timeout DC	As above but applies when running on battery power.
Force Logout	When enabled this option will force a logout. If this setting is not enabled an application may veto the logout. Typically applications do this to prompt the user to save unsaved work therefore, if this setting is enabled, user data loss may occur. This setting is enabled for environments where data integrity is not a concern.

The following settings are available for both the Default and No User configurations:

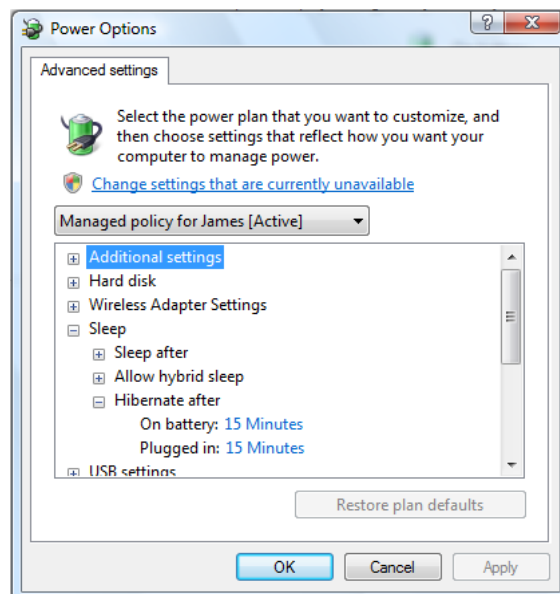
Default and No User Power Settings	Meaning
Idle AC	The action to take (shutdown, suspend, hibernate, nothing) upon entering the idle state
Idle Timeout AC	The inactive time in minutes, when running on AC (mains power), that will trigger the idle action.
Idle Sensitivity% AC	The level of sensitivity applied by Windows to detect system idle. On systems that fail to correctly idle it may be necessary to lower this (see notes below). The recommended value is 5%.
Idle DC	As per Idle AC but applies when running on battery power.
Idle Timeout DC	As above
Idle Sensitivity% DC	As above
Monitor Off AC	The inactive time in minutes, when running on AC power, before switching the console monitor off.
Monitor Off DC	As per Monitor Off AC but applies when running on battery power.
HDD Off AC	The inactive time in minutes, when running on AC power, before switching the hard disk off. NB: This policy may not be very effective on many systems that perform frequent background tasks. See troubleshooting section for further information.
HDD Off DC	As per HDD Off AC but applies when running on battery power.
CPU Performance AC	The processor throttling policy to apply when running on AC power. Adaptive – Match performance to demand

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	<p>Degrade – Maximize energy saving by reducing CPU performance</p> <p>None – Maximize performance (increased energy consumption)</p> <p>Processor throttling is not available on all hardware and is ignored if it is not supported. Energy consumption can be dramatically reduced when CPU Performance is set to degrade. This is especially useful when no user is present as it unlikely to have any adverse impact.</p> <p>See the following for additional information: http://www.microsoft.com/whdc/archive/winpowmngmt.mspx</p>
CPU Performance DC	As per CPU Performance AC but applies when running on battery power.



PowerMAN running on Windows XP



PowerMAN running on Windows Vista / 7

Scheduled PC Wake-Up

The **Scheduled Wake** option allows you to configure a time that the computer will automatically wake from the sleep or hibernate states:

Scheduled Wake	Meaning
Enable/Disable	Enable the scheduled wake policy. When this feature is enabled the computer will automatically resume from suspend or hibernate at the specified time.
Days	The weekdays that the scheduled wake policy will apply (typically All or Mon-Fri). This option may be extended by editing the ADM file. See appendix for further details.
Time (hh:mm)	The local time that the computer is scheduled to wake. Typically this value is set to be a few minutes before the user requires the computer. Remember that, depending on other power settings, the computer may shutdown or sleep if no activity occurs within the timeout period.

PowerMAN uses two complementary systems for PC wake-up.

The scheduled wake-up feature uses the timer built-in to most modern computers. This is more reliable than WOL techniques and does not require any network communication. You can test this feature on a PC by using the `SLEEPCHECK` or `HIBERCHECK` commands. The scheduled wake feature is not suitable for ad-hoc wake because the timer must be configured before the PC enters the low-power state.

The PowerMAN server system also allows you to perform ad-hoc system wake-up. This can be accomplished by clicking the link provided on the server reports or by manually forming the required wake URL. This feature requires the Data Synergy wake proxy software. This is available upon request from Technical Support.

To use a WOL based technique some computers will need this feature to be enabled. This configuration is usually accomplished in two phases:

1. Wake-on-LAN must be enabled in the BIOS. The Data Synergy DMCMOS32 tool may be used to automate this process
2. The network card must support WOL and this must be enabled in Windows Device Manager

Remember: Not all computers support scheduled wake. This is because it requires certain circuitry to be present on the computer's motherboard. In practice most modern computers do have this function. In some cases it may be necessary to modify the BIOS settings to enable this feature. PowerMAN is capable of reporting if the computer *believes* it is capable of automatic wake. This reporting information is, however, not always accurate. If in doubt please contact your PC vendor. PowerMAN Technical Support can provide further information on debugging automatic wake issues.

Scheduled wake can be especially useful when combined with an idle action of sleep or hibernate. Typically most modern systems cannot resume from the full power-off state but can resume from sleep/hibernate. This means that a system can be automatically made available at a specific time of day such as the start of a school day.

Scheduled PC Shutdown / Sleep / Hibernate

The **Scheduled Shutdown/Sleep** feature allows you to specify a scheduled time that the system will automatically enter a power saving state. This approach is generally not as power efficient as using the idle based timeout methods explained in this section but may appropriate in classrooms or similar where the usage pattern is predictable.

Scheduled Shutdown/Sleep	Meaning
Enable/Disable	Enable the scheduled shutdown or sleep policy. When enabled the system will enter the required power state at the time specified time.
Days	The weekdays that the scheduled action will apply (typically All or Mon-Fri). This option may be extended by editing the ADM file. See appendix for further details.
Time	The local time that the computer is scheduled to enter the specified state. Typically this value is set to be a few minutes after the closing of a public access area.
Mode	How to apply the specified action - This may be one of the following: <ol style="list-style-type: none"> 1. Allow user to cancel the action (the user is prompted) 2. Do not allow user cancel (the user is warned but cannot prevent the action) 3. Only if no user logged on (the action is ignored if a user is present)
Action	The action to take. This may be sleep, hibernate or power off.
Allow Resume If Necessary	<p>Allow system to wake from a low power state in order to perform another task or transition to another power state.</p> <p>This setting is typically used in environments where Sleep (S1-S3) is used during the daytime but at night additional energy saving is desired by changing to Hibernate (S4) or power off (S5). If this setting is enabled the system will wake from one state and immediately transition to the specified state. As with the scheduled wake feature this function depends upon the hardware support for scheduled wake-up.</p>
Override	Allow scheduled event to be inhibited by other programs or settings. This option can be used to prevent the event from occurring when a protected program or file is present.

Tip: Some organisations have found that power saving can be maximized without sacrificing usability by combining sleep and hibernate. In such a configuration sleep is configured as the 'daytime' idle action with a relatively low timeout value (for example 10 minutes). This means that the system will frequently sleep but is available almost instantly should the user require it. The user experience with such a light sleep is very similar to that when only the monitor is turned off. When this is combined with scheduled hibernation during non-operating hours (night) and wake at the start of operating hours the user may not even notice that the system is using power saving.

Global Power Settings (Power buttons, lid switches etc.)

PowerMAN supports the following **Global Power Settings**. These apply to all users including when nobody is logged on:

Global Power Settings	Meaning
Lid Open AC	The action to take, when running on AC power, when the computers lid (if present) is opened. Support for this feature may not be present on all hardware.
Lid Open DC	As above but applies when running on DC power
Power Button AC	The action to take, when running on AC power, when the power button is pressed.
Power Button DC	As above but applies when running on DC power
Sleep Button AC	The action to take, when running on AC power, when the sleep button (if present) is pressed.
Sleep Button DC	As above but applies when running on DC power
Lid Close AC	The action to take, when running on AC power, when the computers lid (if present) is shut. Support for this feature may not be present on all hardware.
Lid Close DC	As above but applies when running on DC power
Password on wake	Require a password when the computer wakes from sleep or hibernate. This should normally be enabled.
Show power meter	Show the power meter on the task bar. This policy should generally only be enabled for laptop computers.
Video Dim DC	Dim the screen when running on DC power. This policy is typically only supported by some laptop computers.

Protected Programs and Files

PowerMAN supports the following **Protected Object Settings**. These apply to all users including the logon prompt user:

Protected Setting	Meaning
Protected Programs	<p>Specifies a list of programs that, when running, require the system to remain awake.</p> <p>Program names should be specified without a file extension.</p> <p>e.g. CMD and <i>not cmd.exe</i></p>
Protected Files	<p>As above but applies to files. When a file in the protected list exists PowerMAN will ensure that the system remains awake.</p> <p>Files should be fully qualified and include a file extension.</p> <p>e.g. C:\CONDOR\ACTIVE.LOG</p>

Resume Configuration

By design Windows will return to the previous low power state two minutes after an automatic resume if there is no user activity. On some systems application behaviour may interfere with this behaviour or it may be undesirable.

PowerMAN's **Resume Configuration** feature allows this Windows feature to be inhibited where necessary:

Resume Configuration Setting	Meaning
Inhibit re-suspend timeout	<p>Specifies a period of time during which PowerMAN will prevent the system from returning to the previous low power state.</p> <p>If no user activity occurs during this period PowerMAN will subsequently allow the PC to return to the previous low power state. This process is terminated immediately upon any user activity</p>
Activate Display * *This feature is not supported on some hardware platforms or graphics cards.	<p>Allow the display to be turned on following an automatic system resume.</p>

Power Policy Enforcement / Anti-Insomnia

PowerMAN also supports a **Policy Enforcement / Anti-Insomnia** feature. This can be used to ensure that the specified idle action will occur and cannot be suppressed by Windows or another program. This is sometimes known as 'PC Insomnia' and is necessary on some systems where the installed software may periodically reset the Windows idle timer or otherwise prevent the system from idling.

Policy Enforcement Settings	Meaning
Extra Timeout AC	The amount of time, in addition to the specified idle timeout after which the idle action will be forced.
Extra Timeout DC	As above but applies when running from battery power.

Miscellaneous Power Settings

The separate DC power policy settings are provided for systems, such as laptop computers, that run on both AC and DC power. Typically the DC policy will be stricter to enhance battery life. For desktop computers these values should be set to the same as the AC policy.

Separate DC Settings	Meaning
Enable/Disable	Allow separate DC settings to be configured. When disabled any DC settings are ignored. This option should be set to not-configured or disabled except when configuring PowerMAN for use with portable computers. If separate DC settings are used care should be taken to ensure they are compatible with the AC settings.

PowerMAN allows you to hide the various built-in Windows power management tools. These settings are available separately, using several different policies provided by Microsoft, and is therefore provided to simplify the process with a single configuration option.

Hide Power Management Tools	Meaning
Enable/Disable	Hide the Power Management control panel applet and the Screen Saver configuration tab of the display properties applet. This setting also disables the Power Management configuration options in the separate PowerCONFIG (user override) tool. See notes below.

Remember: Only Power Users and Local Administrators can usually change the computer power settings. PowerMAN allows you to specify settings for all users regardless of their access level. The option to hide the built-in Windows tools is designed to prevent casual tampering. It will not prevent a knowledgeable Power User (or above) from loading the Power Management Control Panel applet (Powercfg.cpl) manually. This should not be a significant concern as any configuration changes a user does make will be erased the next PowerMAN updates (usually every 10 minutes). If users really require the ability to override you Administrator defined configuration you should consider either applying a separate user policy OR supplying the user with the Power Configuration tool.

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The **Hibernate (Suspend to disk)** option allows you to remotely enable the Hibernate (S4) power saving state. This is the same as selecting the checkbox on the local computers Power Management Control Panel applet. As noted elsewhere S4 is the most effective power saving state available that still retains the users (logon) session state.

Hibernate (Suspend to disk)	Meaning
Enable/Disable	Enable support for the hibernate (S4) power saving option. This is the same as ticking the hibernate option in the local control panel applet. If hibernate is not enabled attempts to hibernate will normally result in Suspend To RAM (S1-S3) instead.

The **Keep Awake Server Service** option allows you to configure the client computer to remain awake (not idle) when the Windows Server service is running. This service is enabled in a default operating installation but is sometimes disabled by some system administrators and only enabled if it is specifically required for printer or file sharing. When this option is enabled, and the Server service is running, the system will not sleep, hibernate or shutdown as a result of a power policy.

Keep Awake Server Service	Meaning
Enable/Disable	<p>When enabled and the Server Service is running, the system will not sleep, hibernate or shutdown. This option should normally be either not configured or disabled unless specifically required as incorrect configuration will result in increased energy consumption. This option has no effect if the Server Service is not running.</p> <p>Tip: The Server Service is used by Windows to provide access to your computer from other workstations. This setting may be ignored the workstation does not share any printers or folders.</p>

The **Ignore User Power Settings** option allows you to disable the separate user specific power settings on a per-machine basis. This option may be useful where you are using a combination of default user and specific user settings but on specific systems you want the default user settings to apply regardless.

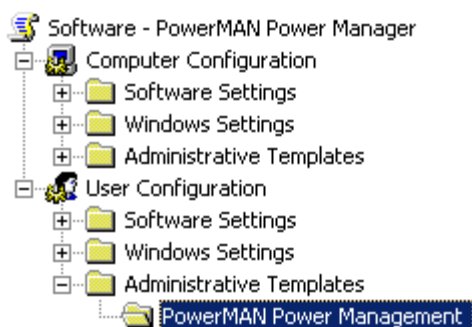
Ignore User Power Settings	Meaning
Enable/Disable	<p>Ignore any user specific power settings. When a user is logged in the Default User settings will apply. When no user is logged in the No User settings will apply.</p> <p>This setting may be used to override the specific user settings on a per-computer basis. This is ideal for shared systems or computers in a public area.</p>

Advanced Settings

Finally, PowerMAN supports the following **Advanced Options**. These are intended for resolving configuration options and should normally be used only under the supervision of PowerMAN Technical Support.

Advanced Settings	Meaning
Ignore Active Flag	When enabled this option will ignore other related tools (such as PowerCONFIG and PowerSTART). This means that non-user activity will not be reported and will be counted as idle time. This also means that such activity, or the user configuration in PowerCONFIG, will not prevent the idle or logout policies from functioning. Use this option to enforce a policy regardless of user preferences.
Host polling interval ms Note: This value is in milliseconds	How often PowerMAN checks the current power status. This should happen at least once per minute. The default setting is 58 seconds.
Policy update interval ms Note: This value is in milliseconds	How often PowerMAN updates the active power settings. Typically PowerMAN checks the system every 10 minutes. This option may be used to speed up (or slow down) this process. Warning: Values below 30s can have a very detrimental impact on system performance.
Upload timeout ms Note: This value is in milliseconds	How long PowerMAN will wait for the server before terminating an upload attempt. The default is 5 seconds
Event Logging	The amount of information reported in the Event Log. This setting may be changed to increase or reduce the amount of information reported.

Distinct User Power Policies



All of the PowerMAN settings described above are applied within the **Computer Configuration** branch of the Group Policy Object Editor. They apply to all users and are the simplest way to quickly implement an effective power management policy.

In some cases it may be necessary to apply **additional** policy settings for specific users or groups of users.

Tip: PowerMAN can be very effectively implemented **without** creating any separate user based policies. These are only necessary when specific users need to deviate from the standard policy and should be the exception rather than the rule. If this approach is taken please remember to continue to configure No User (logon prompt) and Default User (everyone else) policies to ensure you achieve the most effective coverage. The user policy should **always** be created using a separate Group Policy Object to that used to install and configure the PowerMAN service.

To create a separate user policy you must create a separate Group Policy Object for the user settings. This is necessary because the normal policy is applied on a per-computer basis. To perform this configuration:

1. Open the **Group Policy Management Console (GMPC)**
2. Locate the Organisational Unit (OU) to which you wish the initial policy to apply
3. Right click the OU and select **Create and Link a GPO here**
4. Enter a name of the new policy and click **Ok**. The example creates a policy called **Software – PowerMAN Power Manager**
5. Select the newly created policy, right click and select **Edit**
6. The Group Policy Object Editor should open
7. Navigate to the User Configuration section and expand the **Administrative Templates** section
8. Right click and select **Add/Remote Templates**
9. Click **Add** and locate the PowerMAN5.adm file supplied. When this is completed click Close. It may be helpful to remove the other administrative templates present using the Remove button. These are not required for PowerMAN.
10. Configure the **User Power Settings** using the same method as outlined above for the Default User Settings

Getting the most from PowerMAN

Baseline existing environment

PowerMAN will work best if the existing environment is measured before any power management is attempted. We therefore recommend that the software is used for monitoring only during the first few weeks of operation. After a consistent pattern has emerged this may then be used to inform decisions about which power management policy settings to use and then quantify the effect of those settings.

The software offers many different ways to manage power effectively. The following section explains best practices and provides some useful tips on getting the most from PowerMAN.

Timeout or schedule based power management?

PowerMAN allows both (idle) timeout and scheduled power management actions to be configured. Each has advantages and in some cases they may be used most productively together:

- **Timeout Strategy** – The Default User, No User and specific user policies allow an idle timeout to be defined. This is very similar to the basic configuration available in the Windows Control Panel Power applet. A timeout strategy allows each computer to respond dynamically to its environment. This will normally maximize any power savings but does mean that each computer will behave independently. This may be unsuitable for some environments such as timetabled rooms in schools.
- **Scheduled Strategy** – The scheduled shutdown / sleep / hibernate policy allows a specific action to occur at a specific time. This is ideal for environments with a predictable usage pattern or where independent computer behaviour may be disruptive. Unless computer utilisation is very high it is unlikely that a scheduled strategy alone will achieve the savings possible from a timeout driven approach.
- **Combined Strategy** – In some environments a combination of the two strategies may be ideal. A common approach is to use a light sleep timeout driven strategy for 'daytime' periods. This has the advantage of a fast resume time and minimal disruption. This can be complemented by a nightly full shutdown or hibernation strategy.

Complementary PowerMAN features

Consider using the following additional options to improve results:

- **No User Policy** – It is often possible to use a more aggressive power management strategy when nobody is logged on. PowerMAN allows a distinct policy to be defined for this situation.
- **Logout Policy** – Sometime operating environments (such as school or university computer rooms) have a very high turn-over of users. It would be inappropriate to enable an idle policy, whilst a user was logged on, in such environments as this may result in a computer being locked for subsequent users.

A logout policy can be used in combination with the No User policy to ensure that the user is not logged on before the appropriate idle action occurs. This approach can also benefit usability because it allows Sleep or Hibernate to be configured as the idle action when no user is logged on which means the system can become available again to the next user in a reduced time.

- **Policy Enforcement** – Sometimes the installed software may prevent the computer from becoming idle. As noted elsewhere in the documentation there are numerous legitimate reasons for this (such as a Microsoft Office PowerPoint slide show) where this is desirable. Unfortunately this can also happen when not intended and can result a significant additional amount of energy waste. If this appears to happen the policy enforcement feature may be used to configure an **additional** time, after the last user input, after which the idle action will be forced.
- **Scheduled Shutdown/Sleep** – Alternatively, the scheduled shutdown/sleep policy may be used as a 'catch-all' policy to ensure that systems are put shutdown or configured to use less energy at certain times of the day. This approach can prove very effective where the usage pattern is predictable.

Tips for an effective PowerMAN deployment

As you move towards using PowerMAN for actual power management the following tips may help with project planning:

1. Think about your users and their usage pattern. Are your user-computer relationships persistent? Will the same user use the PC next time? If the same user will be the next person to use the PC then using hibernate / sleep may be ideal.
2. If the users change frequently then hibernate or sleep may result in the computer being locked for the next user. In this case a forced logout may be a good approach. When the user has been logged out you can then implement your chosen power management strategy using a 'No User' policy.
3. PowerMAN offers several different policy management policies. Most organisations implement a standard 'Default User' policy. If appropriate you may also wish to implement a 'No User' policy for when nobody is logged on. This is a good opportunity to use full power-off (shutdown) when nobody is logged on.
4. Idle (timeout) strategies generally save more energy because they allow each computer to respond independently to its environment. This works well in some environments but may be unacceptable in others with a more rigid operating schedule (for instance school classrooms).
5. Alternatively you may like to use a scheduled strategy (scheduled hibernate etc.) as you primary management mechanism. Depending upon your environment this may be a cruder approach but have the advantage of being consistent on every PC and therefore more suitable for your users.
6. Some organisations use a mixture of Idle and Scheduled approaches. This can work very well with the 'daytime' idle timeout being used for a 'light' sleep and the night-time scheduled shutdown being used to clean-up and maximize savings over night.
7. Whatever approach you use please remember that PowerMAN will work most consistently if you:
 - Always define a Default User policy - even if it is configured to do nothing
 - Always define a Global policy for hardware buttons etc. - even if the configuration is trivial this will ensure consistency. This step is particularly useful on Windows XP where pre-existing power management configuration may sometimes cause a conflict.

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- Remember to enable hibernate if you plan to use this power saving mode
- Enable 'Policy Enforcement' to ensure consistent application on PCs suffering from PC Insomnia.

Common Scenarios

The following table provides common scenarios and suggested PowerMAN strategies:

	Scenario	Suggested Strategy
Workplace User dedicated PC	Same user uses PC every day. Locked workstations are not a problem. Majority of users leave systems on to avoid start-up delay and preserve work or allow remote access	Sleep / hibernate systems when not in use. This preserves system state ready for later access. Schedule wake for start of working day. Configure system for remote wake if remote access required
Hot desk office Non-dedicated PC	Different user uses PC every session. Locked workstations are not acceptable. Users frequently change and therefore data preservation for extended periods is not required. No requirement for remote access	Log out / shutdown systems not in use. Use log out / hibernate to minimize delay at start-up. If appropriate use scheduled wake / shutdown to match user usage pattern
Public access area Multiple regular users	Users frequently change and may not have unique logons. Therefore data preservation is not required. It is not desirable for users to shut down system. Majority of systems left permanently powered on.	Configure default power settings to sleep system after a few minutes of inactivity. User pressing any key (or even moving mouse) will wake system within a second. If appropriate use scheduled wake to ensure system available during opening hours

Example Settings

As noted above the recommend approach following an initial deployment is to wait several weeks and monitor the site. This will give you a baseline against which to judge the various policies you may consider applying.

It works best to start gradually and apply policies over several weeks monitoring the energy saved and any impact on users. The settings may be edited using the Group Policy Object Editor described above (access this through the Group Policy Management Console).

A typical site scenario would proceed as follows:

- Deploy and determine baseline usage. This may typically take several weeks
- Apply some relatively non-intrusive settings. Some examples could be:

No User Power Settings (Logon Prompt)

NB: It is safe to turn off the PC when nobody is logged on

Idle AC	Power Off
Idle Timeout AC	15 minutes
Idle DC	Power Off
Idle Timeout DC	15 minutes
Monitor Off AC	5 minutes
Monitor Off DC	5 minutes
HDD Off AC	2 minutes
HDD Off DC	2 minutes

Default User Power Settings (Apply to all users)

Logout Timeout AC	Disabled
Logout Timeout DC	Disabled
Force Logout	Disable
Idle AC	Do nothing
Idle Timeout AC	NA
Idle DC	Do nothing
Idle Timeout DC	NA
Monitor Off AC	10 minutes
Monitor Off DC	10 minutes
HDD Off AC	Do nothing
HDD Off DC	Do nothing

- Enable policy enforcement (anti-insomnia). This will ensure that selected power settings operate as intended and are not interrupted by application behaviour. The enforcement feature allows a 'grace' period to be defined. After this additional time has expired PowerMAN enforces the selected power management behaviour:

Extra Timeout AC	5 minutes
Extra Timeout DC	5 minutes

- Remember to ensure hibernate is enabled if this power management is to be used. The simplest way to do this to use the PowerMAN setting:

Hibernate (Suspend to disk)	Enabled
------------------------------------	---------

- After allowing a period to establish the effectiveness of these settings you may wish to go further. Typically the most gains can be made by reducing the time allowed before a computer turns off or hibernates:

Default User Power Settings (Apply to all users)

Logout Timeout AC	Disabled
Logout Timeout DC	Disabled
Force Logout	Disable
Idle AC	Hibernate
Idle Timeout AC	15 minutes
Idle DC	Hibernate
Idle Timeout DC	15 minutes
Monitor Off AC	5 minutes
Monitor Off DC	5 minutes
HDD Off AC	5 minutes
HDD Off DC	5 minutes

- Follow-up the deployment to ensure that the policy is working as desired. This can easily be achieved by monitoring the reported power statistics.

Maximizing Savings

Each organisation has specific operating requirements that will require tailored power management settings. Often the perceived drawbacks of using active power management can be overcome by both a careful deployment and by keeping the users informed. The following tips may help maximize savings:

1. The monitor and hard disk settings may be used to reduce energy consumption without risking user data. These should generally always be enabled.
2. Similarly the CPU performance settings can be used to reduce energy consumption with minimal impact on users. Typically these should be set to 'Adaptive' when a user is present and 'Degrade' when no user is present.
3. Screen savers consume energy. Consider turning the monitor off rather than enabling a screen saver.
4. Most modern programs fully support sleep or hibernate. These may be used to save energy whilst preserving the user session and any open documents. Sleep and hibernate are most appropriate when the PC is used by the same long-term user.
5. When the computer is regularly used by many users (for instance in a hot desk or public access area) sleep or hibernate are rarely appropriate policies for when the user is logged on. This because both lock the workstation for subsequent users. Instead consider using a logout policy to prevent the system being hogged by an absent user. Typically it can be quite simple to determine a suitable timeout after which the user is assumed to have 'abandoned' the computer.
6. The power settings appropriate when a user is logged on may be very different from those appropriate when no user is logged on. PowerMAN allows separate user and No User policies to be easily defined. Ideally a power policy should be configured in both situations (even if the user policy doesn't implement an idle action it can still save significant energy by turning the monitor off or logging the user out after the specified period).
7. Power off does not need to be the default action – hibernate or sleep can be used as idle actions when no user is logged on to allow the next user to rapidly logon and become active.
8. Similarly PowerMAN can resume the PC from one sleep state to transition to another. This can be effectively used to use a light sleep (S1-S3) during the daytime when the system is idle but transition to power-off or hibernate (S4) at night time.

Excluding Specific Computers

Normally it is possible to apply the same power management configuration to each computer within an organisational unit (OU) and use a separate OU for each logical power policy. However, sometimes this may not be desirable or it may not be practical to re-arrange the OUs to match the required power scheme. In this scenario the Protected Files feature may be used to exclude specific computers.

To use this procedure proceed as follows:

1. Create an empty text file which matches the computer name. One way to do this is to use a computer start-up script to execute the following batch file:

```
echo %computername% > c:\%computername%.txt
```

2. Use the Protected Files feature to exclude the `c:\%computername%.txt` file. For instance the following settings would exclude three computers:

```
c:\CriticalPC.txt  
c:\OfficePC.txt  
c:\FaxServer.txt
```

The following Microsoft document provides further information on computer start-up scripts:

[http://technet.microsoft.com/en-us/library/cc779329\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc779329(WS.10).aspx)

Alternatively, Group Policy itself may be used to exclude certain computers using Security Filtering. This is explained in the following Microsoft article and related discussion:

[http://technet.microsoft.com/en-us/library/cc781988\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc781988(WS.10).aspx)
<http://adisfun.blogspot.com/2009/04/security-filtering-and-group-policy.html>

Viewing PowerMAN statistics

To view the statistics for a site visit the following URL adding the appropriate Site GUID value (this is the value created when PowerMAN is deployed). For instance for the site {bf4c090c-9d22-4c82-8869-b63497040d01} the URL would be:

<http://www.pmstats.org:8080/SiteSummary.aspx?SiteGUID={bf4c090c-9d22-4c82-8869-b63497040d01}>

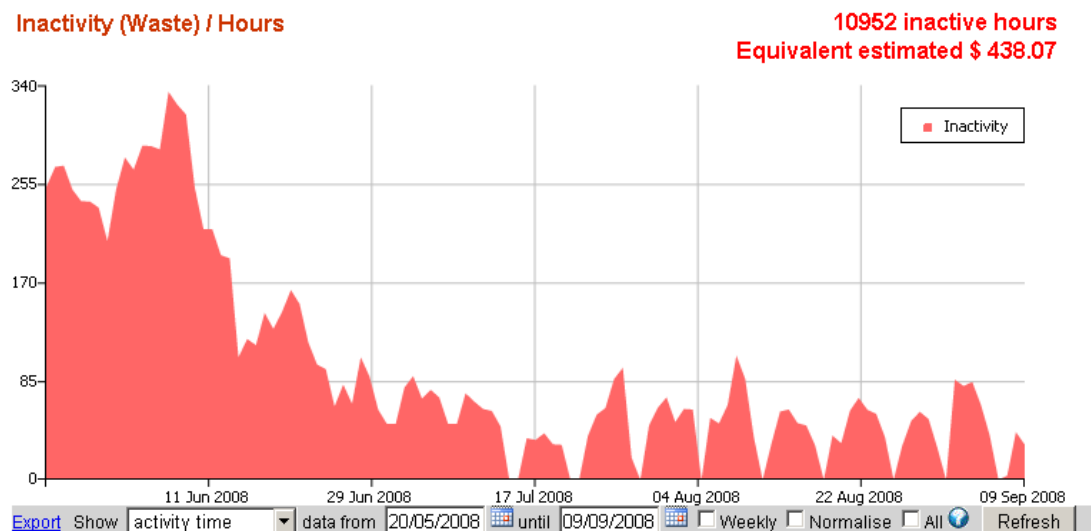
Due to the nature of standard PC hardware it is not possible to calculate an exact amount of energy (in watts) for each PC. This is because the PC architecture does not provide a standard method for measuring this. Therefore PowerMAN measures the following key factors:

- Cumulative time the computer is turned on
- Cumulative time the computer is in active use

From this information it is simple to calculate the time the computer was **not being used**. This is expressed as a number of hours '**idle**'. This figure is directly proportional to amount of energy being wasted.

PowerMAN also measure other power related factors such as: The amount of time the hard disk is spun down, the monitor off, the computer was artificially prevented from sleeping by user configuration etc. In future revisions of the reporting software this information will be included giving a more detailed picture of the power consumption profile.

The Site Summary graph gives a fast, visual, indication of the amount of waste. Over a number of weeks progressive increases in the amount of power management can significantly reduce the amount (and cost) of waste.



Example: A typical PC consumes 150W. This is equivalent to 0.15kWh. Therefore, for a medium sized site of 350 computers, where the total site wasted hours for a week is 47040, and the cost of the electricity \$0.15 per kWh the calculation would be:

$$0.15 \text{ kWh} \times 47040 \text{ hours/week} \times \$0.15 / \text{kWh} = \$705.60 \text{ per week}$$

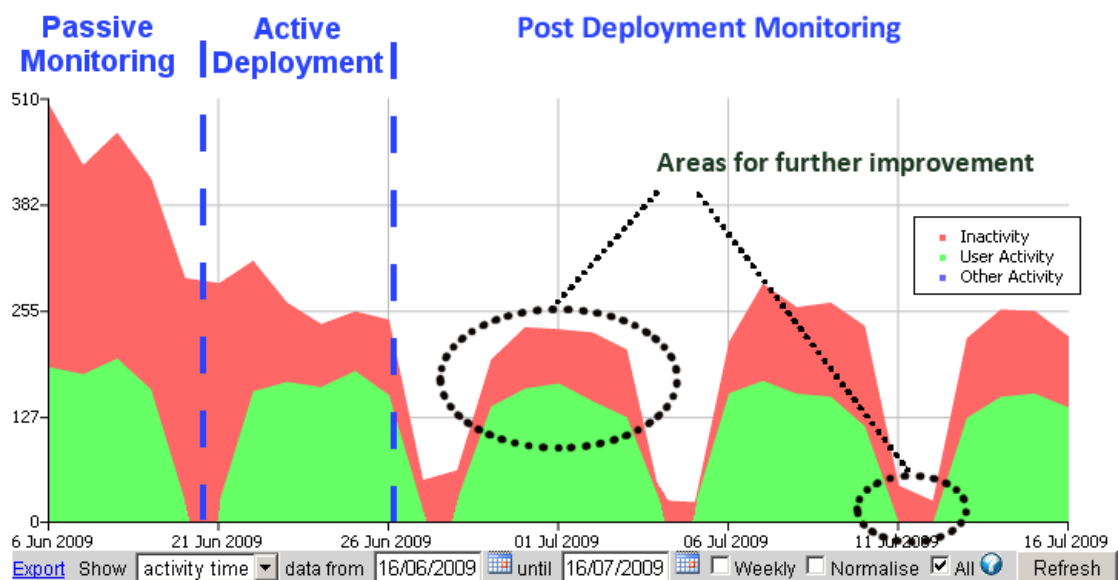
This is equivalent to a yearly cost of over \$36,000.

A useful **rule of thumb** is that office based computers are used 25% of the time (40 hours per week). If the computers are not shutdown at other times the waste period is up to 75%. With suitable configuration PowerMAN can virtually eliminate this waste.

Typical deployment phases

A typical deployment is divided into three distinct phases:

- An initial period of **passive monitoring**. This allows a baseline usage profile to be established
- Deployment of an **active power policy**. This is designed to reduce energy from the established baseline. Often the specific settings used are chosen based upon both the results of the monitoring phase and existing knowledge about the usage pattern and user requirements
- A **post deployment monitoring** phase. In this phase the power policy is monitored and areas for possible further improvement may be identified.



How PowerMAN Works

PowerMAN installs a service application POWERMAN.EXE on each computer. The service spends the vast majority of the time idle and therefore does not have any measurable impact on system performance. Periodically (every 5-10 minutes) the service checks the current status of the computer. This process only takes a fraction of a second.

During each cycle the program:

- Determines if the system has recently been accessed by a user
- Checks for the managed power scheme ('Managed policy for [username]')
- Creates the power scheme if necessary
- Updates the scheme settings according to the administrator configuration

PowerMAN uses the built-in power management features of Microsoft Windows wherever possible. This is why the current PowerMAN settings can be viewed through the standard Control Panel tools. This approach means that PowerMAN works alongside Windows wherever possible and allows the software to achieve maximum software compatibility. PowerMAN does implement some features (such as policy enforcement and user logout) internally. This is necessary because these features are not available in Windows.

PowerMAN is fully capable of configuring the power management settings for users who are not permitted, themselves, perform this action. Unlike most other solutions for power management this is achieved without lowering any of the security safeguards built into the operating system. In addition PowerMAN provides finer control not normally available including:

- Default user power policy
- Separate policy for the logon prompt screen (when no user is logged on)
- Separate policy per user (if required)
- Scheduled wake, shutdown, sleep and hibernate
- Policy 'enforcement' to overcome PC 'insomnia' issues
- User override (for permitted users)
- Protection for specific programs or files from power management
- Full management reporting

PowerMAN is invisible to users and is active less than 0.01% the time.

Additional PowerMAN Features

External PC wake-up gateway




PowerMAN includes the facility to wake, on demand, any PC within the managed site. This allows a PC, perhaps required by a remote worker or Technical Support to be activated when powered down.

This is achieved by using the Wake-On-LAN (WOL) feature present in most modern computers. To wake a suitably configured PC a **wake gateway** must be present on your network. This allows the PowerMAN server to send a WOL request to the PC.

The gateway provided with PowerMAN is called **Wake Proxy** and is available upon request from PowerMAN Technical Support. Wake Proxy requires a computer (which does not need to be a server) with an internet facing networking connection to be running Microsoft IIS 5 or later (Windows 2000 or later).

For suitable configured site a PC can be simply awoken by using the 'wake' link on the PowerMAN website:

Technical / TECHSUPPORT5

Site	Technical		
Computer	TECHSUPPORT5 Wake	MAC Address	00-11-2f-28-76-44
Created	08/11/2007	Client Version	5.1.1.3472
Last Status	20/07/2009	Windows® Version	5.1.2600 Service Pack 2
Supports States 	S1345	Timezone 	0.0 hour(s) UTC
Supports Wake 	S1234		

Wake-On-LAN (WoL) is not a mature technology and can fail for a number of reasons which are beyond PowerMAN's control. The most common issues are:

- WoL typically uses broadcast network packets. These are not routable and therefore only work within the local sub-net. This why the Wake Proxy is necessary. It may, in some cases, also be possible to re-configure your router to forward WoL packets
- A typical WoL implementation does not include any security. It is possible to wake an arbitrary PC on the local sub-net. This should not normally be a significant security concern
- WoL must be enabled in the system BIOS and usually in Windows Device Manager. There is sometimes a degree of trial and error required to get WoL working

PowerMAN on Windows Vista / Windows 7

There are minor differences between operation on Windows XP and later editions. When running on Windows Vista and Windows 7 the additional power settings, not built-in to Windows, are visible in the Control Panel power applet. This feature is not available on Windows XP.

Due to operating system differences the following minor features are not currently supported on Windows Vista and later. These features may be configured but will have no effect:

- Video dim setting
- CPU throttle setting
- Hide power applet setting
- Power meter setting
- Lid open action

In addition the following Windows Vista / Windows 7 features cannot currently be configured by PowerMAN:

- Hybrid Sleep - this can be configured using the policy settings provided with Windows

Troubleshooting

PowerMAN is a very reliable program but problems do sometimes happen. Most issues arise during installation and can normally be solved quickly. The following section details some of the most common issues and explains possible solutions for them:

Problem: PowerMAN does not deploy correctly using the GPO method

This can occur for a number of reasons. The following should be considered:

1. Do other programs deploy correct via Group Policy?
2. Is the client computer within the correct Organizational Unit (OU)?
3. Are there any errors in Event Log?

If PowerMAN is the first program to be deployed via GPO there may be an underlying problem with the domain or active directory configuration. The following should be checked:

- Do other applications deploy successfully using the group policy mechanism from the same file-share? Sometimes applications are inadvertently configured to deploy from a local drive letter (on the server) and not a publically available share.
- The client computer is within the correct Organisational Unit (OU). This can be checked with the **Active Directory Users and Computers** snap-in (dsa.msc)
- The PowerMAN MSI is in share accessible (read access) to the **computer account** of the client PC. Sometimes there may be NTFS access restrictions that are stricter than the share permissions. Both types of permission should be checked. The easiest way to achieve this is to grant a Read Access to the group **Domain Computers**.

Remember: The Windows group policy engine runs in the security context of the computer account. Therefore the share and underlying NTFS permissions must grant access to this account. The effective permissions are the lowest common denominator of the share and NTFS permissions.

- Another policy or application may be preventing installation. This can be checked with the Resultant Set of Policy (RSOP.MSC) tool provided with Windows. The error tab contains information about policy deployment problems.
- Is the problem resolved by disabling Asynchronous policy deployment (see **Computer Configuration\Administrative Templates\System\Logon** in the Group Policy Object Editor)?
- Is the problem resolved by restarting the computer twice? Depending upon other group policies scheduled for installation and removal it can take up to two additional reboots for PowerMAN to install. This situation can also happen if the MSI and license settings are deployed separately because PowerMAN will not start until the product license key is present.

Microsoft also provides some advice on debugging GPO based deployment issues:

[http://technet.microsoft.com/en-us/library/cc787386\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc787386(WS.10).aspx)

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[http://technet.microsoft.com/en-us/library/cc775679\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc775679(WS.10).aspx)

Microsoft also documents a scenario where a network timeout problem can prevent effective Group Policy application. The following document explains this and provides links to the necessary Windows hotfix:

<http://support.microsoft.com/kb/840669>

In some cases it may be necessary to investigate further by enabling 'verbose' MSI logging. This can be enabled on the client computer by creating the following Registry value:

Key: HKEY_LOCAL_MACHINE\Software\Policies\Microsoft\Windows\Installer

REG_SZ: Logging

Value: voicewarmup

This will create log files in the %temp% folder (\Windows\Temp for standard Group Policy MSI deployment. The users' own temporary folder for manual MSI deployment). This following document explains this in detail:

<http://support.microsoft.com/kb/223300>

After this setting has been enabled, reboot the PC, and allow Windows to attempt the MSI installation again. When this process has completed (or nothing has happened) log into the machine and check the log files created in the \Windows\Temp folder.

If this technique does not reveal the cause of the problem it may also be useful to enable 'verbose' logging for the Windows Group Policy engine. Please remember that this is an advanced technique and it may take some time to decipher the log files. You can enable this logging by creating the following registry value. It may also be necessary to create the Diagnostics key if one is not already present.

Key: HKEY_LOCAL_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\Diagnostics

REG_DWORD: AppMgmtDebugLevel

Value: 0x4b

After this setting has been enabled, reboot the PC, and repeat the installation process described above. The Group Policy engine will create a file called Appmgmt.log in the C:\Windows\Debug\Usermode folder. This is further explained here:

<http://support.microsoft.com/kb/246509/>

NB: You may also need to create the Usermode folder if it does not already exist.

Problem: The PowerMAN application appears to deploy okay but the configured policy doesn't seem to deploy consistently

This is commonly caused by attempting to apply invalid power settings. Please check the Power Management Event Log to determine the cause of the problem.

This can also be caused by attempting to configure the majority of settings against a User object rather than a computer. The following guide lines should be applied:

- The PowerMAN service should be deployed to computers (not users)
- The majority of the settings should also be deployed to computers
- If a specific user policy is required this should be deployed using a **separate group policy** to the users

Problem: PowerMAN appears to be deployed okay and the required settings are displayed in the Control Panel Power Management applet but the computer does not shutdown/hibernate/sleep as expected

OR PowerMAN reports event #2003: The computer is being prevented from entering the idle state by an unknown program

Some programs can inhibit the Windows idle timer and effectively force the computer to remain awake. There are many legitimate reasons for this. For instance:

1. Microsoft PowerPoint forces the computer to remain active when displaying a slide show
2. Microsoft Word has been seen to prevent the computer from sleeping when editing a document.
3. Microsoft Windows will force the computer to remain awake if remote users are accessing local resources (such as printers or files) through a Windows share.
4. Cyberlink PowerDVD (or similar) forces the computer to remain active when playing a DVD
5. The PowerMAN PowerCONFIG or PowerSTART tools can be used to force the computer to remain active when other programs are running or the user has specified the system cannot sleep

When this happens too often or is undesirable it can prevent timeout driven power management from working effectively. This can be because of deliberate application behaviour, intermittent activity bursts, or because of non-power management aware application development practices. This is sometimes known as 'PC Insomnia'. For instance:

1. Background activity such as anti-virus scanning, system updates (for instance Symantec Endpoint Live Update or Windows Update) or automatic system optimization (such as hard disk defragmentation) may cause the system to be relatively busy.
2. Foreground activity such as a screen saver may keep the system artificially busy. Some screensavers may intermittently perform more intensive activities that result in the idle timer being periodically reset.
3. Some (mainly optical) mice can infrequently (or worse continuously) send small movements resulting the illusion that the user is active. This can sometimes happen in the presence of florescent light.

PowerMAN reports this problem in the Power Management Event Log. Typically this is reported as Event #2003: "The computer is being prevented from entering the idle state by an unknown program"

The following steps should be performed to locate the cause of the problem:

1. Check the Event Log. PowerMAN logs to ensure that the desired policies have actually been applied (with no errors) and that no other program is keeping the system awake.
2. Enable the Policy Enforcement settings and re-test. In most cases the system will perform the configured idle action as expected. If this option resolves the problem then one or more of the installed programs were preventing the idle action from occurring.
3. Enable additional event logging (located in the Advanced configuration section) and restart the computer or PowerMAN service. After a few minutes check the Power Management Event Log for additional information.

4. Enable the debug log file (Advanced\All Information + Debug Log) and restart the computer or PowerMAN service. After a few minutes stop the PowerMAN service and examine the log file (see the section below on using the debug log file for more information) to determine if the system is being prevented from entering the idle state because of hardware input (mouse / keyboard) or system activity. It can sometimes help to plot the idle time remaining field using a charting tool such as Microsoft Excel. This may help you visualise the timer behaviour and understand what is happening. Often this can result in a 'saw-tooth' pattern as the timer periodically resets. There is an example of this later in this guide.
5. Reduce the idle sensitivity to a much lower value. This change increases the threshold of system activity that Windows uses to reset the idle timer. Try reducing the sensitivity to 5%.
6. Unplug the mouse and the keyboard and determine if the problem is resolved. Sometimes a faulty input device (especially an optical mouse) may be the cause of the problem.
7. Unplug the network cable and determine if the problem is resolved. If the Wake-On-LAN (WOL) feature is not required disable it. If the network card supports wake on 'directed packet' (using IP address) and this feature is not actually required try disabling it.
8. Confirm that the system will reliably sleep and/or hibernate (and resume again) on demand by using Windows Task Manager and selecting the appropriate option from the Shutdown menu.
9. Stop all running programs (one at a time if necessary) and wait for the computer to enter the idle state. This can most quickly be done by disabling PowerMAN (stop the PowerMAN service) and manually setting the idle timeout to 1 minute.

If the above steps do not reveal the cause of the problem PowerMAN Technical Support will be able to offer further debugging steps to find the cause of the problem.

Problem: A Hard Disk (HDD) spin-down policy has been applied but doesn't seem to do anything. The hard disk always remains powered on.

Unfortunately for power conservation modern installations of Windows remain stubbornly busy even when no user is present.

Unlike earlier revisions such as Windows 95/98, Windows XP includes a number of optimization features that are designed to run in the background. Coupled with the typically large number of other background services this means that many systems are never idle long enough for the system hard disk (the one containing Windows) to switch off.

On fresh OS installation it is sometimes possible for the hard disk to spin-down, in practice however, many real-world installations do not because the required level of inactivity never occurs. It is, however, quite common for systems with multiple drives to reach a point where one drive is not being used and therefore that drive will spin-down as expected. (See the next problem below for the side effects that result from this)

PowerMAN Technical support can advise on possible actions that may improve the situation.

Problem: After enabling a Hard Disk (HDD) spin-down policy the system may sometimes freeze momentarily

If the hard disk becomes idle (see above problem) for a sufficient period it will spin down to save energy. When the system is activated again (for instance by a user moving the mouse or pressing a key) the hard disk is accessed again and usually takes several seconds to spin up. During this time the system may appear to freeze momentarily.

As noted in the previous problem it is quite unusual for the system hard disk to become idle enough to spin down. However, in systems with more than one hard disk it is quite likely that the secondary drives will power off after a period of inactivity. Therefore this symptom is usually more apparent on such multi-drive systems.

Typically this problem can be resolved by increasing the HDD policy timeout to the same value as the monitor timeout. This means that the HDD will spin-up at the same time the monitor powers on and therefore the delay will not be apparent to the user.

Problem: PowerMAN reports that there are fewer computers than expected in the site

OR PowerMAN reports many more computers than expected in the site

OR PowerMAN reports unexpected duplicate computer names within the same site

OR PowerMAN reports computers that seem to be on more than 24 hours a day!

OR PowerMAN is deployed using an image based Windows installation and only one client is reported. The service appears to be operating okay on each computer

These symptoms are commonly seen in the following circumstances:

1. A problem is preventing PowerMAN being deployed correctly. This will reduce the number of computers registered in the site
2. Computers containing a working PowerMAN installation are cloned using imaging software such as Symantec Ghost.

PowerMAN uses a randomly generated identity (called the ClientGUID) to distinguish each computer within a site. If an image is deployed with such an identity PowerMAN is unable to determine this has happened and therefore all computers have the same identity. This can cause most computers to be ignored by the logging sever.

This problem can be worked around by using the following technique:

- Temporarily stop the PowerMAN service with **ONE** of the following commands:

```
NET STOP POWERMAN
```

or

```
POWERMAN STOP
```

- Delete the following value from the registry:

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HKEY_LOCAL_MACHINE\SOFTWARE\PowerMAN\ClientGUID

- If necessary shutdown the computer
- Create the image
- Do not restart the computer until the image is created because the PowerMAN service will create another Client GUID

Problem: PowerMAN is installed but the computers are not showing up on the reporting system

OR Power Management Event Log reports Event #6015: Downloaded XML was corrupt

PowerMAN records and transfers log data on a daily basis. The data is not sent until the close of the day. If the reporting feature is enabled the data is transferred to the reporting server. When the hosted PowerMAN reporting system is being used this is located at pmstats.org:8080. If a private PowerMAN Enterprise Server is being used then this address will normally be located somewhere on the enterprise network.

The upload normally happens between 00:00 and 03:00 if the computer is on or within a few minutes of the computer next starting. Therefore, if you installed PowerMAN today it will not report anything until tomorrow.

If computers do not register within 24 hours of being installed with PowerMAN then there may be a configuration problem. The following should be checked:

1. The SiteGUID setting is correctly configured and registered on the PowerMAN reporting server. The SiteGUID should always contain the {brace} characters.
2. The server address. This is normally pmstats.org. There is no need to prefix this with http:// or www.
3. The server port. This is normally 8080. In some circumstances it may be necessary to use the alternate port 443. This is commonly necessary in networks which bar all HTTP traffic but permit standard SSL traffic.
4. The proxy address and port setting. If you are using a proxy server please check that server address and port are correctly configured. The proxy should permit unauthenticated HTTP traffic to the reporting server. The proxy server logs may also indicate the cause of the problem.
5. The Power Management Event Log. This will probably explain the cause of the problem. Some upload problems are reported using a standard Winsock error code. These are explained in the following Microsoft document:

[http://msdn.microsoft.com/en-us/library/ms740668\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/ms740668(VS.85).aspx)

In some cases it may be helpful to enable additional event logging (located in the Advanced configuration section) and restart the computer or PowerMAN service. This may be combined with the FORCEUPLOAD command (see below).

Power Management Event #6015: 'Downloaded XML was corrupt' indicates that there was a problem with the response data from the PowerMAN server. This can happen when an intermediate proxy server blocks the traffic and returns a human-readable error page.

NB: The pmstats.org hosted reporting service has two redundant IP addresses. Ideally firewalls should be configured to use the DNS name pmstats.org. If this is not possible then BOTH IP addresses should be configured to ensure reliable operation. The addresses are 80.46.47.216 and 212.248.221.157.

In some circumstances it can be useful to force an upload. Please remember this will only work if **more than one** day of log data is present. It is never possible to force the upload of the current, incomplete, log data. To force an upload use the following commands:

```
POWERMAN STOP
POWERMAN FORCEUPLOAD
POWERMAN START
```

If the above steps do resolve the problem it may necessary to investigate debug the network communication between the computer running PowerMAN and the server. This advanced technique may especially useful when using an intermediate proxy server. PowerMAN uses a standard Windows supplied component called WinHTTP to perform network communication. This is the same library used by most of Windows including Internet Explorer. Microsoft has incorporated a logging system into WinHTTP that can be used to examine the network traffic.

To use this technique proceed as follows:

1. Confirm that there is some PowerMAN data to upload. The easiest way to check this is to confirm that more than one log value exists in HKLM/Software/PowerMAN/Logs
2. Obtain the WinHTTPTraceCfg tool. This is in the Windows 2003 Resource Kit
3. Enable WinHTTP tracing with the following command:

```
winhttptracecfg -e 1 -d 0 -s 2 -t 1 -l c:\winhttplog
```

This will create a series of files in the C:\ folder prefixed 'winhttplog'

4. Force an upload using the above technique:

```
POWERMAN STOP
POWERMAN FORCEUPLOAD
POWERMAN START
```

Check the C:\ folder for a log file (there may be several). These show the network transaction with the (proxy) server

5. Remember to disable logging with the command:

```
winhttptracecfg -e 0
```

The most common proxy server communication issues are:

- Incorrect proxy server address / port setting
- Proxy server requires authentication – PowerMAN does not support proxy authentication. You can work around this behaviour by creating an proxy server exception for the PowerMAN server
- The PowerMAN server address is missing from the proxy 'white-list'

Problem: Windows Power Management applet reports blank or incorrect status for a power action or power timeout

The Windows XP Control Panel Power Management applet (Powercfg.cpl) is only designed to show certain power states (it does not support power off) and certain timeout values (1, 3, 5, 10 minutes etc). PowerMAN allows other values to be specified which the applet is incapable of displaying. In most circumstances the relevant value is displayed as blank **or** downgraded to the nearest displayable setting. This does not alter the application of the desired policy which will function as desired.

Problem: The PowerMAN service (or power configuration) is applied using a logon script but does not consistently work

PowerMAN is a service application and therefore must be installed by an Administrator (or via GPO). Similarly, the majority of PowerMAN settings are in the HKEY_LOCAL_MACHINE area of the registry and this is not modifiable by most users. PowerMAN cannot be installed or configured from a user logon script.

Problem: The 'Managed' power scheme does not appear in the Windows Control Panel**OR The settings in the Windows Control Panel do not match those configured**

PowerMAN typically only refreshes power settings every 10 minutes. Therefore it may take a few minutes for recently changed settings to become active. Group Policy settings can sometimes take up to 120 minutes to propagate across the network. Please be patient.

You can force a faster update using the following commands:

```
GPUPDATE /FORCE  
POWERMAN RESTART
```

Sometimes it isn't possible for PowerMAN to activate the configured settings. This can happen if there is an inconsistency in the settings or (sometimes) if the hardware is not capable of configuration selected. If the desired settings do not appear in the Control Panel applet or configuration doesn't function as expected please check the Power Management event log.

Problem: Sleep has been configured (suspend to RAM). The power saving is not as great as expected

There are several levels of sleep called (S1-S3). Each offers increased amounts of energy saving by progressively stopping additional levels of the PC hardware. All resume within a second or two and therefore the highest (S3) setting should be used wherever possible. Sometimes PC motherboards are not capable of S3 (or have been configured to use S1 instead). Sometimes these are referred to as **Suspend to RAM** and **Power On Suspend**. Please check your BIOS settings to ensure that S3 support is enabled.

Windows XP / 2003 can prevent use of the S3 state when USB devices are connected (preferring the S1 state). This feature is implemented because of problems sometimes found with resume from S3 when using USB devices. Microsoft explains this in the following document:

<http://support.microsoft.com/kb/841858>

Problem: A scheduled wake policy has been configured but nothing happens

Unfortunately not all computers are capable of resuming from all sleep states. This functionality depends on underlying support from the PC motherboard hardware which is not always present. The following steps should be checked:

1. Check the Power Management Event Log. A problem may be preventing the wake policy from being applied
2. Use the `POWERMAN INFO` command to determine the supported wake states. Check the value of `Min RtcWake State`. This is the highest (S1-S5) state from which the computer is capable of waking. Sometimes this can be changed by modifying the BIOS settings.
3. Check the BIOS Power Management settings. Different BIOS manufacturers use different terminology for the wake-up / resume feature. If the computer supports this function it is normally located in the power management settings and may be described as S1/4 Resume, Alarm Resume or similar. This setting should not be confused with the BIOS based alarm feature (with a resume time) that is present in some older BIOS.
4. Attempt wake from different levels of sleep – some computers can wake from hibernate whilst others can only wake from the suspended state. You can test this using the `POWERMAN HIBERCHECK` and `SLEEPCHECK` commands. Remember most hardware does not support wake from the powered off state (although it is quite common for wake from hibernate to work fine). In addition, some laptop computers are designed to prevent system resume when running on battery (DC) power. To confirm this re-test the computer when the mains supply is connected.
5. Contact the motherboard vendor to determine if the required functionality is available

Problem: The computer is configured to hibernate or sleep. Sometimes the previous user leaves the workstation without logging off and this can lock the workstation for the next user

This problem can be avoided by using the logout feature. Configure the Default User (or specific user) power settings to log the user out after the desired time period. Configure the Default User idle action to 'Nothing' when using the logout feature and use a suitable No User policy to save energy. Systems configured using this approach will never be locked.

Problem: Windows displays a pop-up message during hibernation - Insufficient System Resources Exist to Complete the API

This problem is caused by a known issue in Microsoft Windows XP. This problem typically occurs when the computer uses 1 gigabyte (GB) or more of RAM. The following Microsoft document explains how to obtain the required hotfix:

<http://support.microsoft.com/kb/909095>

Problem: PowerMAN appears to be installed but will not start

OR PowerMAN service starts and then stops again

OR The event log reports a problem with the Terminal Services service (TermService)

PowerMAN is designed for simple, single-file, deployment and does not depend on any non-Windows components or external frameworks (such as Microsoft .NET). When running on Windows XP PowerMAN requires the Terminal Services (TermService) service to be available. This service is used to provide power configuration for non-administrator users. This service is not required when PowerMAN is running on Windows 2000, Windows Vista or Windows 7.

PowerMAN will operate correctly on systems where the TermService is set to manual (the default) or automatic start. However, the PowerMAN service will fail to start if the TermService is disabled. Some organisations disable this service to reduce memory footprint or enhance system security. This configuration is unfortunately not compatible with PowerMAN when running on Windows XP.

Microsoft documents the following method to disable remote desktop access without disabling the TermService:

<http://support.microsoft.com/kb/306300>

Problem: PowerMAN works correctly on some computers but gives inconsistent results on others. The settings used are the same in both cases

OR PowerMAN works correctly on some computers but others have a recurring error in the Power Management event log

There are several reasons why this may happen:

1. Incomplete power settings / Interaction with pre-existing settings – This happens when pre-existing settings are not fully replaced by the new PowerMAN configuration. For instance, if specific user policies are used or a NoUser policy is applied this can still leave periods when no PowerMAN policy is applicable. In this case the pre-existing settings present on the computer are used. This scenario is especially likely if other power centralised-management techniques (such as EZ-GPO) have been trialled on the same systems in the past.

This problem can be avoided by ensuring that a Default User policy is always applied. This step may not be strictly necessary but it will ensure that a known power configuration is always operational.

2. Hardware limitations / Windows Configuration – Sometimes the configured power policy may not be supported by the computer hardware or existing Windows configuration. This commonly occurs when sleep mode is not supported (or is disabled in the BIOS) or the hibernation feature is not enabled. Depending upon the cause of this PowerMAN may use alternative settings or do nothing. PowerMAN reports this in the event log.

Rarely similar problems can happen if no global settings are employed. To avoid this and ensure that the power configuration always works as intended we suggest the following guidelines:

- Remember to check the hardware capabilities. This can be done with the `POWERMAN INFO` command. Only use sleep if it is supported by the hardware
- Similarly, remember to enable the hibernate feature if you intended to use hibernate as an idle or scheduled action
- Always configure a Default User policy (even if it does nothing)

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- Always configure a Global power policy (even if its settings are trivial)
- Remember to check the event log. It may provide further explanation of the problem

Problem: The power policy doesn't work as expected. The Hard Disk / Monitor timeout is less than the idle timeout

PowerMAN will reject inconsistent settings. For instance, it is not possible to configure the hard disk to spin-down or the monitor to standby after the system has already entered a low-power state. Please change the settings to ensure that the hard disk or monitor timeout is less than the idle timeout. Please check the Power Management event log for further information.

Problem: Some computers wake-up (resume) unexpectedly

There are several reasons a PC may automatically resume from a low-power state. The following steps will help isolate the cause of the problem:

1. Unplug the mouse and the keyboard and determine if the problem is resolved. Sometimes a faulty input device (especially an optical mouse) may be the cause of the problem
2. Unplug the network cable and determine if the problem is resolved. If the Wake-On-LAN (WOL) feature is not required disable it. If the network card supports wake on 'directed packet' (using IP address) and this feature is not actually required try disabling it
3. Study the power management event log. Is there a pattern? Does the automatic resume happen at set times or regular intervals?
4. Try a minimal software image removing all non-essential applications. The automatic resume maybe caused by another application

Problem: Some computers fail to suspend / resume reliability and consistently

Successful power management implementations often make extensive use the suspend (sometimes called sleep) and resume functionality present in modern computers. In most situations these functions work very well and require no specific configuration to be effective. Occasionally, however, some computers may have problems either successfully suspending or resuming to an operational state.

There are many potential reasons why this may happen and it may require some experimentation to fully diagnose. The following sections explain the basic steps that you can take to isolate the cause of such a problem. A separate troubleshooting section explains the steps that may be required on some systems to allow the computer to wake from a specific input (such as a USB keyboard or via Wake-On-Lan).

For the purposes of this troubleshooting procedure 'suspend' means either S1, S2 or S3 sleep (sometimes called 'suspend-to-RAM') rather than hibernation (S4) which is sometimes known as 'suspend-to-disk'. In Windows 2000 and later S4 is implemented almost exclusively by the operating system itself and therefore is less prone to failure caused by hardware or BIOS issues.

It is important to remember that **PowerMAN itself does not implement suspend and resume**. These functions are provided by the underlying Windows operating system.

Depending upon the configuration PowerMAN operates in the following ways:

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- **Suspend with idle timeout** – PowerMAN creates a standard Windows power policy (visible in the Control Panel power applet – powercfg.cpl) and operating system implements the policy. There is therefore no practical difference between a centrally deployed PowerMAN policy and one manually created on the PC.
- **Scheduled suspend, enforced suspend and shutdown (Windows Vista and later)** – PowerMAN instructs Windows to suspend or shutdown the PC and the operating system implements the suspend operation. This is identical to using a third party program (for instance SysInternal's PSShutdown) to perform this procedure and very similar to pressing the suspend button.

The following procedure should be followed:

Isolate PowerMAN from the problem. Try the following steps:

1. Temporarily remove the PowerMAN service (POWERMAN REMOVE)
2. Manually create a similar power policy using the Control Panel. It may be helpful to use a minimal timeout value
3. Determine if the PC will suspend/resume reliably

Manually initiate a suspend operation:

1. Download the PSShutdown utility. This is available from:
<http://technet.microsoft.com/en-us/sysinternals/bb897541.aspx>
2. Initiate a manual suspend operation with the following command

```
pssshutdown.exe -d -t 5
```

It can sometimes be unclear if the problem is occurring during suspend OR resume. Try the following:

1. Manually suspend the PC and observe the process. A successful suspend will have the following characteristics:
 - Operation may take 5-30 seconds (depending upon configuration)
 - Windows will usually report the operation is in progress. This does not happen in Windows Vista and later when hybrid sleep mode is enabled
 - The screen becomes blank. External monitors should switch to standby mode within a few seconds
 - The hard disk should spin down. This may make a distinctive sound
 - The fan should stop running (and the PC become generally quieter)
 - A hardware indicator may illuminate or start flashing to indicate the PC is suspended
2. Similarly, a successful resume will have the following characteristics:
 - Resume operation can be initiated by keyboard/mouse button press or by pressing the hardware sleep/power buttons or, sometimes, opening a laptop lid.

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NB: Sometimes it may not be clear how to initiate the resume process or it may not be possible to initiate resume using the desired method. This is distinct from being unable to initiate the resume process using ANY method and is discussed further below.

- The hard disk will spin up
- The fan will resume operating (and the PC become generally noisier)
- On a laptop PC the screen backlight will turn-on. On a desktop PC the monitor will return to the normal power mode (often with a distinctive click) and a flashing cursor may be displayed
- After a few moments (sometimes up to 30 seconds) the normal Windows user interface will be displayed
- The PC will respond to mouse / keyboard input and normal application operations can be resumed

If the PC will suspend but it is not obvious how to resume the PC please try the following

1. Confirm if the PC will resume automatically. This may provide reassurance the problem is caused by being unable to initiate the resume operation rather than the PC being unable to resume. The simplest way to do this is with the following PowerMAN command which will suspend the computer and then resume it 60 seconds later:

```
POWERMAN SLEEPCHECK
```

2. Double check the PC will hibernate and then resume. The simplest way to do this is with the PSShutdown utility:

```
psshutdown.exe -h -t 5
```

3. Check the PC BIOS settings and confirm the following:

- Suspend / Sleep (Sometimes called S1/S2/S3) is enabled
- The keyboard / mouse can wake the PC (especially for non-USB devices)
- USB devices may wake the PC (for USB keyboards and mice)

Determine if the problem occurs every time or just sometimes:

1. Repeat the manual suspend operation 10 times
2. Record the number of times the operation fails. Does the operation fail on suspend or resume?

Determine if the problem is caused by S1 or S3:

1. Check the PC BIOS settings and look for a setting related to suspend / sleep mode. This is sometimes called Suspend-to-RAM or S1/S3
2. Repeat the above steps for both S1 and S3. S3 is a deeper sleep state that requires less energy. Some systems work correctly with S1 but are inconsistent or unreliable with S3.

Determine if the problem occurs on a specific model of PC or with a specific software image:

1. Repeat the basic tests on a number of different computers. Does the problem only occur on specific models or with specific hardware / software revisions?

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2. Try to initiate suspend directly at the logon prompt. Does the problem still occur on first boot-up prior to logging on? Does the problem become more evident after the PC has been in use for a period of time? This may indicate the problem is related to a specific application.

NB: It may be helpful to use the Control Panel power applet, powercfg.cpl, to configure the power button as a 'sleep' button.

3. Unplug any non-essential devices, reboot, and repeat the tests. If the PC has a USB keyboard/mouse and supports a legacy PS/2 keyboard/mouse retry the operation with the PS/2 devices. This may indicate the problem is related to USB (this is quite common)
4. Repeat the tests using a 'clean' software image that contains the basic Windows installation and minimal drivers
5. Check that the latest Windows service pack and hot fixes are installed. This is often easily achieved by using the Windows update tool.
6. Double check for driver updates. The most common drivers to cause problems are Video, Sound and Network related drivers.
7. Contact the PC vendor and determine if there is a known problem with suspend. Confirm if there is a BIOS update available for the PC.

The following Microsoft Knowledge Base documents may also be useful:

Article	Title
http://support.microsoft.com/kb/952117	When you try to put a Windows XP-based computer into hibernation or into standby, the computer stops responding
http://support.microsoft.com/kb/907477	How to troubleshoot hibernation and standby issues in Windows XP
http://support.microsoft.com/kb/815304	The computer does not resume from hibernation or does not Wake-on-LAN from standby
http://support.microsoft.com/kb/331506	Computer Stops Responding When You Stand-by or Hibernate More Than One Time
http://support.microsoft.com/kb/822827	Computer stops responding after you put it into hibernation, and then resume it from hibernation many times
http://support.microsoft.com/kb/951447	A Windows XP SP3-based computer loses wireless connectivity when it resumes from standby or from hibernation, or you receive an error message when you try to put the computer in standby or in hibernation
http://support.microsoft.com/kb/302713	Error Message: Power Policy Manager Unable to Set Policy. Indicates Two Revision Levels Are Incompatible
http://support.microsoft.com/kb/841858	Description of how to enable the S3 system power state for standby when USB devices are armed for wake
http://support.microsoft.com/kb/831114	Your USB keyboard or USB mouse does not work when you resume your Windows XP-

	based computer from standby
http://support.microsoft.com/kb/878467	Your Windows XP-based computer does not resume from standby when you move your USB mouse or press a key on your USB keyboard
http://support.microsoft.com/kb/833837	You receive a "Stop 0x0000008E" error message after you resume your (Windows XP) laptop computer
http://support.microsoft.com/kb/890042	<p>You lose access to network resources after you resume your Windows XP-based computer from standby</p> <p>NB: This hotfix is documented for use with systems using smartcard authentication. There have been reports this hotfix also works in some non-smartcard scenarios.</p>

Problem: Unable to resume computer using selected input / button method

OR Unable to resume PC using a USB keyboard / mouse

OR Unable to resume PC using Wake-On-Lan (WOL)

OR Unable to configure Device Manager power management remotely

Most computers can be configured to suspend / resume with little difficulty.

However, sometimes, it can be difficult to initiate a 'resume' from suspend (S1, S2 or S3) or hibernate (S4) using the desired method. This is a distinct problem and should not be confused with systems that are unable to suspend or resume reliably. The most common scenario is that the PC can resume but not using the desired keyboard, mouse or Wake-On-Lan (WOL) method. This may cause user experience problems and potentially cause a power saving initiative to fail.

This troubleshooting section explains the most common scenarios and how they may be resolved.

There are four stages to this process:

1. Confirm the system can suspend and resume reliably (using ANY method)
2. Check the appropriate BIOS settings
3. Check the related Windows Device Manager settings
4. Check and configure the Power Management settings (this can be done with PowerMAN)

First, confirm that system can actually suspend and resume reliably using **any method**. The simplest approach is as follows:

1. Use the following command to initiate a suspend operation:

`POWERMAN SLEEPCHECK`
2. Wait two minutes. The system should resume automatically within this time

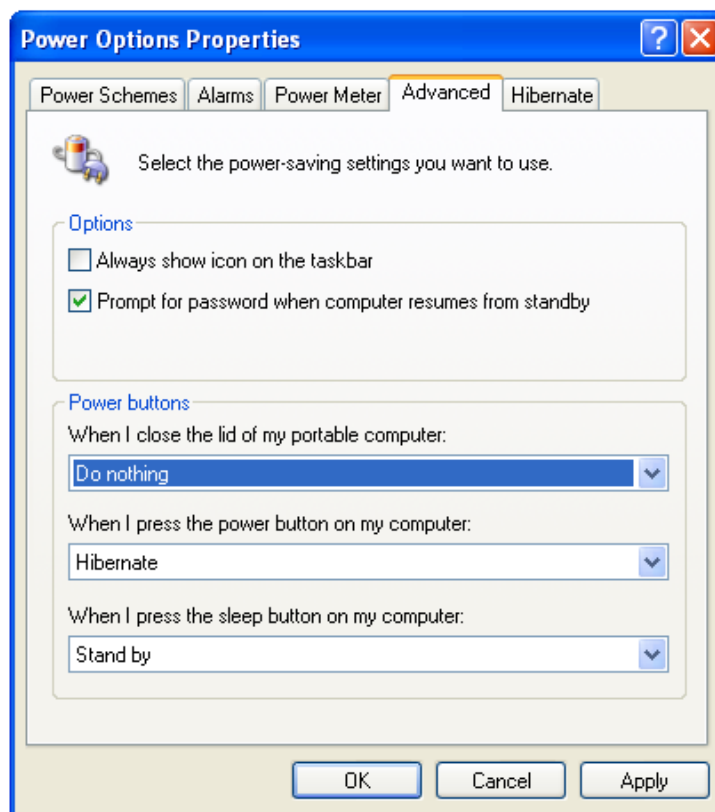
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3. If this does not happen this may indicate the PC does not (currently) support automatic resume. Follow the following sections to resolve this.

The most simple resume method is a dedicated hardware button. Some systems include such buttons (although they are not always connected). Such buttons may normally be configured via a BIOS setting. It is not possible to configure this behaviour from Windows. Please check the BIOS configuration to determine if this is supported on your specific PC.

A second, related, approach is to initiate system resume using a legacy PS/2 keyboard (not a USB keyboard). As above, these are configured using only BIOS settings and do not require any configuration of the related Windows Device Manager entry. In some cases pressing any key will resume the system whilst in others a specific key must be pressed. Some systems also support resume via PS/2 mouse buttons. Please check the PC BIOS configuration to determine if this is supported on your specific PC.

Dedicated hardware sleep/resume buttons (including those on some legacy keyboards) may be configured using the PowerMAN 'Global Power Settings' feature. This is similar to the Power Options dialog in Windows 2000/XP/2003 Control Panel Power applet:



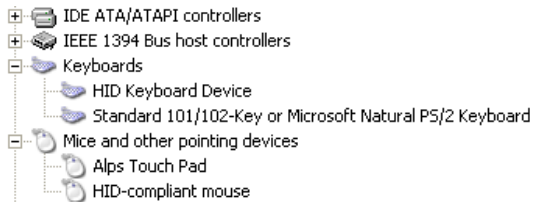
When investigating suspend / resume issues it can often be helpful to configure the hardware 'Power' button as the 'Sleep' button. This is especially useful on systems that do not have a dedicated sleep button or where this is not connected or appears to not function correctly. Please consider re-configuring the 'Power' button temporarily to check this.

Configuring the system to resume from a USB keyboard or mouse is considerably more complex than in the legacy cases above. This is because the functionality must be configured in the BIOS, Windows Device Manager and sometimes the related USB Hub devices. To configure resume from for USB keyboard please check the following:

1. The BIOS supports USB resume and this is enabled (often there is a dedicated setting called 'Resume on USB' or similar)

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- The Device Manager entry for the keyboard has the 'Allow this device to bring the computer out of standby' option ticked:



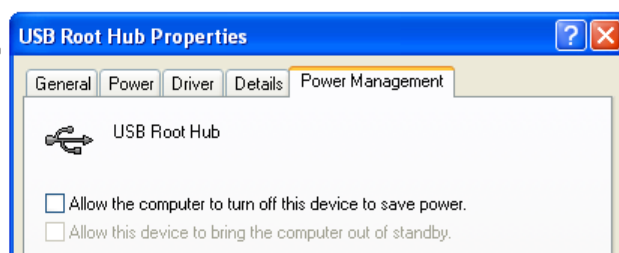
- If this option is unavailable (greyed out) then this may indicate that the related BIOS feature is not enabled.
- In some case this may also indicate that Windows has disabled resume for this device because the system is using the S3 suspend mode. This is only applicable to Windows XP.

To restore the functionality create a 'USBBIOSx' value in the Registry. This is described in the Microsoft KB article 'Description of how to enable the S3 system power state for standby when USB devices are armed for wake':

<http://support.microsoft.com/kb/841858>

NB: Very rarely enabling this feature may result in increased system instability or poor suspend/resume consistency. Please test this thoroughly prior to live deployment.

- If the USB keyboard is connected via a USB Hub then this device must be configured to remain powered and not standby. This is because the hub must remain powered for the keyboard to operate. Please remember that in some cases the USB hub may be internal to the PC. To prevent a USB hub from entering the standby state un-tick the 'Allow the computer to turn off this device to save power' option in Device Manager.



Some system administrators use the Wake-On-LAN (WOL) feature to initiate system power-on or resume from a remote location. This is commonly used for patch management and remote support. WOL is a complex topic requiring specific hardware and network support. To allow WOL to operate the following must be correctly configured on the client PC:

- WOL must be enabled in the system BIOS (if present)
- The following options must be selected (ticked) in Device Manager:

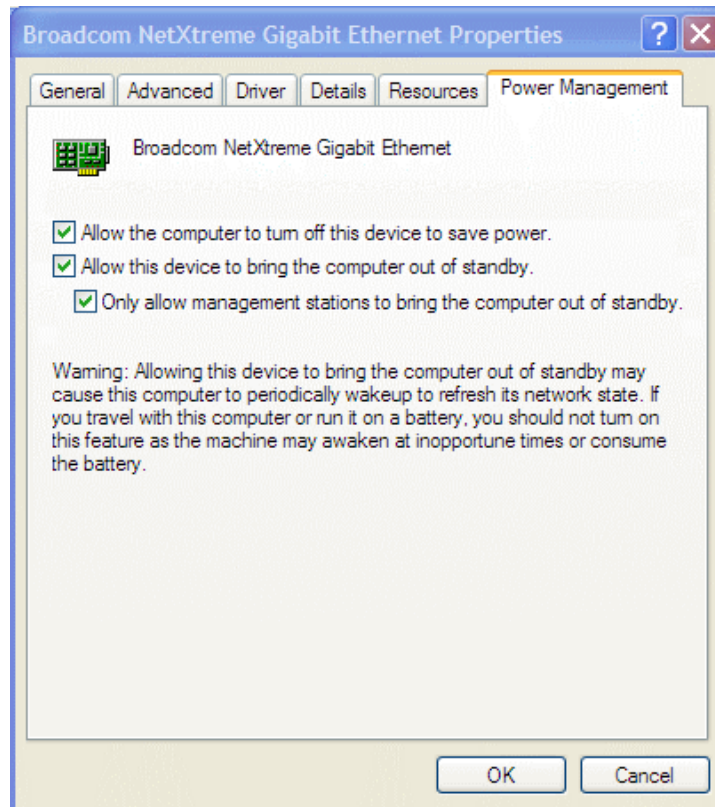
Allow the computer to turn off this device to save power
Allow this device to bring the computer out of standby / wake the computer

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Only allow management stations to bring the computer out of standby

NB: Some systems are unable to resume from S5 (full power-off) using WOL. Please check your system BIOS – in many cases there is a specific setting related to S5 WOL. A 'management station' means a true WOL 'magic' packet and not more general network traffic.

Please contact Data Synergy Technical Support if you require further advice on WOL.



Sometimes it may be necessary to automate the deployment of these settings. This can be done using a script or batch file at deployment time. The following Microsoft documentation may also be useful:

Article / Title	Notes
http://support.microsoft.com/kb/837058 How to disable power management for a network adapter when you deploy Windows XP.	<p>This document explains the PnPCapabilities Registry setting. This is a DWORD value where the network device wake-up configuration is stored: HKLM\SYSTEM\CurrentControlSet\Control\Class\ [DriverKey]</p> <p>The following (hexadecimal) values are commonly used:</p> <p>No options ticked = dword:00000038 Allow device power saving = dword:00000030 Allow device to wake PC = dword:00000020 Management stations only = dword:00000120</p> <p>The system must be rebooted for a change in this setting to become active and be reflected in Device Manager.</p>

<p>http://msdn.microsoft.com/en-us/library/ms793220.aspx</p> <p>Enabling Selective Suspend</p>	<p>This document explains the HcDisableSelectiveSuspend Registry setting. This is a DWORD value that is linked to the 'Allow the computer to turn off this device to save power' option in Device Manager. It may be necessary to change this setting to prevent a USB hub from entering standby:</p> <p>HKLM\SYSTEM\CurrentControlSet\Control\Class\[DriverKey]</p> <p>The following (hexadecimal) values are commonly used:</p> <p>Disabled = dword:00000000 Enabled = dword:00000001</p> <p>The system must be rebooted for a change in this setting to become active and be reflected in Device Manager.</p>
<p>Undocumented by Microsoft</p>	<p>The WaitWakeEnabled Registry setting is a DWORD value that is linked to the 'Allow this device to bring the computer out of standby' option in Device Manager. It may be necessary to change this setting to allow a USB keyboard / mouse to wake the system:</p> <p>HKLM\CurrentControlSet\Enum\[DeviceInstancePath]\Device Parameters</p> <p>The following (hexadecimal) values are commonly used</p> <p>Disabled = dword:00000000 Enabled = dword:00000001</p> <p>The system must be rebooted for a change in this setting to become active and be reflected in Device Manager.</p>
<p>http://support.microsoft.com/kb/841858</p> <p>Description of how to enable the S3 system power state for standby when USB devices are armed for wake</p>	<p>This article explains how to allow S3 suspend / resume on Windows XP when using USB devices.</p> <p>The system must be rebooted for a change in this setting to become effective.</p>
<p>http://support.microsoft.com/kb/878467</p> <p>Your Windows XP-based computer does not resume from standby when you move your USB mouse or press a key on your USB keyboard</p>	<p>This article explains a problem in Windows XP that can prevent a USB mouse from being used to wake the system if the mouse is moved whilst the system is suspending. This problem is not currently fixed by Microsoft.</p>

Problem: Network drive is disconnected after system has resumed

This problem can happen on some systems if the server connection has timed out. This following Microsoft article explains how to resolve this problem:

<http://support.microsoft.com/kb/297684>

Problem: Power Management event log reports error #1019 - Product key has expired. Please contact your sales representative to obtain an updated product key. The software will continue to function in reduced functionality mode

This indicates that the PowerMANMAN PID key has expired. This can happen during product evaluations when a time limited PID key is used. Non-evaluation PID keys are perpetual and do not expire. Please contact you Sales Representative to obtain an updated PID key.

Using the debug log to investigate problems

Sometimes power policies may not behave as expected. As described above this can happen for a number of reasons and sometimes it can be difficult to pinpoint the exact cause of the problem. This is more common in Windows XP which has a more complex power management implementation which may rarely reject or transparently change apparently valid policies.

PowerMAN includes a feature that, when enabled, will dump useful system state information to a log file every second. This feature can result in very large log files and therefore should only be enabled when investigating a problem.

There are **two different** ways that this feature can be enabled:

- Enable **Advanced/All Information + Debug Log**. This will create a file called `powerman.log` in the same folder as the PowerMAN executable file
- Manually configure a log file

To manually configure the debug log proceed as follows:

1. Start `Regedit`
2. Navigate to `HKEY_LOCAL_MACHINE\SOFTWARE\PowerMAN`
3. Create a `REG_SZ` (string) value called `DebugFile`
4. Set the value to the name of the desired file. For instance:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\PowerMAN]
"DebugFile"="c:\powerman.log"
```

5. Restart the PowerMAN service (or restart the computer) with the following command:

```
POWERMAN RESTART
```

PowerMAN will log useful information every second to the specified log file. After a sufficient period has elapsed (ideally at least as long as the desired idle timeout plus a margin of a few minutes) proceed as follows to examine the log:

1. Stop the PowerMAN service with the following command:

```
POWERMAN STOP
```

2. Open the file. For instance:

```
NOTEPAD C:\WINDOWS\SYSTEM32\POWERMAN.LOG
```

The log file contains the following information:

Field	Meaning
Current Time	The time of the log entry. A log entry is produced every second
Busy%	The average level of CPU activity during the last second
Idle%	The current level of idleness. NB: This is the internal value calculated by Windows and is NOT the same as 100 minus Busy%
MaxIdle%	The maximum amount of idleness. Windows allows the idle timer to

	<p>decrement whilst the current Idle% level is above this value.</p> <p>Typically this is 100% when no idle action is configured and 82% when an idle action is configured and the idle sensitivity is 50%. This value can be lowered (making the system more likely to reach idle) by reducing the idle sensitivity setting</p>
LastInput	The time of last user (mouse / keyboard input). If this value is frequently changing this indicates that the system is receiving phantom input (usually from a faulty or over sensitive mouse)
Remain Time (seconds)	<p>The amount of time remaining before the system is considered idle. This decreases (usually in 15s intervals) whilst the Idle% is above MaxIdle%. Where there is intermittent background activity (or user input) this value can decrease but will reset to the initial value before reaching 0.</p> <p>NB: Windows XP uses a negative value to indicate that the system is not using the idle timer. This happens when no idle action/timeout is configured</p>
Users	The number of users currently logged onto the computer
State	The internal Windows System Execution State flags. Any value other than 0x0 indicates that the system is being artificially prevented from entering idle state by a program

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An example log file, where an idle timeout or action is not specified, would appear as follows:

Log started 20080604 110319

CurrentTime	Busy	Idle	MaxIdle	LastInput	Remain	Users	State
20080604 110319	100	58	100	20080604 110318	-15s	1	0x0
20080604 110320	19	58	100	20080604 110318	-15s	1	0x0
20080604 110321	0	58	100	20080604 110318	-15s	1	0x0

Note that the MaxIdle% is 100% and the remaining timeout value is -15 (The timer isn't running).

A common scenario is that a faulty (or poorly designed) mouse may introduce phantom inputs. This can be exacerbated by the presence of florescent lighting. Note that the LastInput field changes in every entry. This results in the idle timer being reset and therefore the system will never idle. In such a situation the log may appear as follows:

CurrentTime	Busy	Idle	MaxIdle	LastInput	Remain	Users	State
20080604 110319	0	58	82	20080604 110319	1200s	1	0x0
20080604 110320	1	58	82	20080604 110320	1200s	1	0x0
20080604 110321	0	58	82	20080604 110321	1200s	1	0x0

Another typical scenario occurs when a program artificially prevents the system from reaching the idle state. You can determine if this is happening by examining the **State** field. Any value other than 0x0 indicates that the system is currently being prevented from idling. For instance

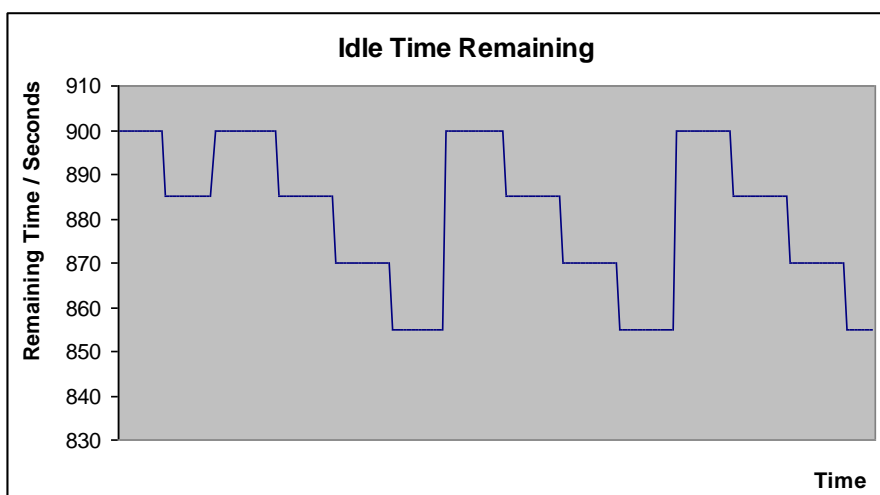
20080604 110321	0	58	82	20080604 110321	1200s	1	0x7
20080604 110322	0	58	82	20080604 110321	1200s	1	0x1

Finally, another scenario may be that an intermittent background process (such as the screen saver) may be preventing the system from reaching the idle state. In this situation the remaining idle time may appear to initially decrease but will frequently reset to the initial value. This may appear as follows (intermediate records have been omitted for brevity):

20080604 100003	10	97	82	20080604 095736	1200s	0	0x0
...							
20080604 100034	0	98	82	20080604 095736	1185s	0	0x0
...							
20080604 100049	8	92	82	20080604 095736	1170s	0	0x0
...							
20080604 100104	0	90	82	20080604 095736	1155s	0	0x0
...							
20080604 100134	0	79	82	20080604 095736	1200s	0	0x0
...							
20080604 100159	0	98	82	20080604 095736	1185s	0	0x0
...							
20080604 100239	8	92	82	20080604 095736	1170s	0	0x0
...							
20080604 100304	0	90	82	20080604 095736	1155s	0	0x0
...							
20080604 100334	0	79	82	20080604 095736	1200s	0	0x0

NB: Some versions of PowerMAN include additional fields in the debug log file. If you need more information on these please contact Technical Support.

It can sometimes help to plot the idle time remaining field using a charting tool such as Microsoft Excel. This may help you visualise the timer behaviour and understand what is happening. Often this can result in a 'saw-tooth' pattern as the timer periodically resets before reaching zero. This is a classic sign of 'PC Insomnia':



Other Deployment Resources

The following Microsoft resources may also be useful:

[302430](#) How to assign software to a specific group by using Group Policy

[224330](#) Assigning a Windows Installer Package with minimal interaction

[257718](#) How to create a third-party Microsoft Installer package (MSI)

[278472](#) Packages assigned to computers with Group Policy are not installed

Appendix A – PowerMAN Command line options

PowerMAN supports the following command line options. These may be used by an administrator to manually configure the service and report on the current installation status:

Command	Meaning
Install	Install the PowerMAN service. For example: <code>POWERMAN INSTALL</code>
Remove	Remove (uninstall) the PowerMAN service (also stops if running)
Start	Start the PowerMAN service (also installs if not already installed)
Stop	Stop the PowerMAN service
Restart	Restart the PowerMAN service
Status	Display the current service status
Makeguid	Generate a unique GUID value. This may be used for the SiteGUID
License	Check the current PowerMAN license key and expiry (if applicable)
Forceupload	Force any logged data to be uploaded at the next refresh interval. This is normally combined with <code>POWERMAN RESTART</code> to force an (almost) instant upload attempt. For example: <code>POWERMAN FORCEUPLOAD</code> <code>POWERMAN RESTART</code>
Hibercheck	Test system ability to hibernate and automatically resume.
Sleepcheck	Test system ability to sleep and automatically resume.
Info	Display various power related information. This is intended for use by Technical Support
Help	Display the command line help

Appendix B – PowerMAN Configuration with Novell ZENworks

Recent versions of Novell's ZENworks product directly support deployment and configuration of applications using a Group Policy based method. This approach is similar to the native Windows Group Policy method and is the simplest approach for deploying PowerMAN in a Novell based environment.

The following section describes the basic approach for ZENworks 6.5. A similar method may be used for other versions of ZENworks. This method assumes the **Novell ZENworks agent** to be already deployed and the **Workstation Manager** component is enabled.

To configure PowerMAN using ZENworks 6.5 proceed as follows:

1. Locate the PowerMAN **PowerMAN5.adm** file supplied with PowerMAN



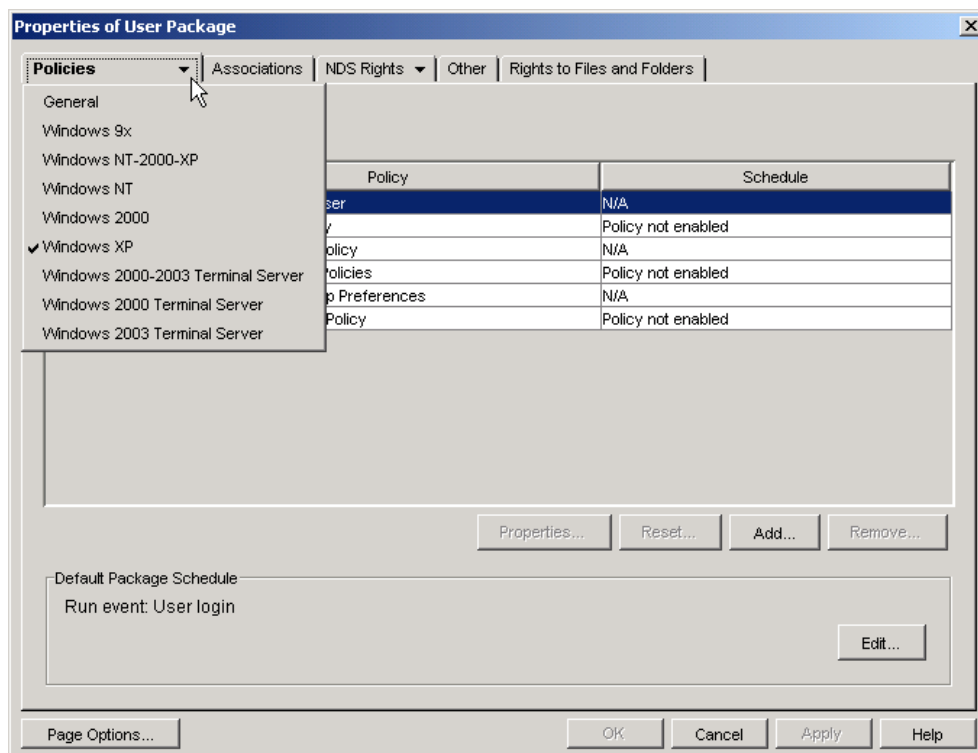
2. Open the **ZENworks ConsoleOne** tool and locate the container where you wish to create the PowerMAN policy. This should be an appropriate container for policies based upon your tree design.

NB: If this is your first policy then the container where the workstations you wish to manage are located may be an appropriate place to start.

3. Right Click and select **New Policy Package**
4. Select **Workstation Package** and click **Next**



5. Click the **Policies** tab and select the operating system(s) you wish to deploy PowerMAN to:



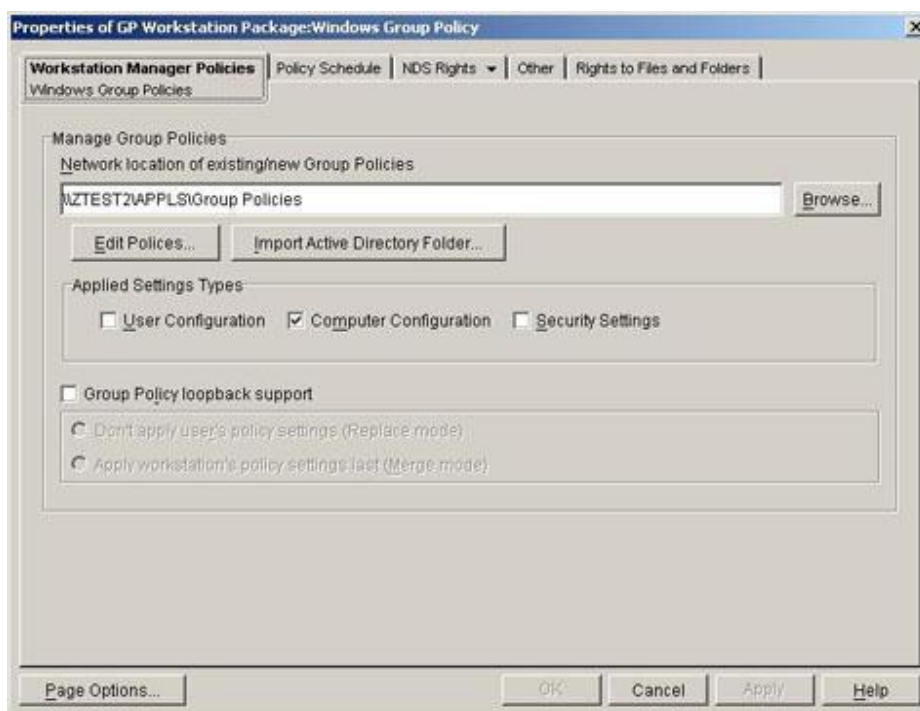
Remember: It is strongly recommended that you create a separate policy for each supported operating system. Whilst ZENworks does allow a unified (multiple operating system) policy to be created Novell recommend that the policy for each operating system be configured from a client running that operating system. In other words the Windows XP policy should be configured on a Windows XP client and the Windows Vista policy should be configured on a Windows Vista client.

6. Tick the **Windows Group Policy** option and click **Properties**

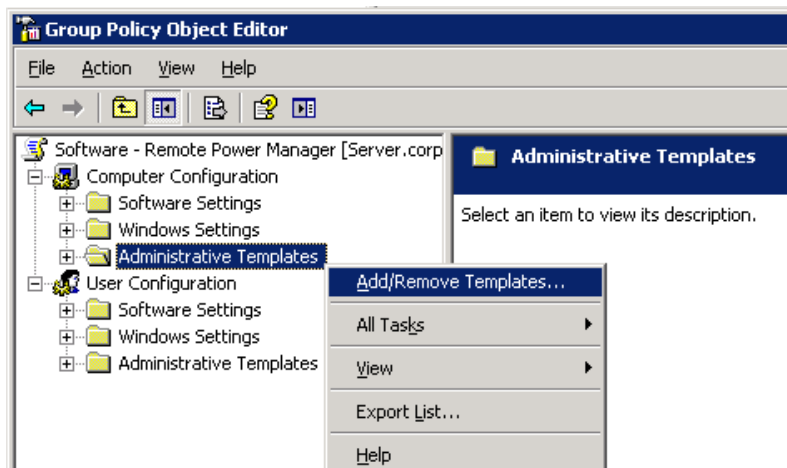


7. Tick **Computer Configuration**
8. Click **Browse** and locate the UNC path where you wish to store the resulting .POL file.

NB: A UNC path should be used to avoid problems with drive letter mapping. This path should be accessible to workstation objects that you wish to configure.



9. Select **Edit Policies**. The **Windows Group Policy Object Editor** will open
10. Navigate to the **Computer Configuration / Administered Templates**, right click and select **Add/Remote Templates**:



11. Click **Add** and locate the **PowerMAN5.adm** file supplied.

NB: It may be helpful to remove the other administrative templates present using the **Remove** button. These are not required for PowerMAN.

12. The **Administrative Templates** section should now contain a section for **PowerMAN Power Management** (other sections may be present depending on server configuration). Select the **PowerMAN Power Management** section and configure the appropriate PowerMAN settings.

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13. For instance, to configure the license settings select **Product Licensing**, right click and select **Properties**
14. Select **Enabled**, carefully enter the product details supplied with the software, and click **Ok**



15. When the appropriate settings have been configured close the Group Policy Object Editor and return to the ZENworks package settings
16. Open the **Policy Schedule** tab, drop down **Schedule Type**, and select **Event**
17. Configure the policy to apply on the **Service Startup** event.
18. Open the **Associations** tab and select the container(s) you wish to associate this settings package with.
19. Click **OK** to complete the package configuration

There is further information about Group Policy based workstation packages on the Novell website:

<http://www.novell.com/documentation/zenworks65/?page=/documentation/zenworks65/dmadmin/data/a777rvi.html>

Appendix C – PowerMAN Configuration with RM Community Connect 3

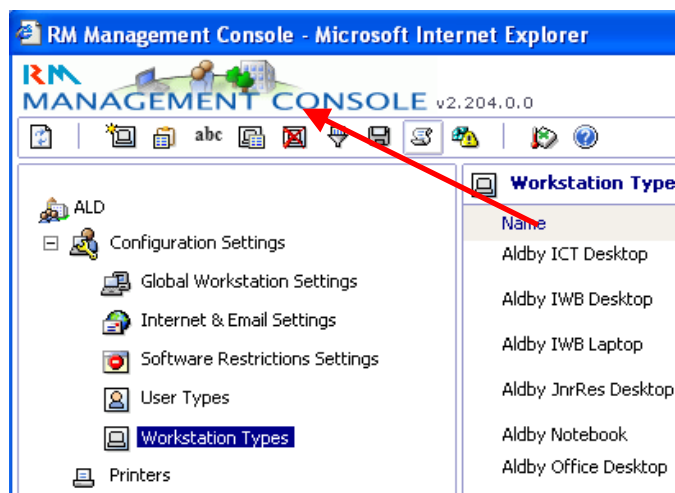
The following section describes the basic configuration approach for RM Community Connect 3. A similar method may be used for other versions of Community Connect (CC).

To configure PowerMAN using RM Community Connect proceed as follows:

1. Locate the PowerMAN ADM file and copy it to the location where group policies are stored on the server.

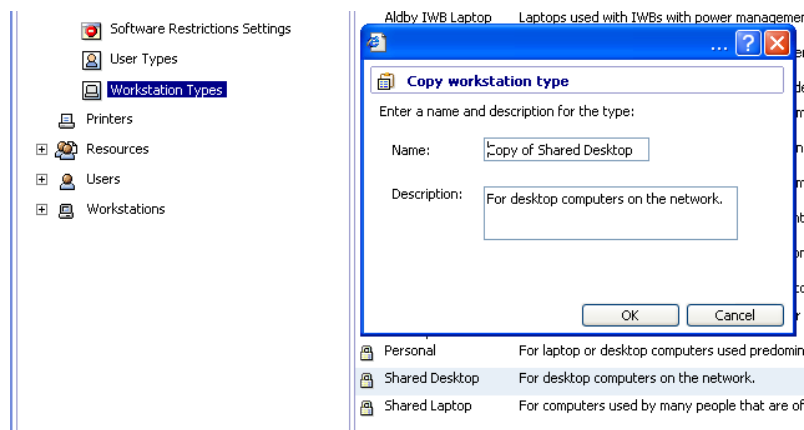
NB: On a workstation, this folder is normally L:\Type Manager\ADM (e.g. the RMManage share) or if at the server, it is D:\RMDelivery\RMManage\Type Manager\ADM.

2. Login to the RM Management Console (RMMC) as System Admin.
3. Expand Configuration settings and click on 'Workstation Types' and then on 'Type Options' at the top (4th button from the right).



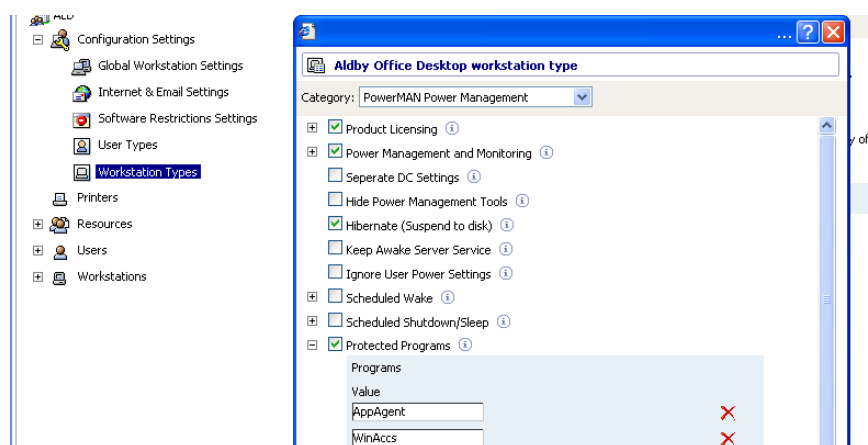
4. A drop down list will appear. Tick the new policy and click OK.
5. The new policy will be applied to a group of computers. To create a workstation type (it is not possible to change the properties of standard RM workstation types), select an appropriate workstation type to copy, e.g. Shared Desktop. Right-click on it, select copy and then give the workstation type a meaningful name.

Hint: Avoid using a name with something which is exactly the same as your 3-letter establishment code as this can sometimes cause confusion in Active Directory. In the example above and below, the code is ALD but workstation type names start with Aldby.



6. Edit the properties of the new workstation type. Double click the new type and select the PowerMAN Power Management option from the drop-down list.
7. Configure the product licence details and other PowerMAN settings as required.

Hint: It can be helpful to configure 'AppAgent' and 'WinAccs' as protected programs. This will avoid the computers suspending whilst lengthy updates are being installed.



8. Finally select a workstation computer to test the policy. Apply the policy to this workstation by assigning that workstation to the new workstation type. To do this locate the PC in the RMMC, select its properties, and on the General page, change the workstation type to be the new one. Restart the computer (a second reboot may sometimes be required) and the policy should be applied.

Hint: A useful tip is to make a change to the screen-saver, or the colour of the pre-login desktop at the same time as you are making other policy. Then when you see that, you know that the other policy will be in effect, too.

Appendix D – PowerMAN Policy Settings Reference

PowerMAN is designed, primarily, for configuration with the Microsoft Windows group policy tools supplied with all recent versions of Windows Server. An Administrative Template (ADM) file is supplied to simplify this process.

PowerMAN may also be configured by manually creating a suitable settings and importing them into the system registry of the deployed workstation computers. This section documents the supported policy settings and their default values. In a few cases options are available via the registry are deliberately omitted from the associated ADM file. These options are intended for advanced configuration and troubleshooting.

General Information

Unless otherwise noted all settings are of type REG_DWORD. True is indicated by 1. False is indicated by 0. Where no value is specified for a setting (it is missing) a sensible default value is assumed.

The following are valid values for settings marked **_ACTION**:

_ACTION Meaning	REG_DWORD Value
PowerActionNone	0
PowerActionSleep	2
PowerActionHibernate	3
PowerActionShutdownOff	6

The following are valid values for settings marked **_STATE**:

_STATE Meaning	REG_DWORD Value
PowerSystemWorking	1
PowerSystemSleeping1	2
PowerSystemSleeping2	3
PowerSystemSleeping3	4
PowerSystemHibernate	5
PowerSystemShutdown	6

The following table may be useful for calculating values expressed in seconds:

Time in seconds	REG_DWORD Value (Decimal)
Disabled	0
1 Minute	60
5 Minutes	300
60 Minutes	3600 etc

Product Licensing

The product license settings are stored in **HKLM\SOFTWARE\Policies\PowerMAN:**

Registry Setting Name / Type	Meaning
RegisteredOrganisation REG_SZ e.g. Example Supplies Ltd	Organisation name supplied with the PowerMAN product key. This forms part of the product key and must be entered exactly.
RegisteredProductKey REG_SZ e.g. KHAT-RDJV-XGQX-JURT-KKXR-KYTH	The product key supplied with PowerMAN. This is exactly six groups of four characters separated by five dashes.

Power Management and Monitoring (Reporting)

The reporting settings are stored in **HKLM\SOFTWARE\Policies\PowerMAN:**

Registry Setting Name / Type	Meaning
SiteGUID REG_SZ e.g. {c0388a36-0826-4566-ba64-c22a96cb7863}	Unique site identity used to track a group of computers that are managed as a single entity. This value can be generated with the <code>Makeguid</code> command line option.
LogServer REG_SZ e.g. pmstats.org	The address of the logging server. This can be blank if management reporting information is not required. The standard logging server is pmstats.org
LogServerPort REG_DWORD e.g. 8080	The port number of the logging server. This is usually either 80 or 8080. The pmstats.org server port is 8080 .
LogProxy REG_SZ e.g. 192.168.1.1	The address of the local proxy server that PowerMAN must use to send management information to the logging server. This can be blank if a proxy server is not required.
LogProxyPort REG_DWORD e.g. 8080	The port number of the proxy server. This is typically 8080. This value has no effect if a proxy server address is not defined.
CacheBackup REG_SZ	Some sites frequently reinstall (sometimes called re-image) workstations to ensure a smooth user experience. In such sites the most recent power usage information can be lost during a re-installation. This can be avoided by configuring PowerMAN to store a backup of the usage information. It is the responsibility of the system administrator to ensure that this file is protected during the

e.g. %windir%\system32\logfiles\PowerUsage.xml	reinstallation process by either excluding it from being over-written or by moving it to a save location. This seeing must refer to a <i>local</i> path.
---	---

Miscellaneous Configuration

PowerMAN supports the following miscellaneous features on a per-machine basis. These are stored in **HKLM\SOFTWARE\Policies\PowerMAN**:

Registry Setting Name / Type	Meaning
HidePowerOptions REG_DWORD 0=Disable 1=Enable (hide)	Hide the Power Management control panel applet and the Screen Saver configuration tab of the display properties applet. See notes below.
EnableHibernate REG_DWORD 0=Disable 1=Enable	Enable support for the hibernate (S4) power saving option. This is the same as ticking the hibernate option in the local control panel applet. If hibernate is not enabled attempts to hibernate will normally result in a suspend to RAM (S1-S3) instead.
SeperateDCPolicy REG_DWORD 0=Disable 1=Enable	Allow separate DC settings to be configured. When disabled any DC settings are ignored. This option should be set to not-configured or disabled except when configuring PowerMAN for use with portable computers. If separate DC settings are used care should be taken to ensure they are compatible with the AC settings.
ServerServiceKeepAwake REG_DWORD 0=Disable 1=Enable	When enabled and the Server service is running, the system will not sleep, hibernate or shutdown. This option should normally be either not configured or disabled unless specifically required as incorrect configuration will result in increased energy consumption. This option has no effect if the Server service is not running.
IgnoreUserSettings REG_DWORD 0=Disable 1=Enable	Ignore any user specific power settings. When a user is logged in the Default User settings will apply. When no user is logged in the No User settings will apply.

Scheduled Events

PowerMAN supports both scheduled wake and shutdown features. These are stored in **HKLM\SOFTWARE\Policies\Powerman**

Days for auto-shutdown/wake are configured using the following bit mask values:

DAY	REG_DWORD Value
Sunday	1
Monday	2
Tuesday	4
Wednesday	8
Thursday	16
Friday	32
Saturday	64

To determine the value for a specific combination of days add the required values together:

For example:

Weekdays (Monday-Fri)	= 62
Weekends (Sat/Sun)	= 65
Everyday (Sun-Sat)	= 127

The supported scheduled wake settings are as follows:

Registry Setting Name / Type	Meaning
AutoWakeDays REG_DWORD Sun=1, Mon=2, Tues=4...Sat=64 etc e.g. 62 (Monday-Fri)	The weekdays that the scheduled wake policy will apply (typically All or Mon-Fri). This option may be extended by editing the ADM file. See appendix for further details.
AutoWakeLocalTime REG_SZ Time in hh:mm:ss format (seconds are optional) e.g. 08:55	The local time that the computer is scheduled to wake. Typically this value is set to be a few minutes before the user requires the computer. Remember that, depending on other power settings, the computer may shutdown or sleep if no activity occurs within the timeout period. Policy is enabled by presence of both valid AutoWakeDays and AutoWakeLocalTime settings

Similarly the supported scheduled shutdown/sleep settings are as follows:

Registry Setting Name / Type	Meaning
AutoShutdownDays REG_DWORD Sun=1, Mon=2, Tues=4...Sat=64 etc e.g.	The weekdays that the scheduled action will apply (typically All or Mon-Fri). This option may be extended by editing the ADM file. See appendix for further details.

62 (Monday-Fri)							
AutoShutdownLocalTime REG_SZ Time in hh:mm:ss format (seconds are optional) e.g. 18:00	The local time that the computer is scheduled to enter the specified state. Typically this value is set to be a few minutes after the closing of a public access area.						
AutoShutdownMode REG_DWORD <table border="1"> <tr> <td>0</td><td>Ignore action if user logged on</td></tr> <tr> <td>1</td><td>Warn user. Allow user cancel</td></tr> <tr> <td>2</td><td>Warn user. No allow user cancel</td></tr> </table> e.g. 1	0	Ignore action if user logged on	1	Warn user. Allow user cancel	2	Warn user. No allow user cancel	How to apply the specified action.
0	Ignore action if user logged on						
1	Warn user. Allow user cancel						
2	Warn user. No allow user cancel						
AutoShutdownAction REG_DWORD This must be one of the value _ACTION values noted above. e.g. 3 (PowerActionHibernate)	<p>The action to take. This may be sleep, hibernate or power off.</p> <p>The policy is enabled by the presence of a valid combination of all four AutoShutdown policy settings.</p>						
AutoShutdownAllowResume REG_DWORD 0=Disable 1=Enable	<p>Allow system to wake from one power saving state to transition to another. If this feature is not enabled the system will remain in the other state and ignore the scheduled shutdown/sleep policy.</p> <p>This feature is typically used in sites that have a lower sleep policy during the daytime and wish to transition to a deeper state at night time. As noted elsewhere this feature requires that the hardware correctly supports a scheduled wake operation. No all hardware is capable of doing this and some hardware incorrectly reports that it supports this.</p>						
AutoShutdownOverrideMode REG_DWORD 0=Operation is not inhibited 1=Protected files/programs inhibit 2=Any application may inhibit	Allow other applications (including protected files and programs) to inhibit the shutdown/sleep operation.						

Global (All User) Power Settings

PowerMAN supports the following global power management features on a per-machine basis. These are stored in **HKLM\SOFTWARE\Policies\PowerMAN\AllUsers**:

Registry Setting Name / Type	Meaning
Enable REG_DWORD 0=Disable 1=Enable (default)	Enable or disable All User Power settings. This is enabled by default. Setting this value to 0 can temporarily disable these settings. This is the same as deleting the HKLM\SOFTWARE\Policies\PowerMAN\AllUsers registry key.
LidOpenAcState REG_DWORD This must be one of the value _STATE values noted above. e.g. 0 (PowerSystemWorking)	The action to take, when running on AC power, when the computers lid (if present) is opened. Support for this feature may not be present on all hardware.
LidOpenDcState REG_DWORD	As above but applies when running on DC power
PowerButtonAcAction REG_DWORD This must be one of the value _STATE values noted above. e.g. 4 (PowerSystemHibernate)	The action to take, when running on AC power, when the power button is pressed.
PowerButtonDcAction REG_DWORD	As above but applies when running on DC power
SleepButtonAcAction REG_DWORD	The action to take, when running on AC power, when the sleep button (if present) is pressed.
SleepButtonDcAction REG_DWORD	As above but applies when running on DC power
LidCloseAcAction REG_DWORD	The action to take, when running on AC power, when the computers lid (if present) is shut. Support for this feature may not be present on all hardware.
LidCloseDcAction REG_DWORD	As above but applies when running on DC power
EnablePasswordOnWake REG_DWORD 0=Disable 1=Enable	Require a password when the computer wakes from sleep or hibernate. This should normally be enabled.
EnableShowPowerMeter	Show the power meter on the task bar. This

REG_DWORD 0=Disable 1=Enable	policy should generally only be enabled for laptop computers.
EnableDimVideoDc REG_DWORD 0=Disable 1=Enable	Dim the screen when running on DC power. This policy is typically only supported by some laptop computers.

User, Default User and No User Power Settings

PowerMAN supports three different types of power settings. All support the same options but are stored in different registry locations:

1. User specific settings are stored in **HKCU\SOFTWARE\Policies\Powerman\User**
2. No User settings (for the logon prompt when nobody is logged on) are stored in **HKLM\SOFTWARE\Policies\Powerman\NoUser**.
3. Default User settings (for users without their own specific configuration) are stored in **HKLM\SOFTWARE\Policies\Powerman\DefaultUser**. These are used for every use and the logon prompt 'user' unless another specific policy is applied

Registry Setting Name / Type	Meaning
LogoutAcTimeoutSeconds REG_DWORD e.g. 300 (5 minutes)	The inactive time, in seconds, when running on AC (mains Power), that will trigger the user to be logged about. This time is measured since the last user activity (mouse or keyboard input). This setting is not available for the NoUser policy.
LogoutDcTimeoutSeconds REG_DWORD	As above but applies when running on battery power. This setting is not available for the NoUser policy.
LogoutForce REG_DWORD 0=Disable 1=Enable	When enabled this option will force the logout to occur. If this setting is not enabled an application may veto the logout. Typically applications do this to prompt the user to save unsaved work therefore, if this setting is enabled, user data loss may occur. This setting is enabled for environments where data integrity is not a concern. This setting is not available for the NoUser policy.
IdleAcAction REG_DWORD This must be one of the value _ACTION values noted above. e.g. 3 (PowerActionHibernate)	The action to take (shutdown, suspend, hibernate, nothing) upon entering the idle state
IdleDcAction	The inactive time in seconds, when running on AC (mains power), that will trigger the idle action.

REG_DWORD	
IdleAcSensitivity	The level of sensitivity applied by Windows to detect system idle. The Windows default is 50%. Some systems fail to reach idle due to background system activity. In this situation it can be useful to lower this value. A value of 5% is recommended. This must be between 5% and 90%
REG_DWORD e.g. 50 (Windows default)	
IdleDcTimeoutSeconds	Same as IdleAcAction but applies when running on battery power.
REG_DWORD	
IdleDcTimeoutSeconds	As above
REG_DWORD	
IdleDcSensitivity	As above
REG_DWORD	
VideoTimeoutAcSeconds	The inactive time in seconds, when running on AC power, before switching the console monitor off.
REG_DWORD	
VideoTimeoutDcSeconds	Same as VideoTimeoutAcSeconds but applies when running on battery power.
REG_DWORD	
HDDTimeoutAcSeconds	The inactive time in seconds, when running on AC power, before switching the hard disk off.
REG_DWORD	NB: This policy may not be very effective on many systems that perform frequent background tasks. See troubleshooting section for further information.
HDDTimeoutDcSeconds	Same as HDDTimeoutAcSeconds but applies when running on battery power
REG_DWORD	
CPUThrottleAc	The processor throttling policy to apply when running on AC power.
REG_DWORD	Adaptive – Match performance to demand
	Degrade – Maximize energy saving by reducing CPU performance
	None – Maximize performance (increased energy consumption)
	Processor throttling is not available on all hardware and is ignored if it is not supported.
	Typically this setting should be set to Adaptive when a user is present but may be set to Degrade when no user is logged on.
e.g. 3 (Adaptive)	
CPUThrottleDc	As per CPUThrottleDC but applies when running on battery power
REG_DWORD	

Policy Enforcement Settings

PowerMAN allows the administrator to enforce the specified idle settings. These can be used to ensure that the specified idle action will occur and cannot be suppressed by Windows or another program. These are necessary on some systems where the installed software may periodically reset the Windows idle timer or otherwise prevent the system from idling.

Policy Enforcement Setting	Meaning
ForceIdleAcExtraTimeoutSeconds REG_DWORD e.g. 300 (5 minutes)	The amount of time, in addition to the specified idle timeout after which the idle action will be forced.
ForceIdleDcExtraTimeoutSeconds REG_DWORD	As above but applies when running on battery power.

Protected Object Settings

PowerMAN allows the administrator to specify programs and files that, when running or present respectively, will prevent the system from enter the idle state. These are specified by listing creating a value in the following registry keys. The name of the value is not important (Windows numbers them when configured with the administrative template)

- HKLM\SOFTWARE\Policies\PowerMAN\ProtectedFiles
- HKLM\SOFTWARE\Policies\PowerMAN\ProtectedPrograms

Protected Setting	Meaning
ProtectedPrograms REG_SZ e.g. CMD	<p>Specifies a list of programs that, when running, require the system to remain awake.</p> <p>Program names should be specified without a file extension.</p> <p>e.g. CMD and <i>not cmd.exe</i></p>
ProtectedFiles REG_SZ e.g. C:\CONDOR\ACTIVE.LOG	<p>As above but applies to files. When a file in the protected list exists PowerMAN will ensure that the system remains awake.</p> <p>Files should be fully qualified and include a file extension.</p> <p>e.g. C:\CONDOR\ACTIVE.LOG</p>

Resume Configuration Settings

By design Windows will return to the previous low power state two minutes after an automatic resume if there is no user activity. On some systems application behaviour may interfere with this behavior or it may be undesirable.

PowerMAN's **Resume Configuration** feature allows this Windows feature to be inhibited where necessary:

Resume Configuration Setting	Meaning
ResumeDisableResuspendSeconds REG_DWORD 	The inactive time, in seconds, during which PowerMAN will prevent the system from returning to the previous low power state. If no user activity occurs during this period PowerMAN will subsequently allow the PC to return to the previous low power state. This process is terminated immediately upon any user activity
ResumeActivateMonitor REG_DWORD 0=Disable 1=Enable *This feature is not supported on some hardware platforms or graphics cards.	Allow the display to be turned on following an automatic system resume.

Debugging / Advanced Settings

The following debugging settings are supported. These settings are located in **HKLM\SOFTWARE\Policies\Powerman**. These are intended primarily for resolving problems under the instruction of Technical Support.

Setting	Meaning / Supported Values
IgnoreSystemActive REG_DWORD 0=Disable 1=Enable e.g. 1	When enabled this option will ignore other related tools (such as PowerCONFIG and PowerSTART). This means that non-user activity will not be reported and will be counted as idle time. This also means that such activity, or the user configuration in PowerCONFIG, will not prevent the idle or logout policies from functioning. Use this option to enforce a policy regardless of user preferences.
HostPollMS REG_DWORD e.g. 60000 Note: This value is in milliseconds	How often PowerMAN checks the current power status. This should happen at least once per minute. The default setting is 60 seconds.

PolicyUpdateMS REG_DWORD e.g. 600000 Note: This value is in milliseconds	How often PowerMAN updates the active power settings. Typically PowerMAN checks the system every 10 minutes. This option may be used to speed up (or slow down) this process. Warning: Values below 30s can have a very detrimental impact on system performance.
CacheDays REG_DWORD e.g. 28	Power data is normally cached for up to 28 days. This allows logging to continue when the client computer is off the network or the logging server is unavailable. This setting can be used to adjust this default value. The power logs are stored in HKLM\SOFTWARE\Powerman\Logs
RemoveCorruptPolicies REG_DWORD 0=Disable 1=Enable (default)	Remove corrupt power policies. PowerMAN beta testing found a scenario where certain third party utility may create corrupt power policies. Such policies prevent PowerMAN from operating correctly and prevent Windows from correctly configuring power management. By default PowerMAN removes such invalid policies.
UploadTimeoutMS REG_DWORD e.g. 5000 Note: This value is in milliseconds	How long PowerMAN will wait for the server before terminating an upload attempt. The default is 5 seconds
EventLoggingLevel REG_DWORD 0 = Standard information only (default) 1 = Additional information 2 = All information (maximum verbosity)	The level of event logging detail required. This may be one of the supported values shown. Logging additional information may fill the event log and cause other events to be lost. This option should therefore only be enabled when required.

Appendix E - Alternative Configuration Method - Local Group Policy / Registry Settings

It can be time consuming and potentially error prone to manually create the required settings. It is recommended that the Group Policy / ADM method is used wherever possible. However, if this approach is not practical it is possible to use the ADM file on a **local computer** to generate a master configuration and then deploy this using the built-in Windows Registry tools. This **Local Group Policy** approach has the advantage that it will create a consistent and reliable configuration with less likelihood of errors.

To use the ADM file on a local PC proceed as follows:

1. Install Windows XP on a computer that is **not** a member of a domain. It is not necessary for the PowerMAN service to be installed on the computer.
2. Create a folder, for example C:\PowerMAN and place a copy of the PowerMAN5.adm file within the folder.
3. Launch the Microsoft Management Console (MMC.EXE)
4. Navigate to the File menu and select Add/Remove Snap-in
5. Click Add
6. Select Group Policy Object Editor and click Add
7. The snap-in will default to Local Computer mode. This is correct. Click Finish
8. Click Close and then Ok to return to the main MMC window
9. Expand Local Computer Policy
10. Select Administrative Templates
11. Right click and select Add/Remote Templates
12. Click Add and locate the Powerman5.adm file. When finished click Close
13. Configure the desired power settings as per the GPO method instructions
14. Save the snap-in for later reuse (this avoids repeating steps 4-12 again) by selecting File/Save As and selecting the filename Powerman5.msc
15. Exit the management console
16. Export the generated registry settings for deployment on other computers by using the following command to create a file called PM.REG:

```
REG EXPORT HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Powerman PM.REG
```

17. Deploy the settings to the required computers using your chosen deployment method. This could be one of the following:

i. REG IMPORT PM.REG

ii. REGEDIT /S PM.REG

iii. Third party deployment tool

18. If you need to create additional settings the following small batch file may be helpful. This overwrites the locally cached copy of the PowerMAN5.adm file and launches the previously saved snap-in. This process is particularly necessary if a new version of the ADM file has been released (it is normally only copied to the %windir%\system32\grouppolicy\adm\ folder when the snap-in is first configured):

```
COPY powerman5.adm %windir%\system32\grouppolicy\adm\powerman5.adm
```

```
MMC powerman5.msc
```

Example Registry File

The following registry example contains the settings for a basic site with the following properties:

1. Site GUID is {bf9d6144-02f1-4292-9f59-225fae4fd7de}
2. Log server is **pmstats.org:8080** (0x1F90 in hexadecimal)
3. A Default User policy applies that hibernates the system after 30 minutes (0x708 seconds) and turns off the monitor after 10 minutes (0x258 seconds)
4. A No User policy applies that powers off the computer after 10 minutes (0x258 seconds) when no user is logged on
5. Policy enforcement (anti-insomnia) that provides a 5 minute (0x12c seconds) grace period

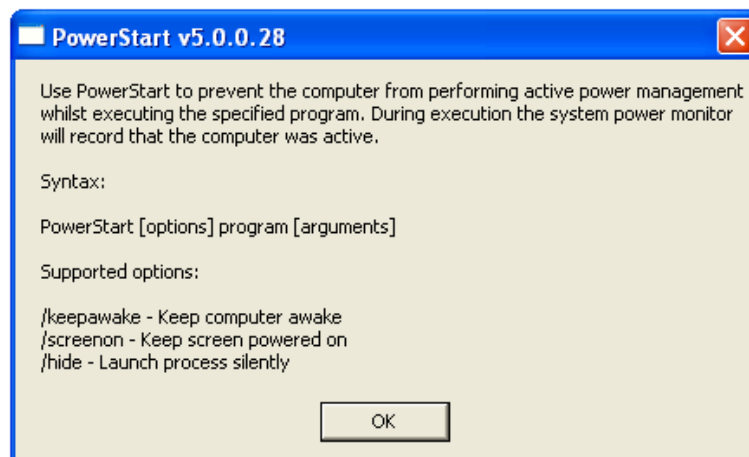
Windows Registry Editor Version 5.00

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Powerman]
"SiteGUID"="{bf9d6144-02f1-4292-9f59-225fae4fd7de}"
"LogServer"="pmstats.org"
"LogServerPort"=dword:00001f90
"ForceIdleAcExtraTimeoutSeconds"=dword:0000012c
"ForceIdleDcExtraTimeoutSeconds"=dword:0000012c
```

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Powerman\DefaultUser]
"IdleAcTimeoutSeconds"=dword:00000708
"IdleAcAction"=dword:00000003
"IdleDcTimeoutSeconds"=dword:00000708
"IdleDcAction"=dword:00000003
"VideoTimeoutAcSeconds"=dword:00000258
"VideoTimeoutDcSeconds"=dword:00000258
"HDDTimeoutAcSeconds"=dword:00000258
"HDDTimeoutDcSeconds"=dword:00000258
```

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Powerman\NoUser]
"IdleAcTimeoutSeconds"=dword:00000258
"IdleAcAction"=dword:00000006
"IdleDcTimeoutSeconds"=dword:00000258
"IdleDcAction"=dword:00000006
"VideoTimeoutAcSeconds"=dword:00000258
"VideoTimeoutDcSeconds"=dword:00000258
"HDDTimeoutAcSeconds"=dword:00000258
"HDDTimeoutDcSeconds"=dword:00000258
```

Appendix F – PowerSTART Tool



It is sometimes desirable to ensure the computer does not sleep or hibernate whilst performing an important task. This can be difficult to ensure whilst using standard idle based power conservation and may result in active power management being sacrificed to ensure correct operation.

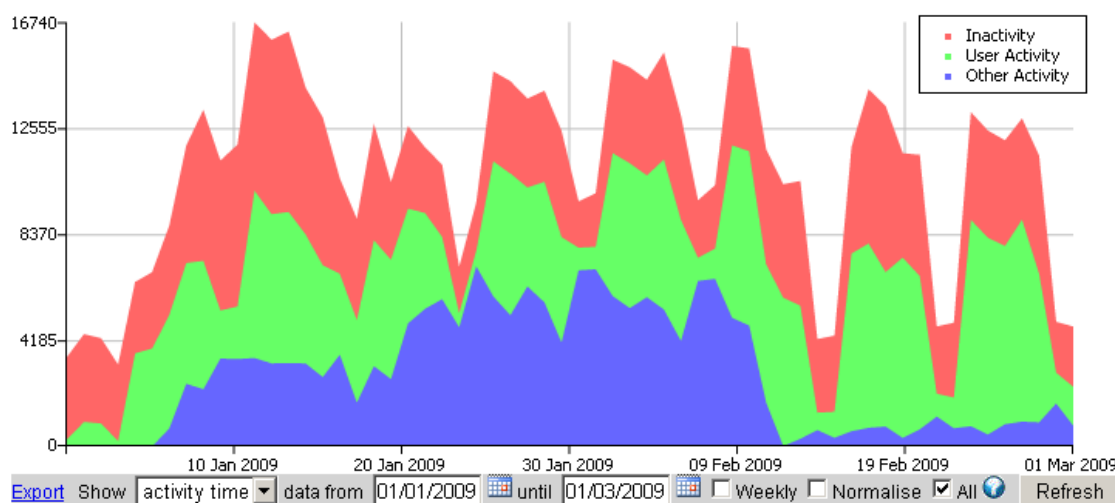
PowerMAN is supplied with a utility called PowerSTART that be used to launch a critical application. PowerSTART is included in the main PowerMAN installation when installed from the MSI file.

PowerStart can launch almost any application and whilst that program is executing will:

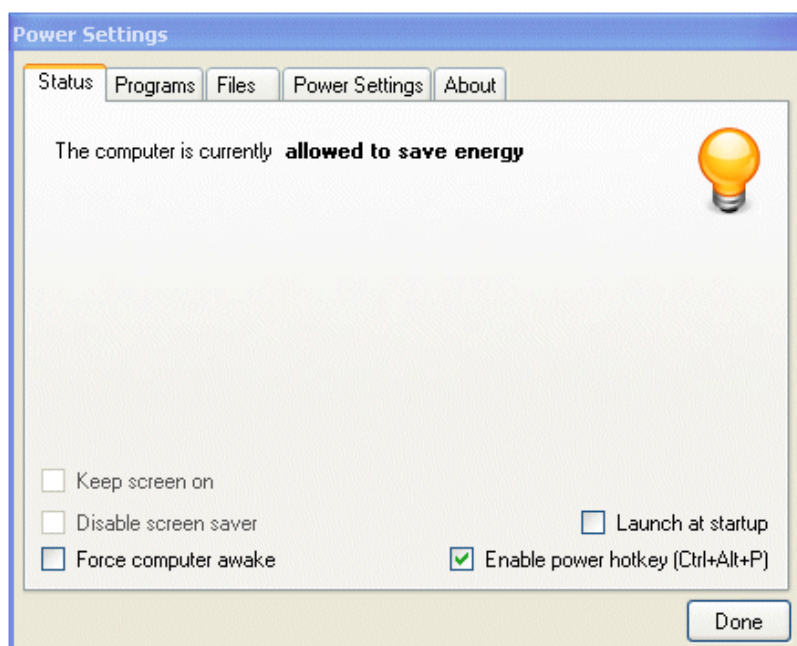
- Log that system was not idle (even when no user is present)
- Prevent the computer from entering the idle state

Programs launched with PowerSTART are labeled 'Other Activity' in the PowerMAN reports. This activity is shown in blue and can therefore be easily distinguished from user activity shown in green:

Activity / Hours



Appendix G – PowerCONFIG Tool



The Power Configuration Tool (PowerCONFIG) is designed to complement PowerMAN. The tool is intended for situations where the user requires the computer to remain powered-on regardless of the activity level.

The administrator specified power configuration can be overridden in the following ways:

- Manual setting to prevent sleep/shutdown
- Prevent sleep/shutdown when specified protected program(s) are running
- Prevent sleep/shutdown when specified protected file(s) exists
- Disabled centrally configured power policy from applying
- Keep the screen on
- Prevent screen saver from activating
- Keep the system active when the Server service is running

PowerCONFIG also allows the administrator to pre-configure the following options:

- Policy based configuration of protected programs and files
- Enable/disable features available to user

PowerCONFIG prevents Windows power management from operating by preventing the system from enter the idle state. PowerConfig will not prevent a user or third-party program from **deliberately** shutting down or suspending the computer. PowerCONFIG is included with every PowerMAN purchase but is installed as a separate application to maximize configuration flexibility.

Regular use of the PowerCONFIG tool will reduce the energy efficiency of the PC and therefore increase the running cost. The program should only be used where absolutely required. PowerMAN offers other features such as **Remote and Scheduled Wake** which may be used to activate a PC when access is required whilst still maintaining energy efficiency.

Appendix H – PowerMAN Data Logging Protocol

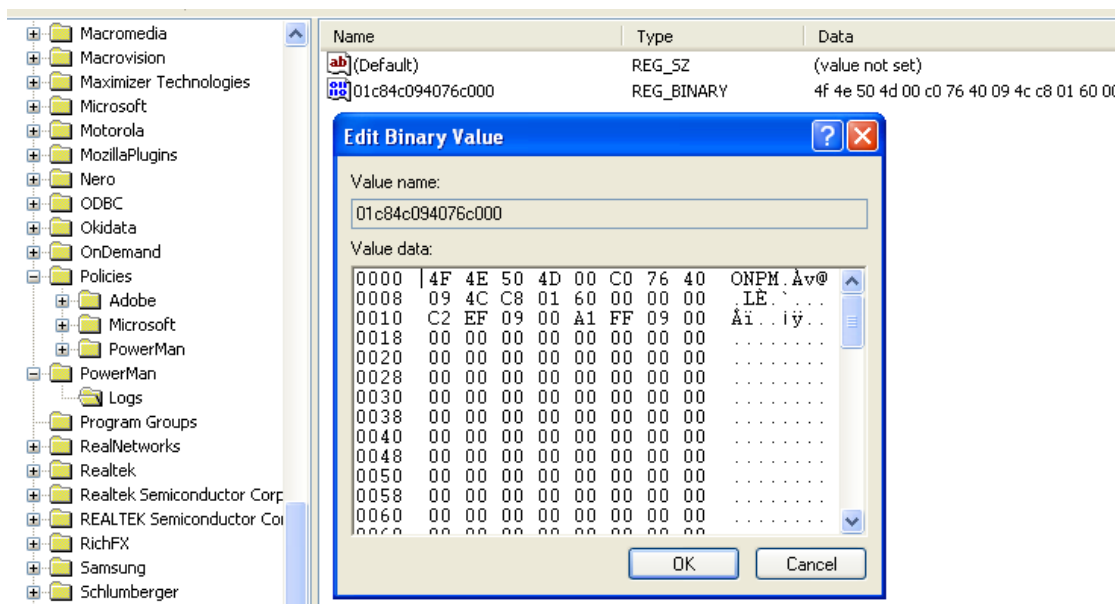
PowerMAN collects power related information on a per computer basis. This information may be used to understand the usage profile of managed PC equipment, create a tailored management policy and monitor the ongoing effectiveness of the policy.

Information is collected in an anonymous format that cannot be used to identify a specific user or the activity the user is performing. The information is uploaded in XML format using the industry standard HTTP POST protocol.

The log data is stored in the `HKEY_LOCAL_MACHINE\SOFTWARE\PowerMAN\Logs` key of the Windows registry. Logs are stored in binary format with a single binary record representing an entire day. Slightly less than 500 bytes of information are logged in each record. The protocol is designed to impose the minimum demand on network bandwidth and be compatible with all known proxy servers.

In normal circumstances only a single log record will be present. This represents the current active day. At midnight (or as soon as possible thereafter) PowerMAN creates a new log record and prepares to upload the previous record to the logging server. The upload is timed to happen at a random time usually between 00:00 and 03:00. If the upload is successful the log record is deleted from the registry. If the log transfer fails for any reason it is reattempted approximately every two hours until successful.

The power reporting is 'historic' and performed using Universal Coordinated Time (UTC). If PowerMAN were to be installed today it would not report anything until tomorrow. PowerMAN will normally retain log records for up to 28 days. This allows logging to continue whilst the logging server or network connectivity is unavailable. The number of days that logs are retained may be configured using the *PowerDataCacheDays* setting.



If you require further details of the PowerMAN logging and data transfer format please contact Data Synergy Technical Support.

Appendix I – Common Event Log Messages

PowerMAN includes a comprehensive event logging feature. This section explains the most common logged events. The exact wording of some events may change from one PowerMAN release to another. However, the general meaning of a specific event number will always be the same. Some events include parameters such as times, program or user names. The first parameter is shown as %1. The second parameter, if present, is marked %2 and so on.

Event	Meaning
1000	PowerMAN Power Management service installed.
1001	PowerMAN Power Management service uninstalled.
1002	PowerMAN Power Management service running.
1003	PowerMAN Power Management service stopped.
1009	<p>The Terminal Services service (TermService) failed to start within a reasonable time. This service is required by the PowerMAN Power Management service.</p> <p>The Windows Terminal Services Service did not start. PowerMAN requires this service to function on Windows XP. Please check that this service is set to either manual or automatic start (manual is the default).</p>
1013	<p>Additional debug power information will be reported. This is an intensive process and should only be used when absolutely necessary</p> <p>PowerMAN's debugging features are enabled. This will result in a much greater amount of information being logged in the event log. Sometimes a debug text file is also created. This option should not be enabled in a production environment for longer than necessary.</p>
1016	<p>No valid product key was found. Check product key and registered organisation name.</p> <p>The product key was missing or invalid. Please check it. The POWERMAN LICENSE command will report additional information.</p>
1019	<p>Product key has expired. Please contact your sales representative to obtain an updated product key. The software will continue to function in reduced functionality mode.</p> <p>Some types of product key are designed to expire after a certain time. Please obtain an updated product key.</p>
2000	System entering sleep/hibernate state
2001	System resumed
2002	System entering shutdown
2003	<p>The computer is being prevented from entering the idle state by an unknown program. This is NOT a program configured by the Administrator. This may result in increased energy consumption</p> <p>Another program, not part of the PowerMAN suite, is preventing the computer from entering a lower power state. Please consider using the policy enforcement feature or other debugging steps to determine the specific program that is causing the problem.</p>
2004	A program has indicated that it is performing activity and the computer is being prevented from entering the idle state. This may result in increased energy consumption.
2005	The computer is being prevented from entering the idle state because the Server Service is running. This may result in increased energy consumption
2006	The computer is being prevented from entering the idle state due to a protected

Event	Meaning
	program or file specified by the Administrator. This may result in increased energy consumption
2010	PowerMAN is preventing the computer from entering the idle state because it has recently automatically resumed.
4000	Removed invalid power policy for user Sometimes power policies can become inconsistent. This often happens when roaming profiles are used and the power policy in the roaming profile has no counterpart on the computer. PowerMAN removes such policies before creating a new one.
4003	Power policy for user checked and does not need to be updated The existing power settings match those configured by the administrator. No action is necessary.
4009	Automatic wake enabled for %1. The auto-wake operation may fail if not supported by hardware or if the system is shutdown. Most systems do not support wake from power off (S5) state.
4013	Scheduled shutdown/sleep policy enabled for %1
4016	The next power policy update is scheduled for around %1
4019	Scheduled sleep event. This system will suspend
4020	Scheduled hibernate event. The system will hibernate
4021	Scheduled shutdown event. The system will shutdown
4023	Scheduled wake event. The system is now active
4024	An invalid global power policy was found. The policy settings were %1
4025	An invalid power policy was found. The policy settings were %1
4026	A global power policy was found. The policy settings are %1
4027	A power policy was found. The policy settings are %1
4031	Due to recent activity rescheduled next power policy update for around %1 PowerMAN detected a change that requires the power policy to be checked / updated. The update is postponed for a few seconds to allow the system to stabilise.
4042	The power policy has been repeatedly applied %1 times. This may indicate that another program (or user) is changing the policy settings. It may also indicate a problem with the policy settings. If this continues please contact Technical Support Occasionally other programs may interfere with PowerMAN. This event warns that PowerMAN has repeatedly configured the chosen power settings because some other process is also changing them. If this event happens frequently you will need to investigate the cause of the problem.
4047	Enforced sleep event. This system will suspend. Last activity %1. Active timeout was %2 seconds The policy enforcement feature forced the computer to sleep. This happened because some other process was inhibiting the normal Windows idle timer.
4048	Enforced hibernate event. The system will hibernate. Last activity %1. Active timeout was %2 seconds The policy enforcement feature forced the computer to hibernate. This happened because some other process was inhibiting the normal Windows idle timer.
4049	Enforced shutdown event. The system will shutdown. Last activity %1. Active timeout was %2 seconds The policy enforcement feature forced the computer to power-off. This happened because

Event	Meaning
	some other process was inhibiting the normal Windows idle timer.
4051	User has been inactive for over %1s and will be logged out
4052	Scheduled shutdown/sleep event inhibited by protected service, program or file
4053	Scheduled shutdown/sleep event inhibited by an application or service that has requested the system remain active
4061	The system has automatically resumed and will be prevented from returning to previous power state for %1
4062	The system has automatically resumed but may return to the previous state shortly unless user activity prevents this. To avoid the system entering automatically re-entering a low-power state please consult product documentation
6009	Discarded some stale events. These are too old to be reported PowerMAN abandoned some historic power logs because they were older than the configured timeout. This usually happens if the PC has been turned off for an extended period. Although this does result in some loss of log continuity it is rarely a problem.
6013	Failed to upload XML (Error %1): %2 There was a problem transferring the power log data to the PowerMAN reporting server. The error number is normally a Windows Winsock error code indicating the cause of the problem. See http://msdn.microsoft.com/en-us/library/ms740668(VS.85).aspx for an explanation of these codes.
6015	Downloaded XML was corrupt: %1 The response from the PowerMAN server was incomplete. This may indicate a network or proxy server problem.
6016	Report operation fully completed. All data sent to server.
6017	Report uploads are disabled. Both a logging server and site identity are required. This can also be caused by a failure to correctly determine the computer identity
6020	No SiteGUID value configured. The computer is not a member of a reporting site. This will prevent power usage information being uploaded. To enable reporting features check the SiteGUID setting