BigFix® Power Management Deployment Guide

BigFix, Inc.
Emeryville, CA

Last Modified: 2/15/2008

Contents

Preface

Audience

This document describes the installation and operation of BigFix Power Management. It is intended for BigFix administrators and operators, as well as people evaluating the product.

Organization of this Manual

It is divided into four main sections:

- **Introduction**
- **Quick Start**
- **Using BigFix Power Management**
- **Frequently Asked Questions**

Conventions Used in this Manual

This document makes use of the following conventions:

Bold Sans	Bold sans-serif font is used for headings.
Bold	Bold font indicates labels and field names in the Web Reports user interface.
Italics	Italics are used for BigFix document titles.
`Mono-space`	Mono-space font is used for sample programs and scripts.

Versions

This document describes functionality available in BigFix Power Management Version 2.

Introduction

The BigFix Power Management site allows you to monitor, manage, and control the power usage settings of your computers. BigFix Power Management has been certified by major energy utilities so customers with the site may be eligible for rebates as high as $15 per computer.

Features of the site include:

- **Use Wake-on-LAN**—Power up Wake-on-LAN (WoL) enabled computers anywhere within your company.
- **Turn off or restart computers**—Easily manage restarting and powering off computers with a touch of a button.
- **Aggregate power usage summaries**—Find the answers to questions like: How many computers are powered off at night? How many computers are left on over the weekends? What percentage of the day are computers on?
- **View power-saving settings**—View a detailed breakdown of the power-savings settings of the computer including hibernation and stand-by settings, hard-drive and monitor shutdown settings.
- **Manage power-savings settings**—Looking to save money or become a "greener" company by reducing power usage? You can easily change the power-savings settings for all of your computers to optimize power usage.

Quick-Start

This section will help you get started with BigFix Power Management.

Beginning Setup

This procedure assumes that you have already installed BigFix.

1. Obtain a masthead for the BigFix Power Management site, by emailing licensing@bigfix.com.

   Refer to the *Console Operators Guide* for more information about mastheads.

2. Add the BigFix Power Management site:

   a. Double-click on the masthead file.

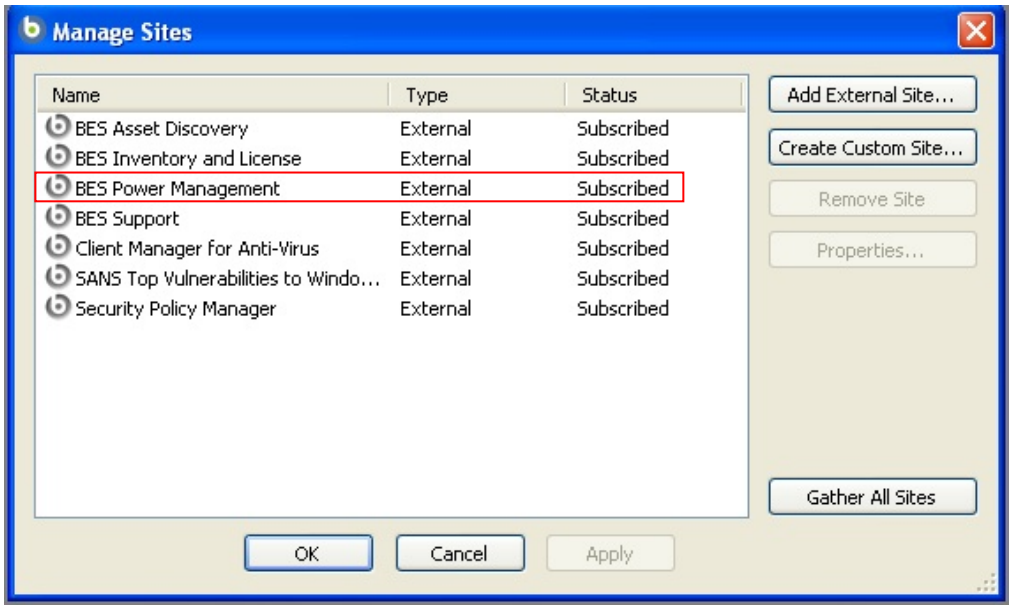
      A dialog box will appear, asking if you want to proceed with adding the site.

   b. Click **Yes**.

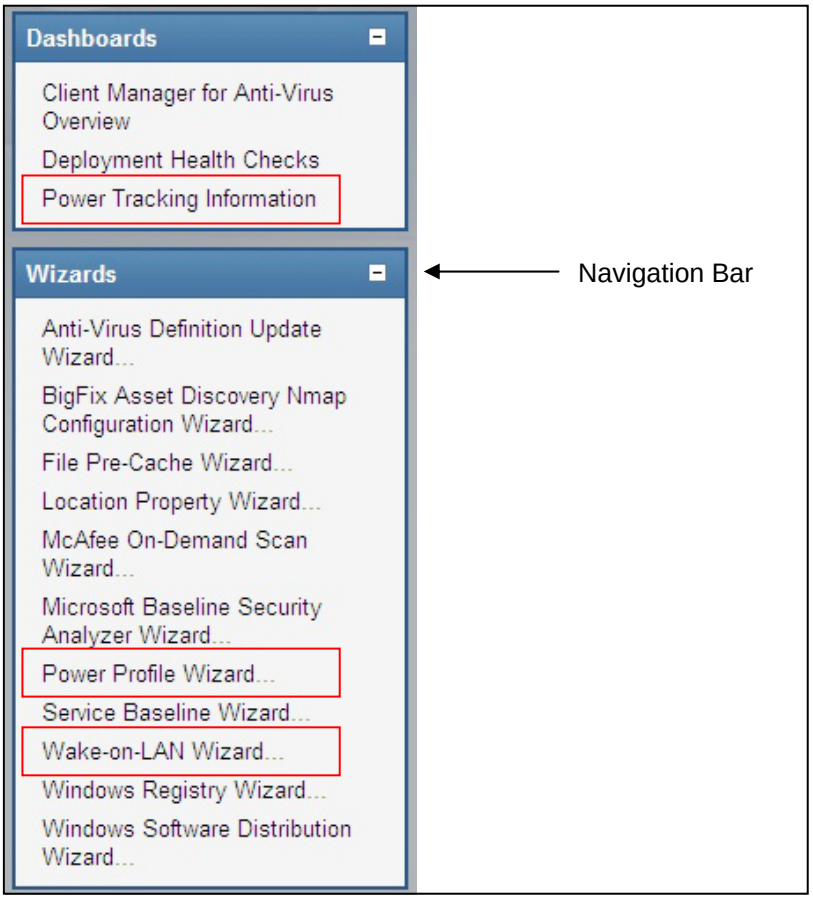
   c. Enter your Private Key Password and click **OK**.

   At this point, the BigFix Power Management site will begin the gathering process, in which Fixlets, Tasks, Analyses, etc. are gathered from the central BigFix server.

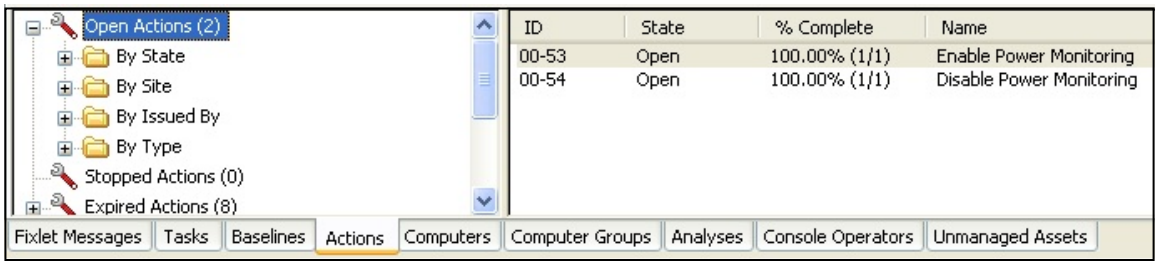
   When the gathering process is complete, the site's status will change to **Subscribed**.



You will see a new **Power Tracking Information** entry in the **Dashboards** menu, and links to the Power Management Dashboard and Wizard in your **Navigation Bar**.



BigFix Power Management adds new Actions to the console as well.



Using the Power Tracking Information Dashboard

The Power Tracking Information Dashboard is the central control panel for the BigFix Power Management site, from which you can also access the individual Fixlet messages, Tasks, and Analyses by going to the specific tabs in the BigFix Console.

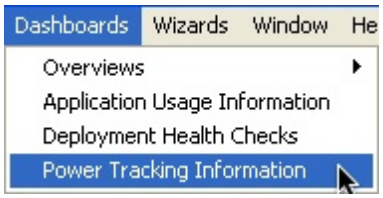
When the Dashboard is first opened, everything but the power control panel is hidden from you because you have not yet enabled power tracking and gathered power information from your computers. The Dashboard will lead you through the process of enabling the analyses that are necessary for using BigFix's full Power Management capabilities.

Initially, you will be prompted to enable power monitoring by selecting the computers that you wish to monitor. You can choose to make this action a **Policy** action by removing the expiration date so that new computers that come online will have monitoring automatically enabled. For more information about actions, consult the *Console Operator's Guide*.

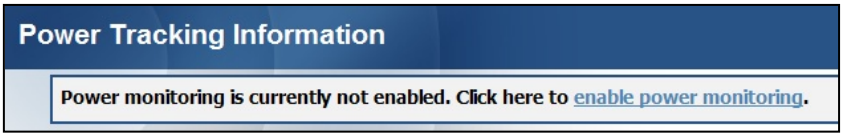
Activating the Dashboard

To activate the Dashboard:

1. Choose **Dashboards > Power Tracking Information**.

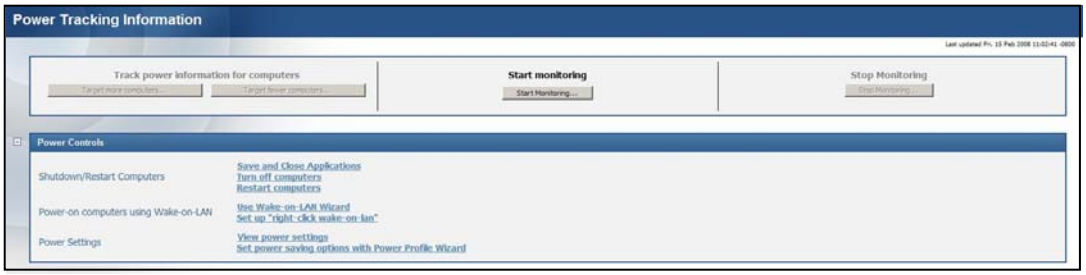


2. Click the **enable power monitoring** link.



3. Enter your Private Key Password.

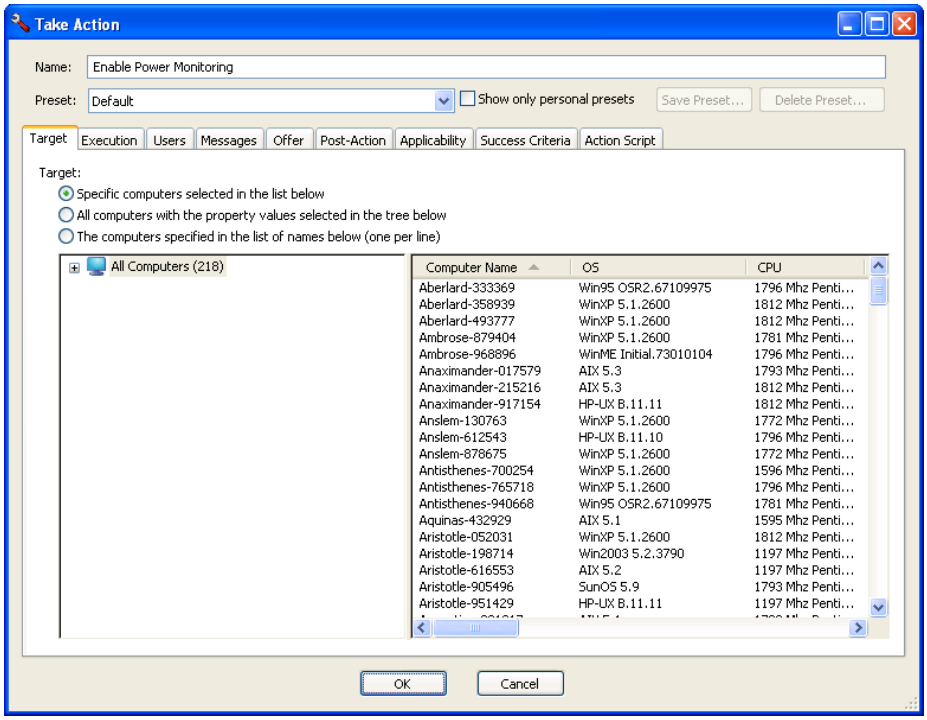
   The **Power Tracking Information** Dashboard opens, showing only the **Power Controls** panel.



4. Click the **Start Monitoring**… button and then enter your Private Key Password.

   When you start power monitoring, the BigFix Agent tracks powered-on statistics about each computer's uptime, powered-on time per day, and other power usage information used in power calculations.

   The **Enable Power Monitoring** Action window opens.



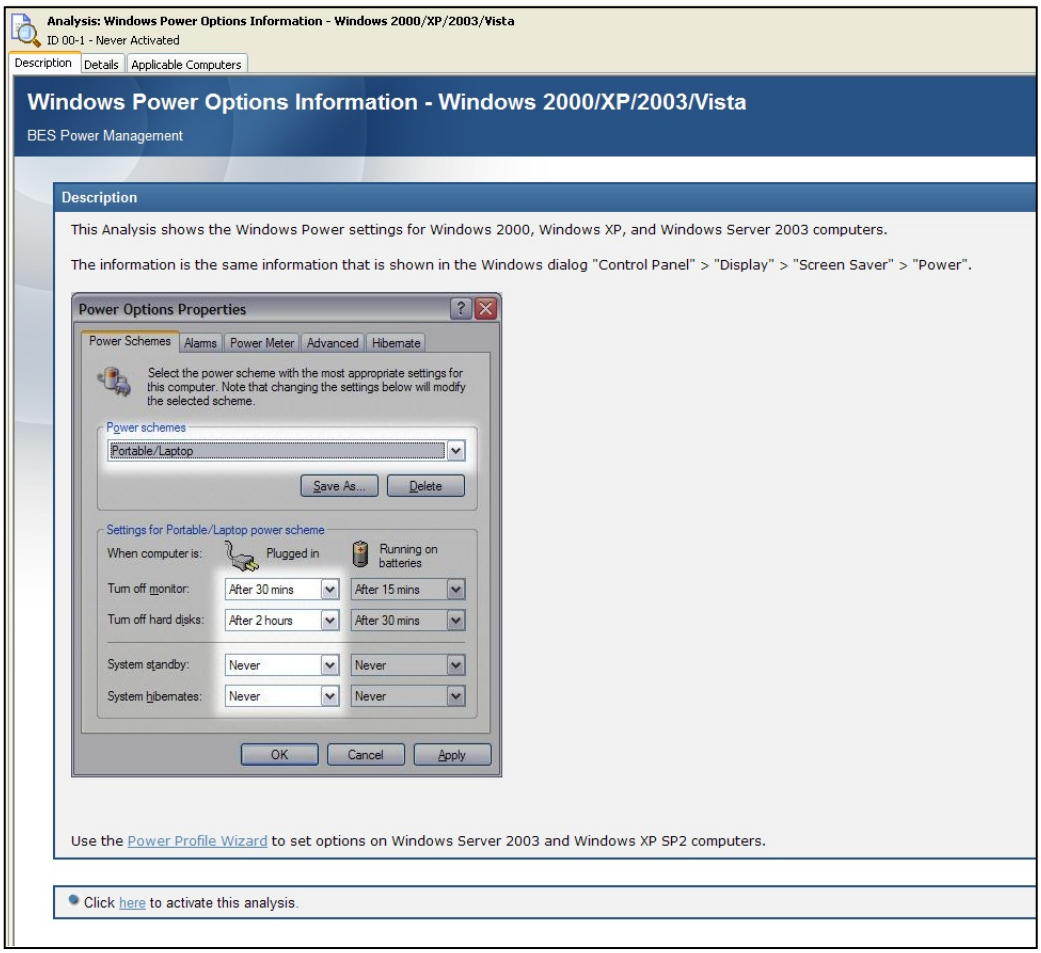
5. On the **Target** tab, select the computers you want to monitor and then click **OK**. Enter your Private Key Password when asked.

   For more information about setting options using the tabs in the Action window, consult the *Console Operators Guide*.

   The Monthly Power Consumption section of the dashboard should now display as not activated.

6. To enable tracking of monthly power consumption, click the **Windows Power Options Information Analysis** link.

   The **Windows Power Options Information – Windows 2000/XP/2003/Vista** Analysis opens. This analysis pulls back the computer's power option information from the local operating system, which is important to the power management calculations.



7. To activate the analysis, click the **Action** link, and enter your Private Key Password when asked.

Viewing the Dashboard

After you enable power monitoring, the Dashboard will populate with several new sections.

Note: The dashboard must be refreshed manually. To do so, press the **Refresh** button at the top right of the dashboard screen.

The Power Tracking Information Dashboard is the centerpiece of the Power Management site. From here you can view important power usage information and quickly deploy Fixlet messages and Tasks. The Dashboard is divided into five main sections: Power Controls, Monthly Power Consumption, Aggregate Statistics, General Statistics, and Custom Statistics.

Power Controls

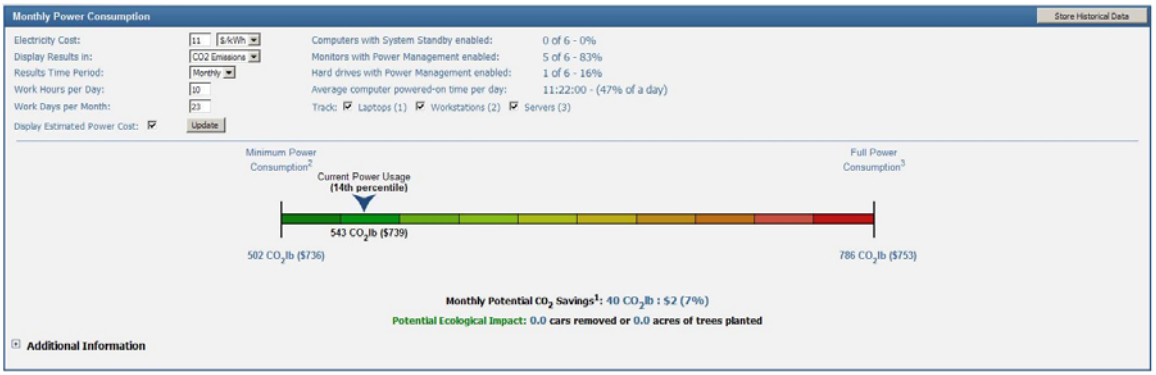
The Power Controls section provides quick access to a number of power management Fixlet messages and Tasks.

From here you have easy access to the **Wake-on-LAN Wizard,** which allows you to wake computers. There are also instructions on how to set up right click Wake-on-LAN (WoL). With this feature enabled, you can simply right click on any computer in the BigFix **Computers** tab and select it for WoL. Right-click wake-on-LAN will only work if you are in the same subnet as the BigFix Clients or if your network allows you to send UDP packets to the broadcast address of different subnets.

Using the Power Settings options, you can deploy an analysis to track Windows Power Options information by selecting the **View power settings** link. With the information provided by this analysis, you can change the power settings profile for the current logged on user. These profiles set options for when the hard disk or monitor turns off, or when the system goes into standby.

There are also links for deploying reboot or shutdown actions.

Monthly Power Consumption



The **Monthly Power Consumption** section is one of the key areas for information about your power management status. If you change the **Results Time Period** from Weekly to Monthly or Yearly, you will see the same information for the corresponding time period and the section title will change.

This section combines information about the number of computers, the type of computers, the powered-on time per day, the power options of each computer, and other power-related information to calculate **Current Power Usage**. By placing your current power usage on a spectrum you can quickly see how your power usage compares against the minimum possible power consumption (computers are only powered-on during work hours) and maximum power consumption (computers always powered-on with no power saving settings). You can display this information in CO_2 Emissions or Power Usage. If you choose to view the results in CO_2 Emissions, the sections displays the possible ecological impact of your power savings in cars removed or acres of trees planted.

Your Current Power Usage will change based on the settings of your computers. If you change the power options of computers to enable/disable power standby, monitor power management, etc., the Current Power Usage will change to reflect the new power usage information. Additionally, BigFix keeps track of how long computers are powered-on and off. This information is important to track the overall power usage of a computer and the aggregate average can be seen in the **Average computer powered-on time per day** statistic. To reset a computer's powered-on time per day, use the **Reset Power Statistics Task**.

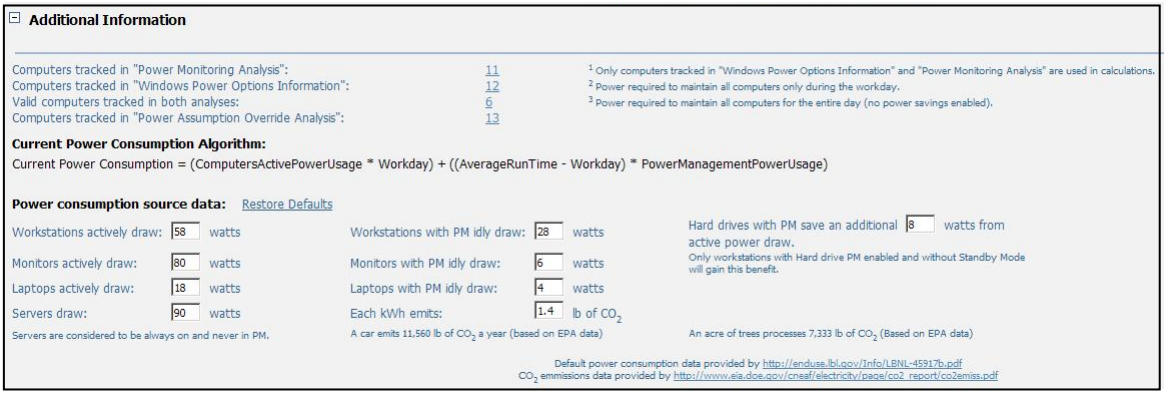
To store your data for reporting, click the **Store Historical Data** button.

Your data will be saved for viewing in Web Reports in the **Historical Power State** and **Power Trends** reports.

Whatever is selected in the dashboard and all dashboard inputs for power assumptions affect what is saved and displayed in Web Reports. As a result, the feature will prompt you if something has changed since the last save. Basically, if you chose to display only laptops and then clicked **Store**, the report for that day would just show power consumption for laptops. If the next day you changed the display to show laptops and desktops and then clicked **Store**, the report would show a big jump in power consumption, cost, etc. from one day to the next.

Click the **Close** link to close the message box.

Monthly Power Consumption (Additional Information)

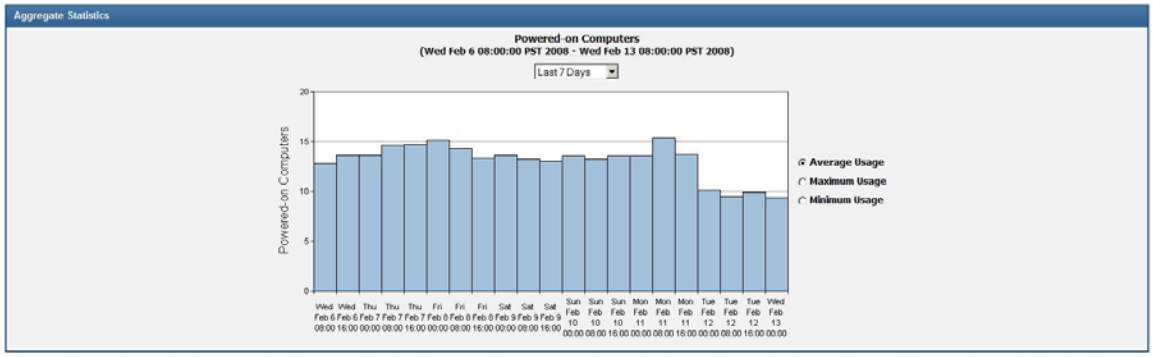


For more information about how Power Savings are calculated, you can click the **Additional Information** link in the **Monthly Power Consumption** section. This section shows you how many computers are tracked in the Powering Monitoring and Windows Power Options Information analyses, and the Current Power Consumption Algorithm.

Note: Only computers that are tracked in both analyses (as listed in that section) are used in monthly power consumption calculations.

The section also displays, in watts, information about source data for active workstations, monitors, laptops, and servers. If you have Power Management activated, it also shows this data for idle workstations, monitors, laptops, and servers. If you do not have system standby enabled, you can also see how many watts your hard drives with power management save.

Aggregate Statistics

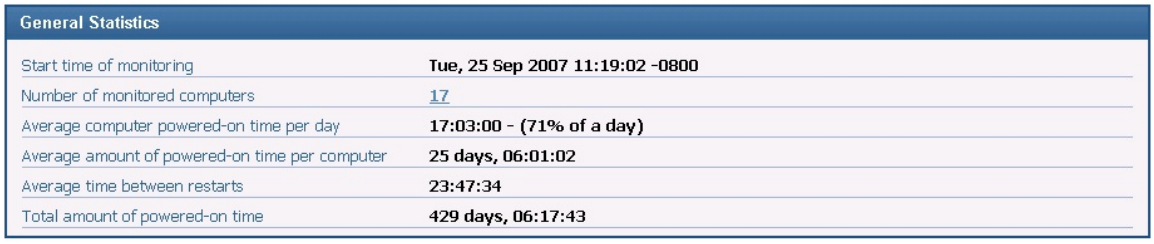


The Aggregate Statistics section shows a bar chart of the number of computers that are powered-on for a given interval, providing a general picture of power usage. Power Monitoring must be enabled for this section to appear.

The graph can display powered-on statistics for the last 2 hours, 8 hours, 24 hours, 7 days, 30 days, 26 weeks, or 52 weeks. Each time interval requires a minimum amount of tracking data before it is displayed. At least 10 minutes of data will need to be available before the graph will display information. You can view the graph for minimum, average, or maximum statistics. Minimum reflects only the number of computers that have been powered on for that chosen time span, maximum reflects the number of computers that were powered on at any point in the chosen time span.

You can manually refresh this data by pressing the **Refresh** button at the top right of the dashboard screen.

General Statistics



The General Statistics section breaks down power usage information. It is designed to give you power statistics for all computers that you track. This information gives you a sense of how often computers are turned on and off, the averages most often requested, and a sense of the total amount of power being used.

Clicking on the link for **Number of monitored computers** shows you a list of the monitored computers.

Custom Statistics

The Custom Statistics section displays a set of statistics about the powered-on behavior of computers within a given time interval.

These statistics are designed to let you "ask questions" about the power usage of the computers. This information can be used to answer questions like "How many people have turned off their computers in the last week?" and so on.

Note: Statistical information is updated immediately after a time interval is changed. The Dashboard does not need to be refreshed.

Using BigFix Power Management

Setting Power Profiles

The BigFix Power Management site includes a Wizard that enables you to change Windows power settings for Windows XP, Windows 2003, and Windows Vista computers.

To use the Wizard:

1. Go to **Wizards > Power Profile Wizard**.

   The **Power Profile Wizard** opens.

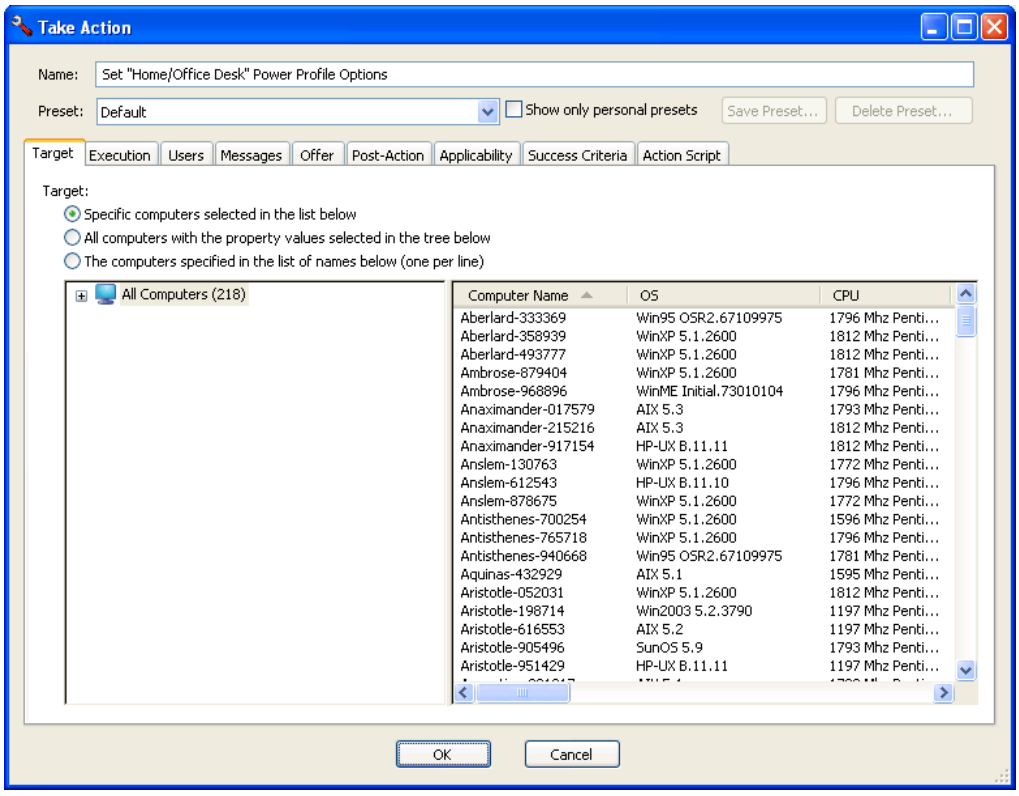
2. Select the power profile to use. Click **Next**.

   The **Set Power Profile options** window opens.

3. Choose when to turn off hard disks, monitors, and go into system standby. If you want to enable hibernation, you can also choose when to do so.

   Click **Finish**.

   The **Take Action** window opens.



4. Select computers to which to apply the action, and click **OK**. Enter your private key password when asked.

   For more information about setting options using the tabs in the Action window, consult the *Console Operators Guide*.

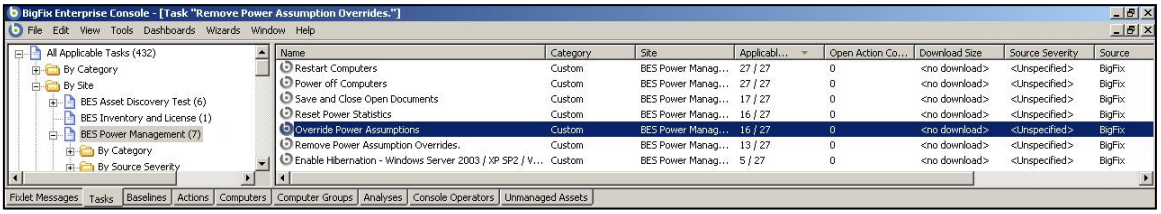
Overriding Power Assumptions

The BigFix Power Management site includes a Wizard that enables you to override the power assumptions used in the Power Tracking Information Dashboard. You can apply these overrides to individual computers or groups of computers. If an override is not applied to a specific computer, Power Management uses the assumptions in the dashboard.

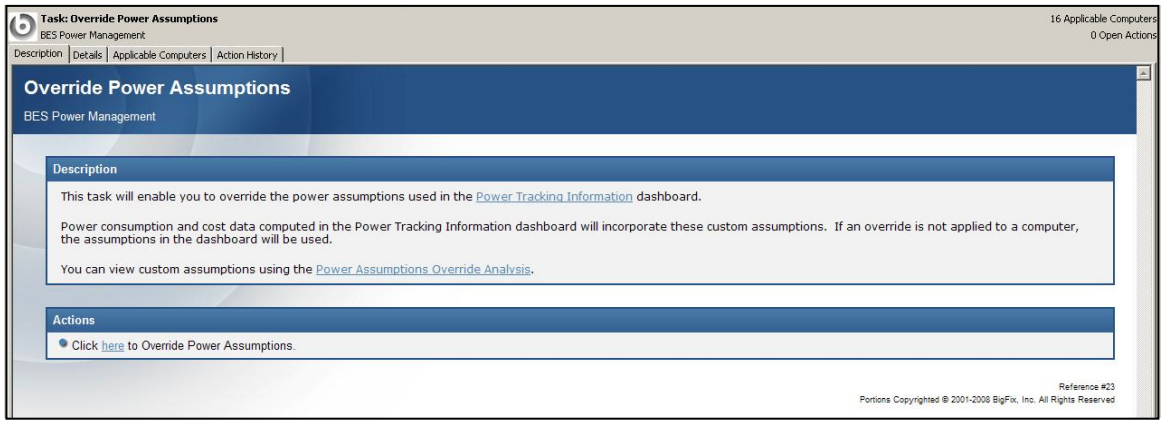
Accessing the Override Power Assumptions Wizard

To access the Wizard:

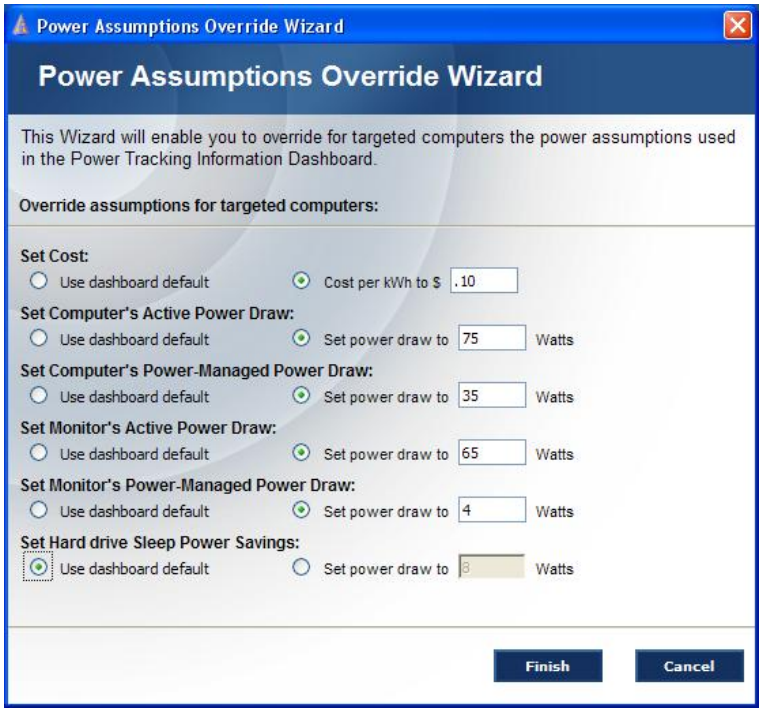
1. Click the **Tasks** tab.
2. Navigate to the **Applicable Tasks** for **BES Power Management**. Double-click the **Override Power Assumptions** Task.



   The Task opens.

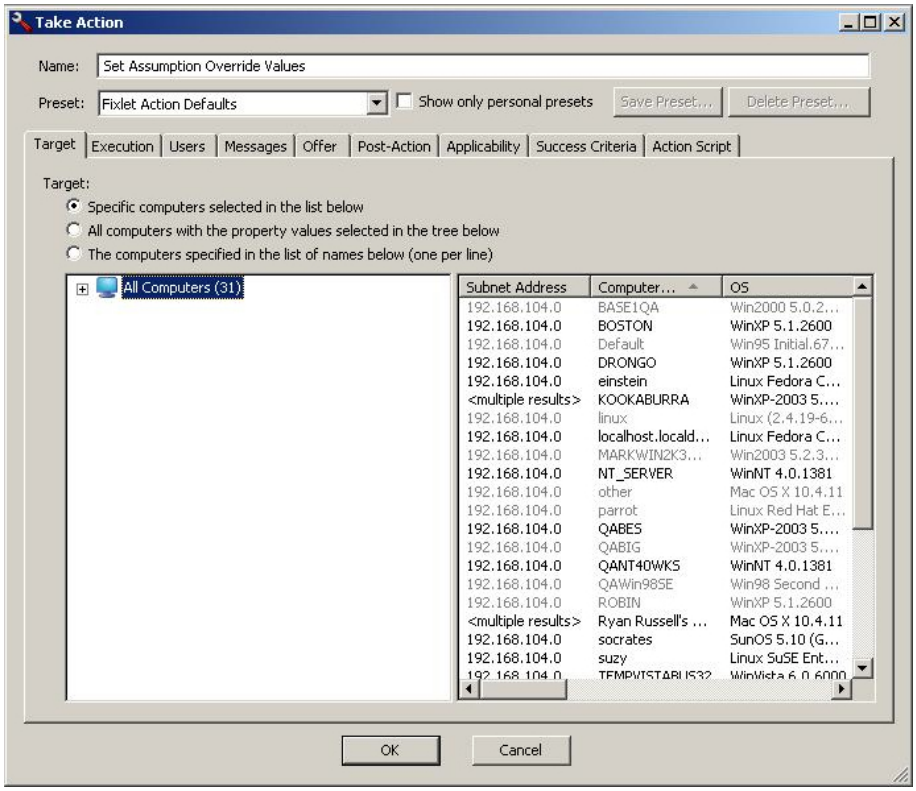


3. Click the **here** link to open the **Power Assumptions Override Wizard**.



Select override assumptions for your targeted computers. Click **Finish**.

A **Take Action** window opens.



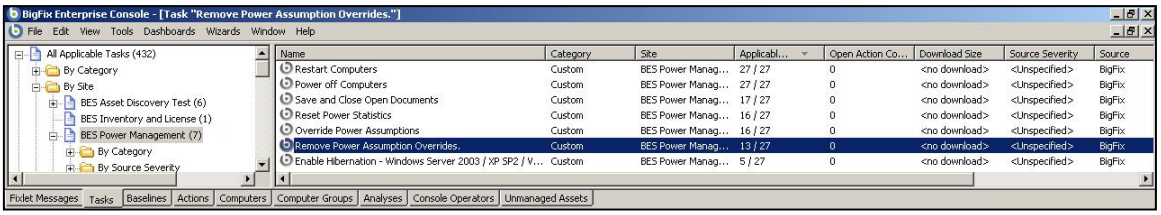
4. Select computers to which to apply the override, and click **OK**. Enter your private key password when asked.

For more information about setting options using the tabs in the Action window, consult the *Console Operators Guide*.

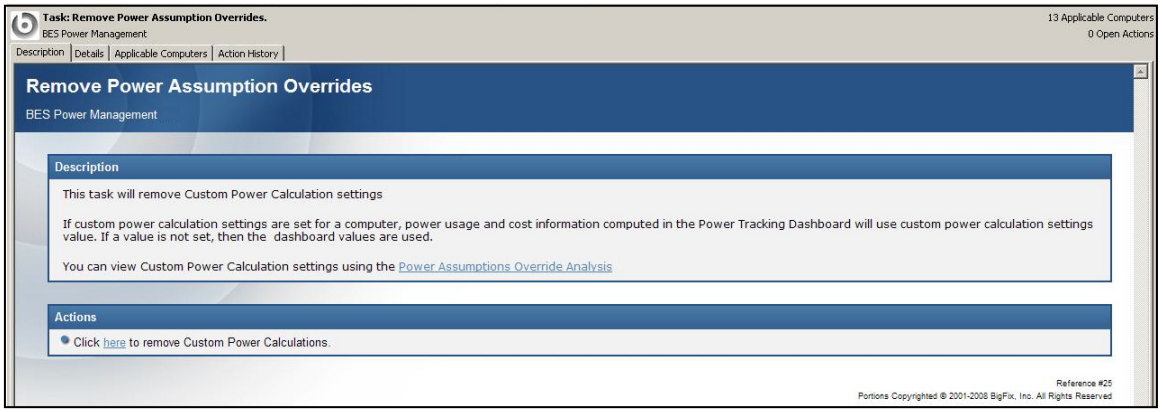
Removing Power Assumption Overrides

To remove power assumption overrides:

1. Click the **Tasks** tab.
2. Navigate to the **Applicable Tasks** for **BES Power Management**. Double-click the **Remove Power Assumption Overrides** Task.

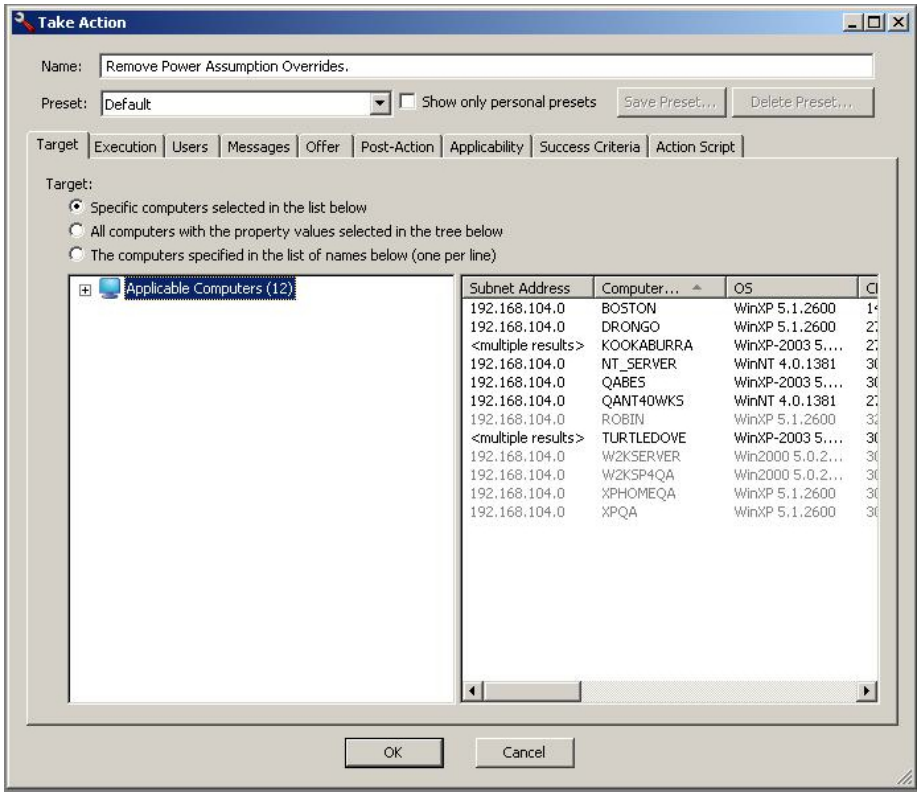


The Task opens.



3. Click the **here** link to remove any custom power calculations.

   A **Take Action** window opens.



4. Select computers for which to remove the override, and click **OK**. Enter your **Private Key Password** when asked.

   For more information about setting options using the tabs in the Action window, consult the *Console Operators Guide*.

Saving Files

BigFix Power Management can save and close files before shutting down or restarting computers in your network. Files can be saved and closed for the following applications:

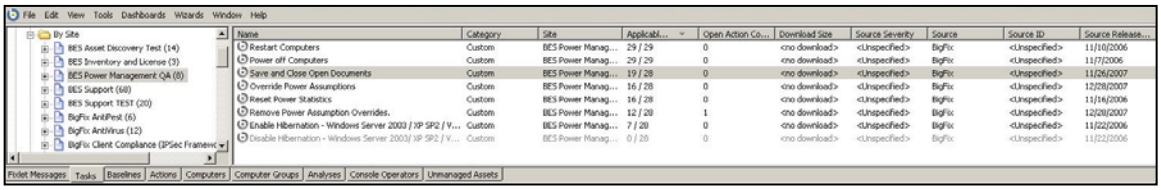
- Microsoft Word
- Microsoft Excel
- Microsoft PowerPoint
- Microsoft Outlook
- WordPad
- Notepad

The Task saves documents to an operator-specified folder, with the file name `##BIGFIX-<application name><date><GUID>`.

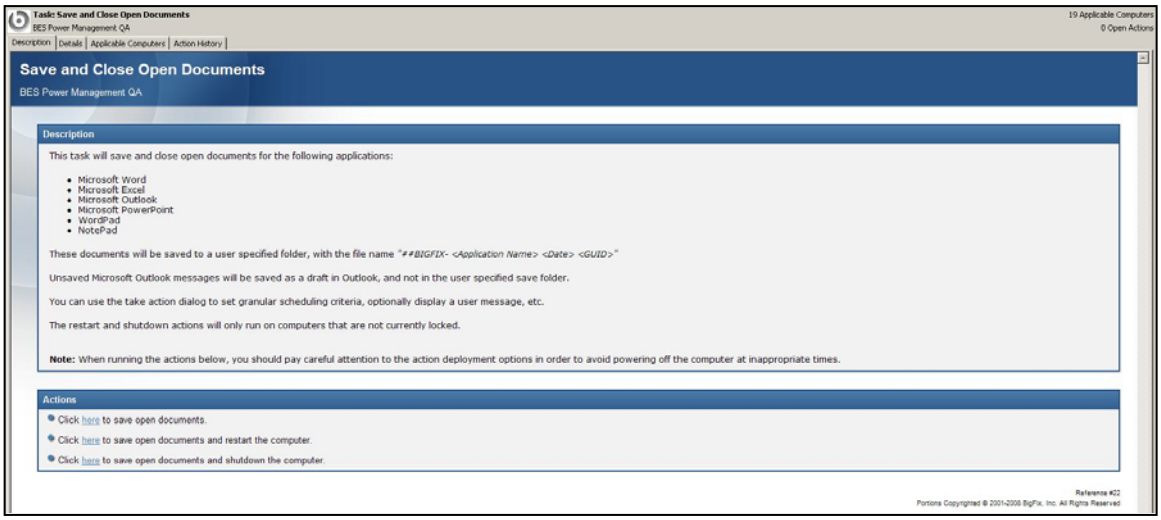
Note: The restart and shutdown actions will only run on computers that are not locked.

To run the Task:

1. Click the **Tasks** tab.
2. Navigate to the **Applicable Tasks** for **BES Power Management**. Double-click the **Save and Close Open Documents** Task.

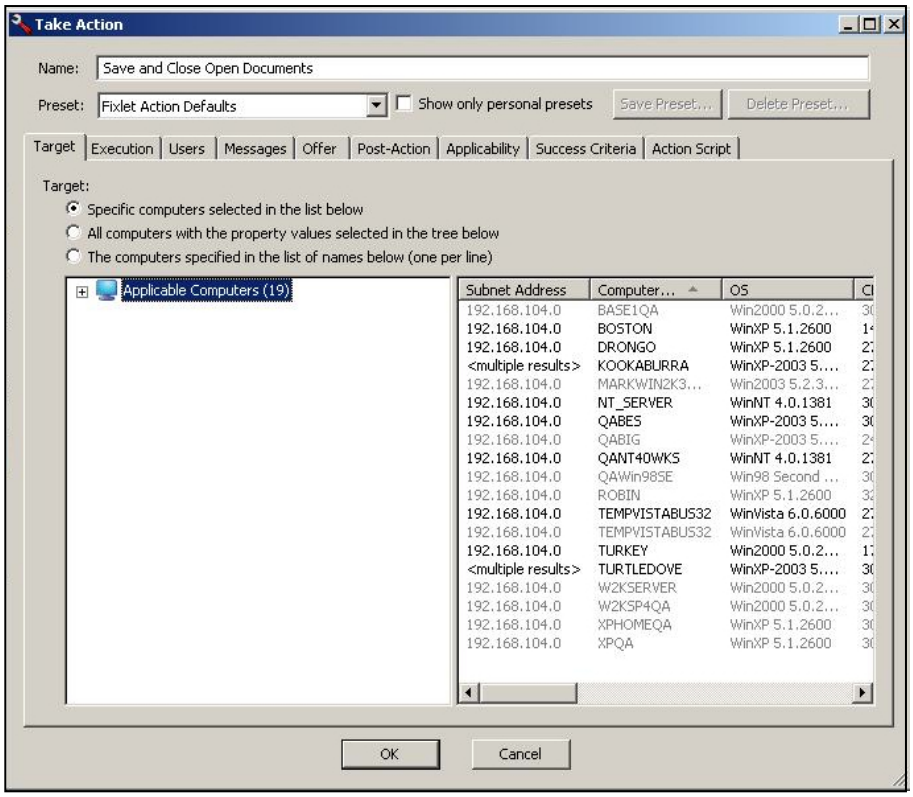


The Task opens.



3. Click the appropriate **here** link to save open documents, save open documents and restart the computer, or save open documents and shutdown the computer.

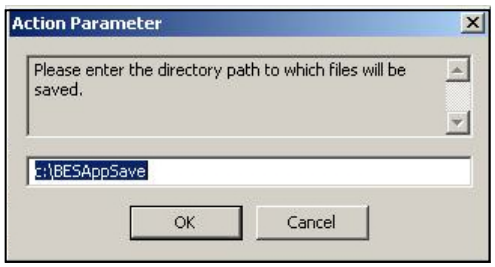
   A **Take Action** window opens.



4. Select computers for which to apply the Task, and click **OK**.

   For more information about setting options using the tabs in the Action window, consult the *Console Operators Guide*.

5. In the **Action Parameter** window, enter the directory path to which files will be saved.



   Click **OK**, and enter your **Private Key Password** when asked.

Working with Wake-on-LAN

The BigFix Power Management site includes the ability to remotely power-on a computer using Wake-on-LAN (WoL) technology. WoL technology enables you to conserve energy by leaving your PC off except when you need it.

WoL is the general process of waking a computer remotely over a network connection. The way that Wake-on-LAN works is that when a computer is powered-off, its network card stays active in a low-power state and watches network traffic for a specific packet known as "the Magic Packet." If the listening computer receives a packet containing the proper information (which includes the MAC address of the computer), the computer will power on. WoL does not work over wireless networks because there is additional information carried in the header of a wireless

frame that interferes with the magic packet frame, preventing the target machine from detecting the wakeup signal.

Before you can use any WoL technology, your computers must have WoL enabled. Most computers built after 2000 have Wake-on-LAN capability, but WoL must be enabled for the network card and in each computer's BIOS. Each computer and network card manufacturer handles this process differently.

Since many companies have hundreds or thousands of subnets, network limitation is a severe restriction on using Wake-on-LAN. However, BigFix solves this problem for you because it enables BigFix Clients to wake other computers in the same subnet. As long as you have at least one BigFix Client powered-on in the subnet, you can wake your other computers.

There are two ways to wake a machine: right-click WoL and distributed WoL. The **right-click Wake-on-LAN** feature sends WoL packets from the BigFix Console computer directly to the specific broadcast address on the BigFix Client's subnet. If your network does not support this type of routing (often known as a "directed broadcast"), **right-click Wake-on-LAN** will only work for computers in the same subnet as the BigFix Console.

Understanding the Wake-on-LAN Wizard

The first time you run the WoL wizard it will create a retrieved property called **Wake-On Address**. This property will link a computer's MAC address to its IP address, which will allow BigFix to know how to wake-up each computer.

Once the wizard has created this property, and the clients have reported back, open the WoL Wizard again. You can now use BigFix Clients to wake up computers in selected subnets. The wizard will list the subnets available with the number of computers in each subnet.

After selecting a subnet and hitting next, you will be presented with deployment options:

- **Expiration Time** - Sets the length of time BigFix will attempt to wake computers. You should expire the Wake-on-LAN actions whenever you can because it helps optimize system performance.
- **Temporal Distribution** - Sets the span of time between WoL packets. Since WoL traffic is all on a local LAN, the network speeds tend to be very fast. Nevertheless, as a precaution against sending too much data in a short burst, if there are many computers on a subnet, this setting should be set to a larger time interval (for example, if there were 200 computers on a subnet and you spread out the Wake-on-LAN packets over 10 minutes, the network traffic used for the Wake-on-LAN packets would be extremely low).
- **Wake-up Points** - Sets the time in which a client must have reported to be considered a Wake-up Point.

The wizard creates a BigFix action that will download the BES-WOL utility to your Wake-up Points. The Wake-up Points will then send special WoL packets to every computer that you select in the subnet. These packets are sent on port 10 using the behaviors you chose in the wizard.

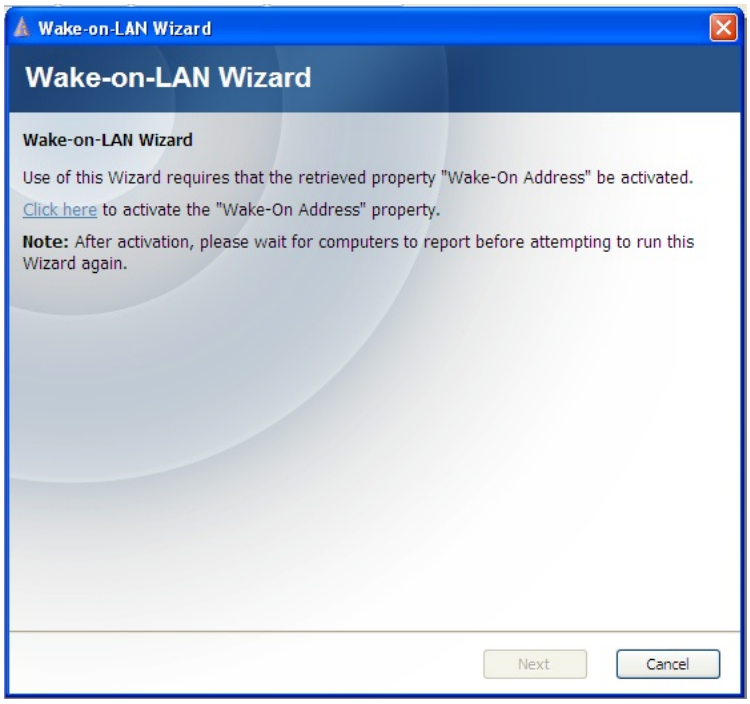
Note: A subnet must have at least one awake computer to awaken another computer within the subnet. A computer cannot awaken a computer on a different subnet.

Running the Wake-on-LAN Wizard

To set up Wake-on-LAN:

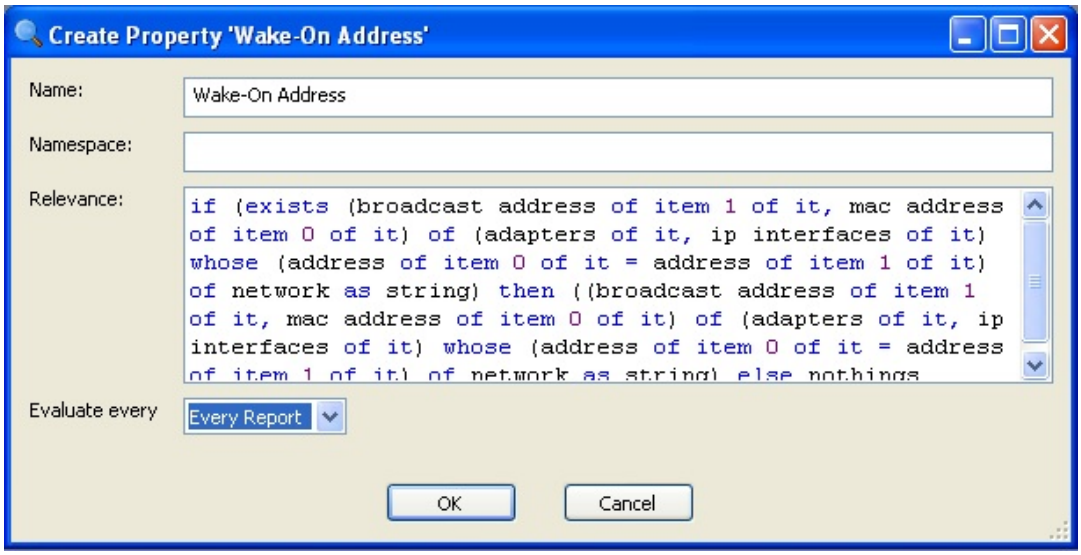
1. Go to **Wizards > Wake-on-LAN Wizard**.

The Wake-on-LAN Wizard opens.



2. Click the link to activate the **Wake-on-Address** property.

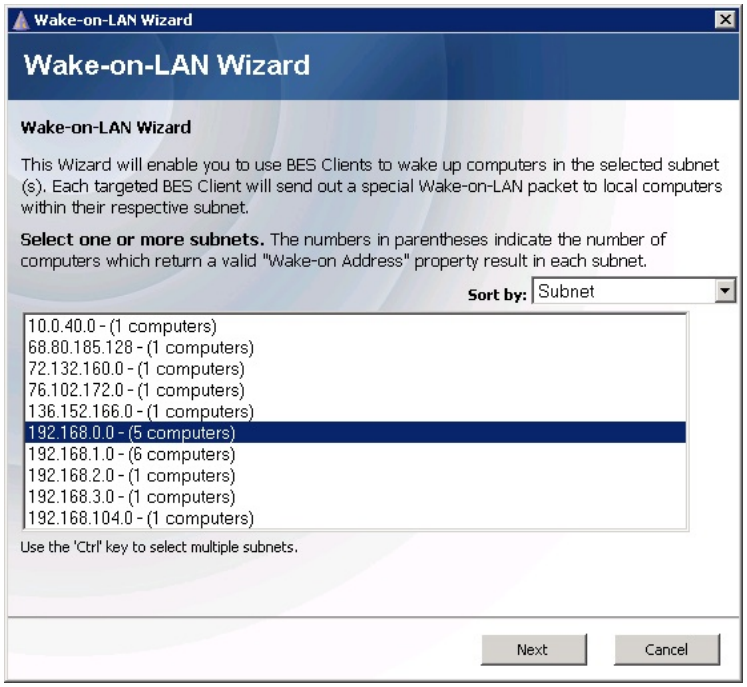
   The **Create Property** window opens.



   Assign a frequency for evaluation, and click **OK**.

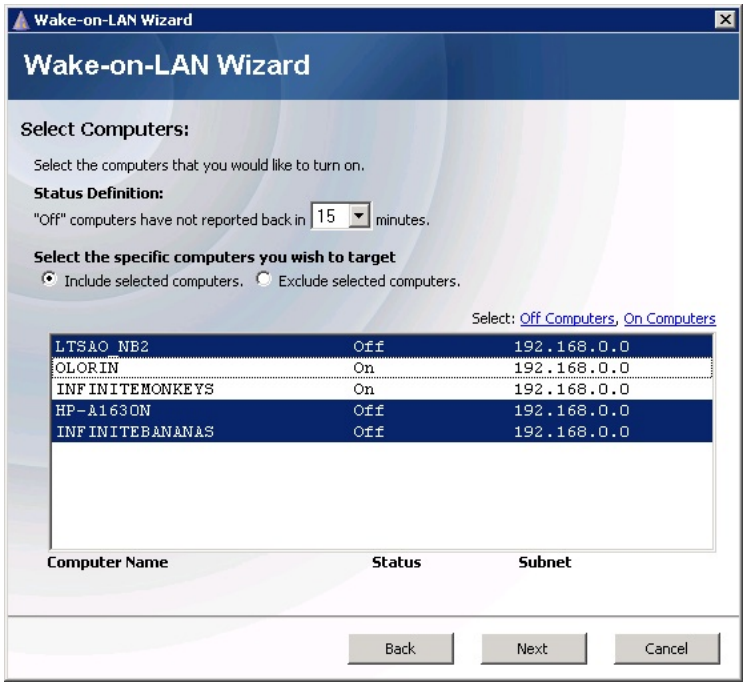
3. After your computers report, open the Wizard again.

   Now the first page of the wizard will ask you to select one or more subnets on which to apply WoL.



4. Select the subnet or subnets, and click **Next**.

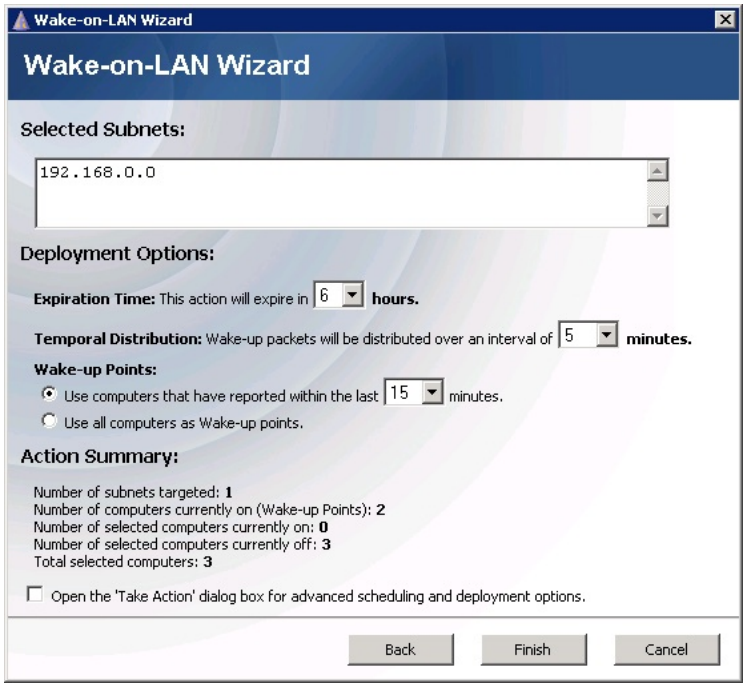
   The **Select Computers** window opens.



5. Select the computers you want to turn on.

   The **Status Definition** section of this page determines what Power Management considers an "off" computer. This consideration is used to aid in individual computer selection; however, a wakeup action is sent to the selected computers whether or not they are awake or asleep when the action is sent out.

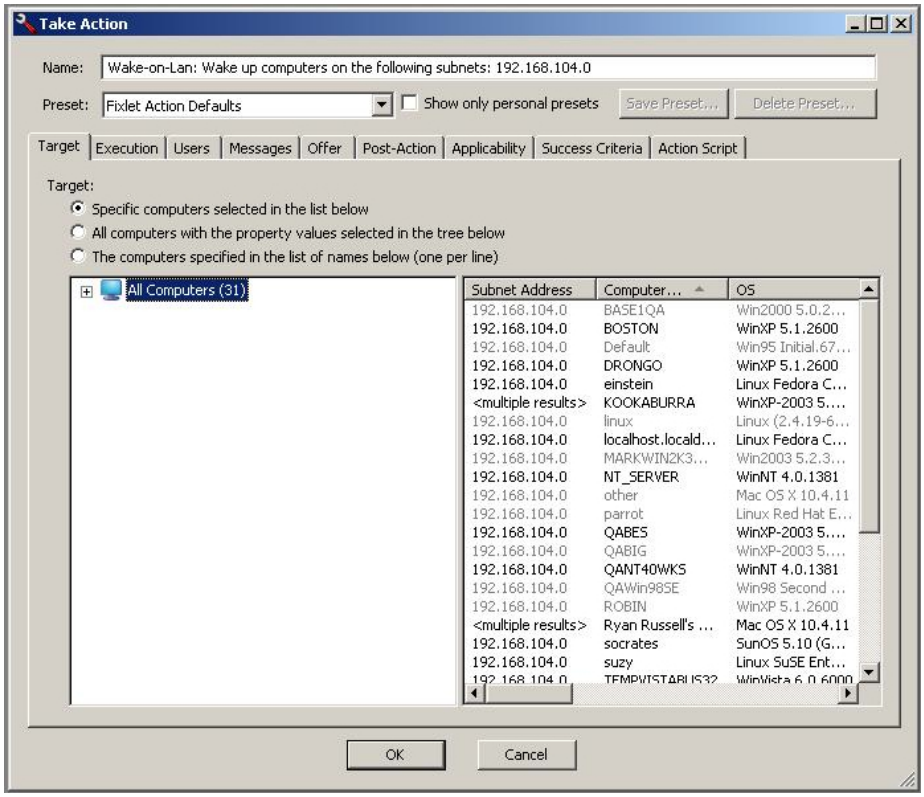
   Click **Next**. The last window opens.



6. In this window:
   a. Confirm your choice of subnet or subnets.
   b. Set an expiration time for the Action.
   c. Set an interval for distribution of wake-up packets.
   d. Select whether to use all computers as Wake-up points, or specific computers based on reporting.
   e. Check the **Open Take Action dialog…** box for advanced scheduling and deployment options.

   Click **Finish**.

   If you have not checked the box at the bottom, the Action will run. If you have checked the box, a Take Action window will open providing you with more options.



7. Click **OK**, and enter your **Private Key Password** when asked.

   For more information about Action window options, consult the *Console Operator's Guide*.

Viewing Power Management Web Reports

BigFix Power Management stores data for two reports: Historical Power State and Power Trend Overview. To store your data for reporting, click the **Store Historical Data** button on the dashboard.

To access Web Reports, choose **Tools > Launch Web Reports…**. The reports will be visible in the Content Reports section of the Reports page. For more information about Web Reports, consult the *BigFix Enterprise Suite Web Reports User's Guide*.

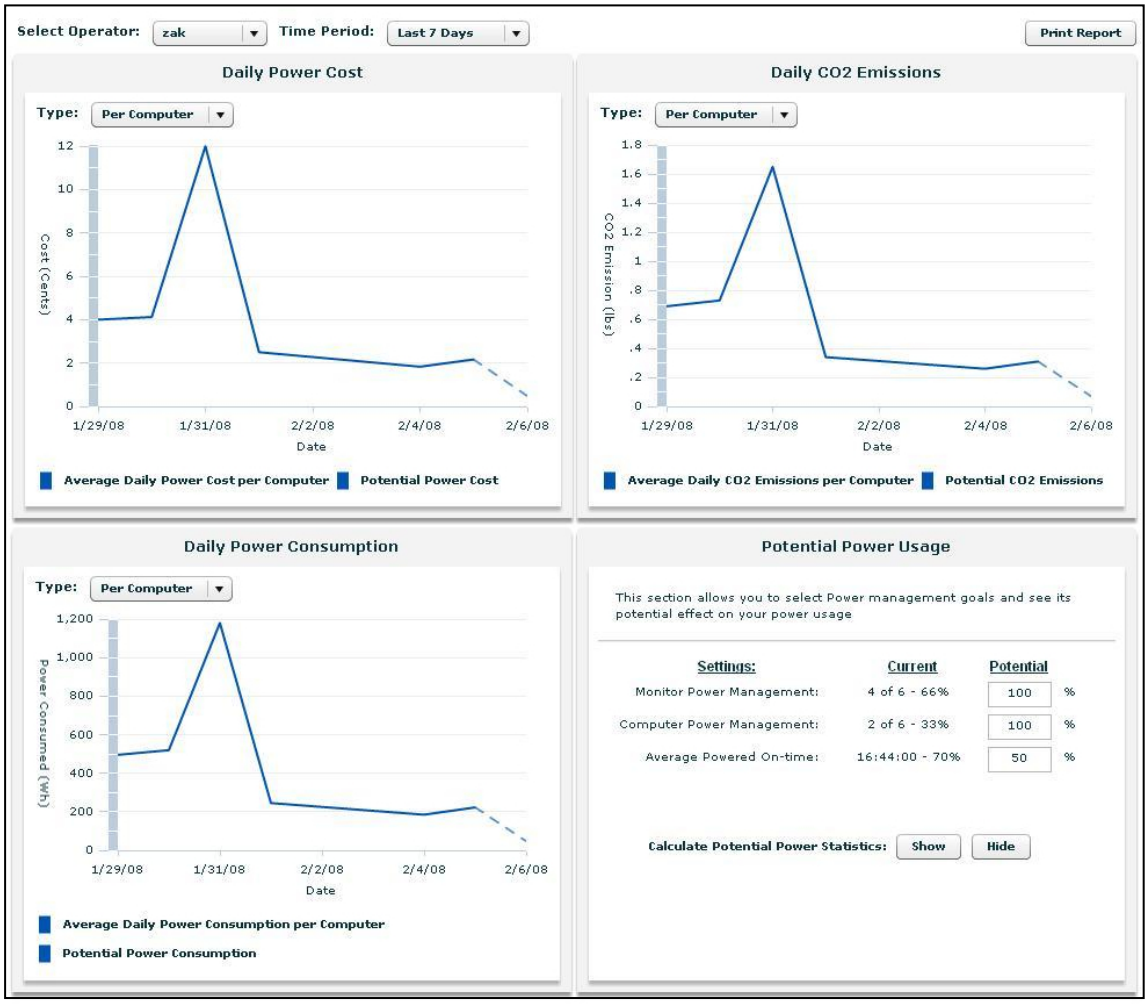
Historical Power State

The Historical Power State report displays information about your power usage, cost and CO_2 emissions both per computer and network total. If you view the graph per computer, you see the average power usage, cost, or CO_2 emissions. If you view the graph as totals, you see the minimum potential maximum potential, and actual total daily power usage, cost, or CO_2 emissions.

The report also tracks the types of computers on which you install BigFix Power Management (laptop, workstation and/or server). Finally the report includes a graph showing the percentage of total monitored computers by the date at which data was stored. It displays this information for Power Management-enabled monitors and hard drives, Standby-enabled machines, and average daily powered-on time.

Power Trend Overview

The Power Trend Overview report displays by date your Daily Power Cost, Daily CO_2 Emissions, and Daily Power Consumption either per computer or network total. If you click the **Show** button in the **Potential Power Usage** quadrant you can select power management goals and view potential effects on your power usage. The potential power consumption statistics are computed with current dashboard and calculation override settings and will display in the other graphs as dotted blue lines.



Frequently Asked Questions

How realistic are the power savings calculations? Are they estimates, or do the figures come from actual monitoring of devices?

Computers today do not actually know how many watts they are using at every instant; therefore, unless a power meter is connected to every computer, the exact power usage of a computer must be an estimate. However, many studies from reputable sources (some commercial studies and some government studies) estimate power usage from a wide variety of computers to establish power consumption averages.

BigFix Power Management establishes power estimates by taking the averages from these studies. However, rather than treating every device as a standard computer, the BigFix agent can find key information about each individual computer that influences its power behaviors. For example, computers without monitors use less power, servers tend to use more power than desktops, desktops use more power than laptops, computers with power management enabled use much less power, etc. The flexibility of the BigFix system allows this information to be aggregated and used as input to create much more accurate power consumption estimates than can be obtained with standard online power calculators that treat every computer the same.

Can I see how my power management efforts are affecting my CO_2 emissions?

Yes. The BigFix Power Management visual power spectrum also provides data on the projected CO_2 savings from your power management efforts.

What is the methodology used in calculating carbon savings?

BigFix carbon estimates are based on the results of research studies that have determined the average carbon emissions needed to generate a kilowatt-hour of power. More information can be found at: http://www.eia.doe.gov/cneaf/electricity/page/co2_report/co2report.html.

Are carbon savings findings robust enough to be used for external trading and regulatory reporting uses?

BigFix Power Management uses carbon estimates from the US Department of Energy for the average amount of CO_2 released per kilowatt-hour. Carbon emissions per kilowatt-hour will vary per region and per power source. Please check with your regulatory agency for more information about power compliance rules.

What if power settings are accidentally set on my servers and it causes a problem?

BigFix Power Management monitors server-class computers and alerts the BigFix administrator when it detects a server with power management settings enabled. A warning is displayed to the BigFix administrator through a BigFix Fixlet message, who can then easily disable power management settings on the affected servers.

Can I get a centralized view and control of my power management efforts?

Yes. You can centrally manage (control and report) up to 200,000 endpoints with a single BigFix Server. Centralized reporting at larger scale is fully supported with multiple BigFix servers.

On what platforms can I use the BigFix Power Management solution to manage power settings?

BigFix Power Management can be used to monitor and manage power settings on computers with Microsoft Windows XP, 2003 Server, and Vista. Limited power management support is available for Windows 2000, and Macintosh Power Management support is coming soon.

Does BigFix Power Management support multi-site, cross-domain deployment?

Yes. The BigFix platform provides for multi-site deployment that operates without requiring Active Directory, but can utilize an Active Directory hierarchy already in place. BigFix is typically installed in an enterprise environment spanning geographically distributed sites. The BigFix platform provides various features to make this deployment possible, including a highly scalable, distributed architecture.

Can I set different power schemes for different groups of computers?

Yes. BigFix Power Management includes the ability to easily apply different power schemes to different groups of computers, enabling you to target specific power settings for different groups. For example, you might want to use different power saving options for help-desk workstations than for mobile laptop users.

Does BigFix Power Management include Wake-on-LAN capabilities?

Yes. BigFix Power Management includes the ability to power-on a computer using Wake-on-LAN (WoL) technology. WoL uses small broadcast network packets to power-on computers, which often presents an operational problem because many networks do not route these types of packets from different subnets. Since many companies have hundreds to thousands of subnets, the network limitation is a severe restriction on using WoL. However, BigFix solves this problem by allowing BigFix Clients to wake other computers in the same subnet. As long as you have at least one BigFix Client powered-on in the subnet, you can easily wake your other computers.

BigFix Power Management includes a Wake-on-LAN Wizard that enables you to quickly set deployment options and to schedule wake-ups. Configurable deployment options include expiration time, temporal distribution, wake-up-points, and subnet selection.

Does BigFix Power Management provide the ability to remotely restart and shut down a number of computers?

Yes. BigFix Power Management provides administrators with the ability to schedule remote restarts and shut downs for groups of computers with just a few clicks.

How can I change the information about the cost of power or the default workday?

There are several options that can be changed directly in the Power Management dashboard. After the information is changed, the power consumption statistics and cost figures will update immediately.