Grid Solutions Monitoring & Diagnostics

Perception Web Installation & User Guide

Transformer Monitoring Software





Contents

	110	511(5	uge
1	Intr	oduction	4
	1.1	Product Overview	4
	1.2	Software Family	4
	1.3	What's New?	5
	1.4	System Requirements	6
	1.5	Customer Support	6
2	Inst	talling and Configuring Perception Web	7
	2.1	Overview	7
	2.2	Enable Internet Information Services (IIS)	7
	2.3	Create the Application Pool	9
	2.4	Run the Perception Web installer	12
	2.5	Configure the Certificates	16
		2.5.1 Creating the Perception Certificates	16
		2.5.2 Trusting the Perception Server Certificate	16
	~ ~	2.5.3 Trusting the Perception Web client Certificate	17
	2.6	I roubleshooting	18
		2.6.1 .NET Framework is not listed when creating a new application pool	18
		2.6.2 Modify the Perception Server hostname of P address	10
		2.6.4 Invalid Application Pool	20
		2.6.5 Other Issues	21
3	Usi	ng Perception Web	22
	3.1	Introduction	22
	3.2	Fleet Overview	22
	3.3	Asset Explorer	23
	3.4	Dashboards	26
	3.5	Wallboards	27
	3.6	Options	29
Apr	bend	lix A Installing Perception Web on Windows Server 200	831
Cor	ntact	t & Copyright Details	35
			-

List of Tables & Figures

Page

	· · · · · · · · · · · · · · · · · · ·
Figure 2-1: Programs and Features	7
Figure 2-2: Windows Features	8
Figure 2-3: Update system	8
Figure 2-4: Add an Application Pool	9
Figure 2-5: Name an Application Pool	9
Figure 2-6: List of Application Pools	10
Figure 2-7: Configure Application Pool Settings	10
Figure 2-8: Advanced Settings	
Figure 2-9: Welcome to the Perception Desktop Setup Wizard	12
Figure 2-10: End-User License Agreement	12
Figure 2-11: IIS settings	13
Figure 2-12: IP address of Perception Server	14
Figure 2-13: Destination Folder	14
Figure 2-14: Ready to Install	15

Figure 2-15: Completed	.15
Figure 2-16: Invalid Server Certificate	.16
Figure 2-17: Invalid Client Certificate	.17
Figure 2-18: Incorrect configuration details	.19
Figure 2-19: Server certificate missing	.19
Figure 2-20: Client certificate missing	20
Figure 2-21: Browser error	20
Figure 3-1: Perception Web home page	22
Figure 3-2: Opening the Asset Explorer	23
Figure 3-3: Asset Explorer	24
Figure 3-4: Asset Explorer - the asset hierarchy	24
Figure 3-5: Transformer Dashboard	26
Figure 3-6: TAPTRANS monitoring data	26
Figure 3-7: MO150 cooling information	27
Figure 3-8: Transformer Wallboard	28
Figure 3-9: Home page	29
Figure 3-10: About page	29
Figure 3-11: Log off option	29
Figure 3-12: Login page	30
Figure 3-13: Session expiry	30
Figure A-1: Control Panel	.31
Figure A-2: Turn Windows Features on or off	.31
Figure A-3: Add Roles	.31
Figure A-4: Select Server roles	32
Figure A-5: Role Services	32
Figure A-6: Launch IIS Manager	33
Figure A-7: Application Pools	33
Figure A-8: Advance Settings	33
Figure A-9: Perception Web Application Settings in IIS	34

Related Documents

Ref#	Title			
MA-020	Perception Desktop - Installation & User Guide			
MA-021	MA-021 Perception Server - Installation & User Guide			
MA-023	Perception Workflow Designer - Installation & User Guide			

Abbreviations & Definitions

Abbreviation	Meaning
KPD	file suffix for a Perception Database file (stored in a SQL format)
ΤΟΑ	file suffix for a device configuration file (stored in a CSV format)
DGA	Dissolved Gas Analysis
CSV	Comma Separated Variable – an industry-standard neutral data exchange format
SQL	Structured Query Language – an industry-standard database format

1 INTRODUCTION

1.1 Product Overview

Perception is a software product designed to assist power plant personnel in the maintenance and management of oil-insulated equipment used in the transmission and distribution of electrical power. It is used primarily for diagnosing fault conditions as well as trending measurements taken from transformers, circuit breakers and tap-changers.

The software accepts data from either manual or automated programs of regular sampling and condition analysis of the equipment's insulating oil as well as other performance data. Several well-established and recognized empirical diagnostic rules are used to present information to the user on the condition of the insulating oil used in the electrical equipment. This assists in the running of a maintenance program and in the identification of potential fault conditions. It allows both the maintenance engineer and asset manager to monitor and diagnose transformer data collected by GE's range of on-line monitoring units. The data includes Dissolved Gas Analysis (DGA), calculated models, bushing and other transformer measurements. By providing access to this valuable data along with powerful diagnostic tools, Perception delivers clear transformer condition information. This enables decisions to be made quickly and reliably, helping to extend the life of transformers, reduce unplanned outage, and avoid catastrophic failure.

Although Perception is an expert analysis and information system, it is only an aid and should not be regarded as a replacement for the knowledge of a subject matter expert in the analysis of insulating oil used in electrical equipment and the operation of oil filled power equipment.

1.2 Software Family

There are four members of the Perception family.

- Perception Desktop A standalone software application that provides customized access to the centrally located asset database. It provides advanced diagnostic profiles on device data, a multi-page transformer report containing key transformer information as well as the facility to launch external applications. Additionally, Perception Desktop can operate standalone or as part of a larger centralized asset management suite in conjunction with Perception Server.
- Perception Server The pinnacle of transformer asset management software. Perception Server provides a fleet-wide network overview via a wallboard display, automatic data downloading with configurable scheduling, email notifications of device condition changes and a TOA4 data export facility. It uses a centralized data storage location based on SQL Server to which Perception Desktop links seamlessly via secure OPC UA communications.

22-Oct-24

- Perception Web A web-based solution that provides *read-only* access to the centrally located asset database. This offers a convenient way to obtain readings and consolidated data analysis across a variety of platforms including mobile devices. This includes transformer dashboards, wallboards and an overview to the status of the entire transformer fleet.
- Perception Workflow Designer The workflow designer uses common flowcharting techniques to express transformer diagnostic processes as a model. These models are known as workflows and in turn drive the Perception dashboard. The Designer brings easily modifiable workflowenabled capabilities to the Perception software suite allowing control over the diagnostic process and customization of how data is presented on the Perception dashboard.

1.3 What's New?

- Enhanced support for DGA 900 TapTrans Plus with models for cooling, thermal and OLTC data, including import and export of such data.
- Minor enhancements and bug fixes.
- Note: If upgrading to Perception Desktop/Server 2.4. X from version 1.X, please contact GE Support before commencing as depending upon the size and complexity of the existing database, a service visit may be required to make the transition.

1.4 System Requirements

The minimum PC and system requirements for Perception Web:

Operating System:	Windows 7 with .NET Framework 4.7
CPU:	1 GHz Processor
Memory:	1 GB RAM
HDD:	500 MB free
Graphics Card:	64 MB graphics, update to the latest driver for your hardware to ensure that it can provide all the facilities of .NET Framework 4.7

Perception Web supports the following web browsers:

Platform	Browser	Supported Versions
Windows	Internet Explorer	9 and above
	Firefox	28
	Chrome	21+
OS X	Safari	5.1+
iOS	Safari	iOS 5+
Android	Browser	4+
Blackberry	Browser	10+

1.5 Customer Support

E-mail:	ga.support@ge.com
North America:	1-877-605-5777
Worldwide:	+44 1785-250-070

22-Oct-24

2 INSTALLING AND CONFIGURING PERCEPTION WEB

2.1 Overview

To publish content for access over the Internet or intranet, you need to host the content via a web site on your web server. Microsoft's Internet Information Services (IIS) is the primary tool for such hosting services and comes included with Windows. By default, an IIS web site is created in the \inetpub\wwwroot directory on your web server. You can either choose to use this default directory to publish your web content, or you can create a directory at a location of your choice.

There are several steps to installing and setting up Perception Web:

- Enable Internet Information Services (IIS)
- Create the Application Pool
- Run the Perception Web installer
- Configure the Certificates

See Appendix A for installing and configuring Perception Web on Windows Server 2008.

Note: A Perception Web login requires Perception Server to be installed and configured, including the creation of a user account. For more information, refer to the Perception Server manual.

2.2 Enable Internet Information Services (IIS)

In Windows, Internet Information Services (IIS) is turned off by default. The first step is therefore to enable IIS through the Microsoft Management Console or Administrative Tools in the Control Panel.

To enable features in Windows, go to Windows Control Panel and double click **Programs and Features**. Then click the **Turn Windows features on or off** link as shown in Figure 2-1.

A REPORT OF A REPORT		Sugar 1 1 Mar. Inc. Sci.	transfer Seal	
🕞 🕞 🗢 🛃 🕨 Control Panel	All Control Panel Items			
File Edit View Tools Help				
Control Panel Home	Uninstall or change a program			
View installed updates	To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.			
Turn Windows features on or				
Un	Organize 🔻			
Install a program from the network	Name	Publisher	Installed On	
	Adobe Flash Player 14 ActiveX Adobe Flash Player 14 Plugin	Adobe Systems Incorporated Adobe Systems Incorporated	17/06/2014 17/06/2014	
Figure 2-1: Program	ns and Features			

Under Internet Information Services ensure that the following features are enabled as shown in Figure 2-2.



Figure 2-2: Windows Features

Click OK to confirm the new settings. Windows may take several minutes as shown in Figure 2-3 to initiate the system changes.

Microsoft Windows	
Please wait while Windows makes features. This might take several r	s changes to ninutes.
	Cancel

Figure 2-3: Update system

2.3 Create the Application Pool

Web applications and sites are typically grouped into application pools on a web server. This effectively creates a process boundary that serves to isolate applications and provide a more stable environment. Perception Web supports an application pool running under the local system account with .NET Framework 4.0 or higher, Integrated managed pipeline and 32-bit support. If a suitable pool for Perception does not already exist on the web server, it is necessary to create one using the following steps:

Open IIS Manager, select Application Pools and right-click to select Add Application Pool as shown in Figure 2-4.

Internet Information Servi	ices (IIS) Manager 30ZW1-EB → Applicat	ion Pools					
File View Help							
Connections	PS-EURO\502222358)	This pag Pool	Application Poor e lets you view and mana pre applications, and pro	DIS age the list of a ovide isolation Go - 🙀 Sh	application poo among differen ow All Group	ls on the server. Application p nt applications. by: No Grouping	oools are associated with wo
	Martesh	INGILIC	· ·	Status	.NET Fram	Managed Pipeline Mode	Identity
		i Defa	ultAppPool	Started	v2.0	Integrated	ApplicationPoolId

Figure 2-4: Add an Application Pool

In the 'Add Application Pool' dialog box, enter an appropriate name for the pool, for example, ASP.NET 4.0 App Pool, then select an appropriate version of the .NET Framework, for example, .NET Framework v4.030319.

Note: If the correct .NET Framework is installed, but not listed here, refer to Section 2.6.1.

Under 'Managed pipeline mode', select Integrated, select the Start application pool immediately checkbox and click OK as shown in Figure 2-5.

Add Application Pool		
Name:		
ASP.NET 4.0 App Pool		
.NET Framework version:		
.NET Framework v4.0.30319 🔹		
Managed pipeline mode:		
Integrated 👻		
Start application pool immediately		
OK Cancel		

Figure 2-5: Name an Application Pool

The available Application Pools on the web server are listed to the right in Figure 2-6. Notice the recently created application pool called 'ASP.NET 4.0 App Pool'.

Note:	During the client installation, you'll be able to associate Perception
	Web with this application pool.

Application Pool This page lets you view and manag one or more applications, and prov	S e the list of application ide isolation among di	pools on the server. Application p ferent applications.	ools are associated with w	orker processes, cor
Filter:	So - Show All G	roup by: No Grouping	•	A
Name	Status .NET Fra	m Managed Pipeline Mode	Identity	Applications
ASP.NET 4.0 App Pool	Started v4.0	Integrated	ApplicationPoolld	0

Figure 2-6: List of Application Pools

[64-bit machines only] If your machine is 64-bit, it's important to ensure that 32-bit applications are supported. To do this, right-click on the newly created application pool, for example, ASP.NET 4.0 App Pool, and select Advanced Settings as shown in Figure 2-7.

Internet Information Services (IIS) Manager						
LIS-4K30ZW1-EB Application	Pools					
File View Help						
Connections Image: Second S	Application Po This page lets you view and mar one or more applications, and p	nage t provide	the list of application pools on the serve e isolation among different applications - ~ 🥁 Show All Group by: No Grou	r. Application poo ping	s are associated with wo	orker processes, contain
	Name		Status .NET Fram Managed Pi	peline Mode	Identity	Applications
	ASP.NET 4.0 App Pool		Add Application Pool	1	ApplicationPoolId	0
	DefaultAppPool	•	Set Application Pool Defaults Start		ApplicationPoolId	1
			Stop			
		2	Recycle			
			Basic Settings			
			Advanced Settings			
			Rename			
		×	Remove			
			View Applications			
		0	Help			
			Online Help			

Figure 2-7: Configure Application Pool Settings

In the 'Advanced Settings' dialog, under the 'General' category, click the **Enable 32-Bit Applications** field and select **True**.

And under the 'Process Model' category, click the **Identity** field, select **LocalSystem** and click **OK** as shown in Figure 2-8.

Note:	LocalSystem ensures that the application has the same privileges as
	the current Windows user.

A	dva	inced Settings		?	×
Γ				_	_
	Ξ	(General)			<u> </u>
		.NET Framework Version	v4.0		
		Enable 32-Bit Applications	True		
		Managed Pipeline Mode	Integrated		
		Name	ASP.NET 4.0 App Pool		=
		Queue Length	1000		
		Start Automatically	True		
	Ξ	CPU			
		Limit	0		
		Limit Action	NoAction		
		Limit Interval (minutes)	5		
		Processor Affinity Enabled	False		
		Processor Affinity Mask	4294967295		
	Ξ	Process Model			
		Identity	LocalSystem		
		Idle Time-out (minutes)	20		
		Load User Profile	True		
		Maximum Worker Processes	1		
		Ping Enabled	True		Ŧ
	Id	lentity			
[identityType, username, password] Configures the application pool to run as built-in account, i.e. Application Pool Identity (recommended), Network Service, Local System, Local Service, or as a specific user identity.					
			ок	Cancel	

Figure 2-8: Advanced Settings

Finally close IIS — you are now ready to run the Perception Web installer.

2.4 Run the Perception Web installer

To install Perception Web, insert the Perception Desktop CD into your PC's CD drive and double click the *'Perception.Web.Setup.exe'* file. The Setup Wizard launches, and you click **Next** to continue as shown in Figure 2-9.

Note: The Installation CD contains other setup programs, so ensure you select the correct installer.



Figure 2-9: Welcome to the Perception Desktop Setup Wizard

If the License Agreement is acceptable, select I accept the terms in the License Agreement and click Next as shown in Figure 2-10.

Berception Web Setup
End-User License Agreement Please read the following license agreement carefully
FORM ES105 (REV 3): SOFTWARE LICENSE NOTICE - READ THIS CAREFULLY: THIS IS A LEGAL AND BINDING AGREEMENT BETWEEN YOU AND LICENSOR. BY INSTALLING THE SOFTWARE, YOU AGREE TO ALL THE TERMS AND CONDITIONS OF THIS SOFTWARE LICENSE ("LICENSE"). IF YOU DO NOT AGREE TO THESE TERMS, DO NOT INSTALL THE SOFTWARE. YOU MAY RETURN THE SOFTWARE, ALL MANUALS, DOCUMENTATION AND PROOF OF PAYMENT TO LICENSOR WITHIN 30 DAYS OF PURCHASE FOR A FULL REFUND. 1. Definitions. Unless otherwise agreed to by Licensor, the following terms shall mean: "Derivative Works" includes but is not limited to (a) any work based upon one or more
✓ I accept the terms in the License Agreement
Print Back Next Cancel

Figure 2-10: End-User License Agreement

Perception Web is hosted by IIS in a dedicated application pool. Select the web site that you wish to install Perception web — this could be the **Default Web Site** as shown in Figure 2-11 or any custom web site that you have defined previously.

The next step is to assign a suitable application pool to Perception Web. This could be the default application pool of the selected web site or a custom application pool that meets Perception Web minimum requirements.

For example, select Use a Custom Application Pool instead of the selected website default and select ASP.NET v4.0 App Pool as shown in Figure 2-11.

Berception Web Setup
Perception Web Application Settings in IIS Specify IIS details for Perception Web application, then dick Next to continue.
Install Perception Web to the website:
Default Web Site 🔹
Install Perception Web to the application named:
PerceptionWeb
✓ Use a Custom Application Pool instead of the selected website default.
Install Perception Web to use the Custom Application Pool:
ASP.NET 4.0 App Pool
Back Next Cancel

Figure 2-11: IIS settings

22-Oct-24

If known, specify the hostname or IP address of the Perception Server. Otherwise leave blank and click **Next** as shown in Figure 2-12.

Note: You can supply this information later via the web.config file (see Section 2.6.2).

Berception Web Setup	
Perception Web Configuration Settings Specify configuration details, then click Next to continue.	9 8
Specify the Hostname or IP Address of Perception Server (leave blank if un can modify this information in your web.config file after installation:	known). You
Back Next	Cancel

Figure 2-12: IP address of Perception Server

Specify a destination web folder for the installation (or accept the default) and click **Next** as shown in Figure 2-13.

邊 Perception Web Setup		x
Destination Folder Click Next to install to the default folder or click Change to choose another.		9E)
Install Perception Web to:		
C:\inetpub\wwwroot\PerceptionWeb\ Change		
Back Next	Cance	2

Figure 2-13: Destination Folder

Click **Install** to start the installation as shown in Figure 2-14. The installation may take several minutes. A progress bar indicates the progress so far.

Berception Web Setup	
Ready to install Perception Web	3
Click Install to begin the installation. Click Back to review or change any o installation settings. Click Cancel to exit the wizard.	of your
Back Install	Cancel

Figure 2-14: Ready to Install

The Setup Wizard proceeds with the installation and presents the following message on successful completion as shown in Figure 2-15. Click Finish to exit.



Figure 2-15: Completed

Perception Web is now successfully installed.

2.5 Configure the Certificates

As a security measure, Perception uses electronic credentials known as certificates to authenticate clients and servers. Every time a new client user is added, both the user and the server administrator must trust each other's certificates (or physically exchange certificates as outlined below). This ensures that the requisite trust exists between client and server. Once the certificates have been exchanged, seamless communication can take place.

2.5.1 Creating the Perception Certificates

A Perception Web client certificate is automatically created on the first instance of launching the web application and can be found in the subdirectory (*TrustedCertificates\certs*) of the Perception Web install location. A Perception Server certificate is automatically created as part of the Perception Server install and can be found in the directory (*C:\ProgramData\GE_Energy\Perception\TrustedCertificates\certs*) of the Perception Server machine. If the Perception certificates are missing or invalid, refer to Section 2.6.3.

2.5.2 Trusting the Perception Server Certificate

If the Server certificate is not trusted, the following error message displays as shown in Figure 2-16.



Figure 2-16: Invalid Server Certificate

To trust the server certificate, the certificate must be copied from the trusted certificates folder on the Perception Server machine to the trusted certificates folder on the client machine. To do this:

Open file manager on the Perception Server machine and navigate to the trusted certificates folder at this location:

C:\ProgramData\GE_Energy\Perception\TrustedCertificates\certs

Look for a certificate of the following format:

Perception.Server.<computer name>[key].der

Where *<computer name>* is the computer name of the server, and [*key*] is the public certificate key.

Copy this certificate to the *TrustedCertificates**certs* folder on the Perception Web install machine at this location:

<PerceptionWebInstallLocation>\TrustedCertificates\certs

Where <*PerceptionWebInstallLocation*> is the directory path specified in Figure 2-13, for example, *C:\inetpub\wwwroot\PerceptionWeb*.

2.5.3 Trusting the Perception Web client Certificate

If the Client certificate is not trusted, the following error message displays as shown in Figure 2-17.

🕲 Log in 🗙 🗖	
← → C 🗋 localhost/PerceptionWeb/Account/Login	☆ = 🤇
Perception Web powered by GE Digital Energy	🛔 Anonymous 🗸
Home About	
Log in	
Username	
adminUser	
Password	
Log in	
Perception Web Client Certificate not Trusted.	
GE impination at work	Perception Web: 1.16.0.13677 © 2014 General Electric

Figure 2-17: Invalid Client Certificate

To trust the Perception Web client certificate, the certificate must be copied from the trusted certificates folder of the Perception Web client machine (or the rejected certificates folder on the Perception Server machine*¹) to the trusted certificates folder on the Perception Server machine.

Open File Manager on the Perception Web client machine and navigate to the trusted certificates folder at this location:

<PerceptionWebInstallLocation>\TrustedCertificates\certs

Where <*PerceptionWebInstallLocation*> is the directory path specified in Figure 2-13, for example, C:\inetpub\wwwroot\PerceptionWeb.

Or alternatively, if an attempted connection was made^{*1}, the administrator can navigate to the rejected certificates folder on the Perception Server machine at this location:

C:\ProgramData\GE_Energy\Perception\RejectedCertificates\cert s

Look for a certificate of the following format:

Perception.Web.<computer name>[key].der

Where *<computer name>* is the computer name of the Perception web server, and [*key*] is the public certificate key.

^{*1} Note: When a client attempts to connect to a server, the Web client's certificate is automatically moved to the Rejected Certificates folder on the Perception Server machine. To trust the client connection, the administrator must move this certificate to the trusted certificates folder on the Perception Server.

Move this certificate to the TrustedCertificates\certs folder on the Perception Server machine at this location: C:\ProgramData\GE Energy\Perception\TrustedCertificates\certs

2.6 Troubleshooting

2.6.1 .NET Framework is not listed when creating a new application pool

If the .NET Framework is installed but not listed as an available option in the .NET Framework version dropdown list when creating a new application pool, then it may just need to be reregistered on the machine. Try the following steps:

- Launch the Command Prompt as an Administrator
- Click Start > All Programs > Accessories
- > Right-click the Command Prompt and choose Run as administrator

Note: If prompted, click Yes to the User Account Control

 Type the following commands (ensuring you use the correct path for the .NET Framework version you have installed).

32-bit machines:

cd C:\Windows\Microsoft.NET\Framework\v4.0.30319

➤ aspnet_regiis -ir

64-bit machines:

- cd C:\Windows\Microsoft.NET\Framework64\v4.0.30319
- ➤ aspnet_regiis -ir

2.6.2 Modify the Perception Server hostname or IP address

If incorrect/missing configuration details occur, the following error message displays.

🛱 Log in		_ 0 ×
← ⇒ C	localhost/PerceptionWeb/Account/Login	☆ =
æ	Perception Web powered by GE Digital Energy	🛔 Anonymous 🗸
Hom	ne About	
Log	g in	
Userna	ame	
а		
Passw	rord	
•		
Log	in	
• Incorr	rect configuration details, Perception Server Hostname (or IP Address) is missing or invalid. Please contact your System Administrator.	
æ	GE insgination at work Perception Web: 1.16.0.13077	© 2014 General Electric

Figure 2-18: Incorrect configuration details

The Perception Server hostname or IP address is specified in the *Web.Config* file that can be found at the Perception Web install location. Open this file in any editor*, such as Notepad, and edit the following key:

<add key="PerceptionServerHostnameOrIpAddress" value="{name}"/>

Where {*name*} points to the Perception Server — this could be localhost or the IP address of the Perception Server.

*Note: The editor must be run with administrator privileges.

2.6.3 Perception Certificates missing or invalid

2.6.3.1 Server Certificate

If the Server certificate is missing or invalid, the following error message displays.



Figure 2-19: Server certificate missing

To resolve, copy a valid certificate to the TrustedCertificates\certs folder in the Perception Server install location or reinstall Perception Server to regenerate the certificate.

2.6.3.2 Web Client Certificate

If the Web Client Certificate is missing or invalid, the following error message displays.



Figure 2-20: Client certificate missing

To resolve, copy a valid certificate to the **TrustedCertificates**\certs folder in the Perception Web install location.

Another possibility is that the Application Pool has been incorrectly configured. To check, open IIS and ensure that the application pool is using a LocalSystem account (see Section 2.3) and/or restart the web site.

Alternatively, reinstall and re-launch Perception Web to regenerate the certificate.

2.6.4 Invalid Application Pool

If the application pool is missing or incorrectly configured, the web browser may show the following message as shown in Figure 2-21.

Configuration Error ×
← → C Dicalhost/PerceptionWeb/Account/Login
Server Error in '/PerceptionWeb' Application.
Configuration Error
Description: An error occurred during the processing of a configuration file required to service this request. Please review the specific error details below and modify your configuration file appropriately.
Parser Error Message: Unrecognized attribute 'targetFramework'. Note that attribute names are case-sensitive.
Source Error:
Line 75: Line 76: Line 77: <compilation targetframework="4.5"></compilation> Line 78: <httpruntime targetframework="4.5"></httpruntime> Line 79: <authentication mode="Forms"></authentication>
Source File: Clinetpublwww.wrootiPerceptionWeblweb.config Line: 77
Version Information: Microsoft .NET Framework Version:2.0.50727.5477; ASP.NET Version:2.0.50727.5483

Figure 2-21: Browser error

To resolve, ensure that Perception Web is associated with the correct application pool and that the Application pool is configured as outlined in Section 2.3.

2.6.5 Other Issues

Known Issue	Resolution
Perception Web installer: after selecting an application pool, it reverts to another application pool.	Reselect the intended application pool.
HTTP Error 401.2 - Unauthorized	This can happen when trying to view Perception Web from a browser. Anonymous Authentication and Forms Authentication must be enabled for IIS to resolve this.
Unable to see ASP.NET v4.0, 4.5 or 4.7 in Perception Web installer application pool drop down or available application pools in IIS manager	 Ensure the correct features are enabled as described in section 2.2. Close IIS manager (if open). Run Command Prompt as Administrator. In the Command Prompt, type (for x64 Windows): cd C:\Windows\Microsoft.NET\Framework64\v4.0.30319 or (for x86 Windows): cd C:\Windows\Microsoft.NET\Framework\v4.0.30319 and press Enter. Type aspnet_regils -ir and press Enter. A message confirms that the configuration of IIS Framework 4.0 has started. Restart IIS.
Perception Web Images / Icons not displaying	 After installing and configuring Perception Web, some images and icons are not displaying on the web pages (Ranking arrows, pie chart, device icons). Steps to resolve the issue: 1. Open Control Panel and select Add/Remove Windows features 2. Enable the IIS feature Static Content under Common HTTP Features. 3. Restart IIS
Perception Web installer fails for non-English Windows	 On some non-English Windows environments the Perception Web installer fails to complete. At the stage when you select the .Net 4.0 application pool and click Next, a message appears stating (ASP.NET v4.0) is not supported. This occurs because the decimal place symbol set in the Windows environment is not "." Steps to resolve the issue: In the Windows environment, open the control panel. Click on Region and Language and then click on Additional settings. Change the Decimal symbol to "." and click OK.

3 USING PERCEPTION WEB

3.1 Introduction

Perception Web is designed to connect with a database that contains the sampling data from the monitoring devices. In a production environment, the database typically resides at a remote location on a distinct web server. The Perception Web client renders this data in a web-friendly format across several platforms including mobile devices. However, the read-only nature of the web client means no modifications are possible.

Note: To customise the data or alter any device settings, you must use the standalone software application, Perception Desktop.

3.2 Fleet Overview



Figure 3-1: Perception Web home page

The Perception Web home page presents an overview to the general state of health of the entire transformer fleet. It is divided into the following sections:

- Fleet provides a summary count of the number of transformers in the fleet, the number that are ranked or in need of attention, and a count of the various alarms that have been triggered.
- Risk Index distribution of the fleet provides a pie chart depicting the risk distribution across the entire fleet. Click the colour-coded legend for a definition and summary count. Red or amber slices present the most risk (or have the most serious defects) while green slices present the least risk (or

have no serious defects). White slices (or the absence of colour) denote those transformers that have yet to be evaluated.

- Ranking Table provides a colour-coded ranking of all transformers according to their calculated risk index. Those listed at the top (in red/amber) present the most risk (or have the most serious defects) while those listed at the bottom (in green) present the least risk (or have no serious defects). The absence of colour coding denotes that the transformer is yet to be evaluated. Clicking a transformer opens the transformer dashboard.
- Latest Events provides a log-style entry for any events that occur during the life of the transformer. This could be anything from a triggered alarm to a user-initiated action.
- Average Fleet Risk Index History provides a timeline to track the overall health of the transformer fleet over time. This timeline calculates and shows the average health risk index across the entire transformer fleet.

3.3 Asset Explorer

The Asset Explorer is used to visualise the network of transformers and devices being monitored, and while it can be configured to display a hierarchy of areas, substations, transformers and devices – this can only be performed in Perception Desktop.

Click the 'right-pointing arrow' (top left) as shown in Figure 3-2 to open the Asset Explorer.





Figure 3-2: Opening the Asset Explorer

The Asset Explorer uses a tree-like structure to represent the hierarchy of assets in the database as shown in Figure 3-3. The tree-like structure provides a logical means of organising the assets and a useful means by which to navigate the hierarchy and find an asset.



Figure 3-3: Asset Explorer

Each node in the tree represents an asset (denoted by the type of icon). Click a side right-pointing arrow, as shown in Figure 3-3, to expand a node and reveal its hierarchy below, as shown in Figure 3-4. Typically, an 'Area' sits at the top of the hierarchy, while a 'monitoring device' sits at the bottom of the hierarchy, as shown in Figure 3-4.

Home About	
	_
* 🌏 Area_1	^ <
Transformer_3	
Transformer_2	
Transformer_1	
TT1-A000000	
MultiTrans_1	

Figure 3-4: Asset Explorer - the asset hierarchy

The asset icons (or nodes) have a status indicator:

- Green Tick: All monitored parameters within bounds.
- Amber Exclamation Mark: A parameter(s) has exceeded the High or Low thresholds.
- Red Cross: A parameter(s) has exceeded the "High-High" or "Low-Low" or Ratio thresholds.
- Purple: Indicates that there is uncertainty in the latest measurement accuracy or the latest measurement is considered to be in error. Refer to the device data table.



• Blue: Indicates the device has experienced a fault and requires a service.



Note: The device status is reproduced up the asset tree so that the related Transformer, Substation and Area also reflect the status of its worst subordinate device.

22-Oct-24

3.4 Dashboards

Click on an asset node for more information. Figure 3-5 shows a Transformer dashboard. Every transformer gets a dedicated page containing key transformer information, such as its risk index, ranking and other parameters, such as alarms and load current. Listed below are any attached monitoring devices.



Figure 3-5: Transformer Dashboard

Click on the relevant monitoring device as shown in Figure 3-5 and scroll down if required to see the data aggregation and analysis as shown in Figure 3-6.



Figure 3-7 shows the cooling information for an MO150 device.



Last Measurement 04/01/2000 14:05

3.5 Wallboards

A wallboard displays all assets and their corresponding status on a map. This provides an 'at-a-glance' geographic view of the assets at any moment in time, but the wallboard needs to be refreshed manually for any updates to show.

Wallboards can be rendered at the Transformer, Substation and Area levels. However, this needs to be preconfigured in Perception Desktop. Once setup, click **Wallboard** to see the configured image. In this example, Figure 3-8 shows a Transformer Wallboard on an image with two attached monitoring devices.

Note: If a wallboard is needed to continuously monitor the condition of assets, for example, in a control room, it's better to use the Perception Desktop wallboard as it dynamically updates.

22-Oct-24



Figure 3-8: Transformer Wallboard

3.6 Options

The Home option returns you to the 'Home' page with the 'Fleet Overview' summary information as shown in Figure 3-9.

	Perception Web powered by GE Digital Energ	y		
	Home bout			
>	Fleet Overview			
	Fleet		Risk Index distribution of the fleet	Ranking Table
	3 Total Transformers in Fleet	^		1. 📫 Transformer_3
	2 Total Ranked Transformers			 2. ➡ Transformer_2 3.
	4.5 Current Average Fleet Risk Index			
Figu	ıre 3-9: Home page			

The About option takes you to the 'Release Notes' and 'Licenses' page as shown in Figure 3-10.



Figure 3-10: About page

The Welcome 'User' option shown in Figure 3-11 allows you to log off.

	Perception Web powered by GE Digital Energy	у			🛓 Welcome a 🗸
	Home About				
>	Fleet Overview				
	Fleet		Risk Index distribution of the fleet	Ranking Table	
	3 Total Transformers in Fleet	^		1. 🔷 Transformer_3	
Fig	ure 3-11: Log off option				

You are returned to the 'Log in' page as shown in Figure 3-12.

Perception Web powered		🛓 Anonymous 🗸
Log in		
Username		
Password		
Log in		
GE imagination at work	Perception Web: 1.16.0.13572	© 2014 General Electric

Figure 3-12: Login page

Also note that every web session expires after a period of inactivity (defined as 10 minutes). However, Perception Web prompts you prior to logging out as shown in Figure 3-13.

Your session is about to expire!		×
YOU WILL BE LOGGED OUT IN 40 SECONDS.		
	No, Sign me out	Yes, Keep me signed in

Figure 3-13: Session expiry

22-Oct-24

Appendix A Installing Perception Web on Windows Server 2008

The following steps outline how to install and configure Perception Web on Windows Server 2008.

- Log on to the Windows Server 2008 machine as an 'Administrator'.
- Go to Start > Control Panel.
- Select Programs and Features as shown in Figure A-1.

📴 All Control Panel Items		EN English (United Kin	gdom) 📮	
Control Panel + All C	Control Panel Items 👻			
Adjust your computer's settings				
🏲 Action Center	C Administrative Tools	🛃 AutoPlay	🕎 Color Management	Credential Manager
👚 Date and Time	👦 Default Programs	🚔 Device Manager	a Devices and Printers	🜉 Display
Sease of Access Center	Folder Options	🙀 Fonts	🔁 Internet Options	🔩 iSCSI Initiator
🕮 Keyboard	I Mouse	🕎 Network and Sharing Center	Notification Area Icons	🛄 Phone and Modem
Power Options	🚾 Programs and Features	🔗 Region and Language	🐻 RemoteApp and Desktop Connections	🛋 Sound
🕎 System	🛄 Taskbar and Start Menu	🔁 Text to Speech	I Troubleshooting	& User Accounts
📑 Windows CardSpace	🔗 Windows Firewall	or Windows Update		

Figure A-1: Control Panel

• Select Turn Windows Features on or off as shown in Figure A-2.



Figure A-2: Turn Windows Features on or off

 In the Server Manager application, select the Roles node and then click Add Roles as shown in Figure A-3.

server Manager		EN Engleh (United Kingdom)	
File Action View Help			
(= =) 💈 🖬 👔			
Steven Monager (LISDEV07V)	Roles		
Configuration Configuration	Wew the health of the roles installed on your server and add	ar remoie nels and features.	
	Roles Summary		Roles Summary Help
	Roles: 2 of 17 installed		🙀 Add Roles



- In the Add Roles Wizard, click **Next** to proceed.
- On the Server Roles page, select the Web Server (IIS) option and click Next as shown in Figure A-4.

Add Roles Wizard		×
Select Server Rol	es	
Before You Begin Server Roles Confirmation Progress Results	Select one or more roles to instal on this server. Location Active Directory Certificate Services Active Directory Domain Services Active Directory Federation Services Active Directory Lightweight Directory Services Active Directory Rights Management Services Application Server DHCP Server DMS Server PMS Server Polies Services (Installed) Print and Document Services Print and Document Services Windows Deployment Services Windows Server Update Services Windows Server Update Services Windows Server Update Services	Description: Web Server (IIS) provides a reliable, manageable, and scalable Web application infrastructure. Additional role services can be added from the Roles home page.
	< Previous Next	>InstallCancel

Figure A-4: Select Server roles

Select the following Role Services as shown in Figure A-5.



Figure A-5: Role Services

 Click the Install button to complete the Wizard and then close the Server Manager application. Start the Internet Information Services (IIS) Manager as shown in Figure A-6.



 In the Connections pane, select the Application Pools node to view all the available application pools as shown in Figure A-7.

Internet Information Services (IIS) Manager				EN English (United King	dom) 📮
	Application Pools					
File View Help						
Connections	This page lets you view	on Pool and manage	IS e the list of applica 🖞 Go 🕞 😽 Show	ation pools on the ser v All Group by: No	rver. Application pools are	e associated with wo
	Name 🔺	Status	.NET Frame	Managed Pipeli	Identity	Applications
	ASP.NET v4.0	Started	v4.0	Integrated	ApplicationPoolIden	0
	ASP.NET v4.0 Cl	Started	v4.0	Classic	ApplicationPoolIden	1
	Classic .NET App	Started	v2.0	Classic	ApplicationPoolIden	0
	DefaultAppPool	Started	v2.0	Integrated	ApplicationPoolIden	1

Figure A-7: Application Pools

- Right click on the ASP.NET v4.0 application pool and select Advanced Settings as shown in Figure A-8.
- > Set 'Enable 32-Bit Applications' to True.
- > Set 'Managed Pipeline Mode' to Integrated.
- > Set 'Identity' to LocalSystem.

General) .NET Framework Enable 32-Bit Ap				
(General) .NET Framework Enable 32-Bit Ap			 	
.NET Framework Enable 32-Bit Ap				
Enable 32-Bit Ap	Version	¥4.0		
-	plications	True		
Managed Pipeline	e Mode	Integrated		
Name		ASP.NET v4.0		
Queue Length		1000		
Start Automatica	ally	True		
3 CPU				
Limit		0		
Limit Action		NoAction		
Limit Interval (mi	nutes)	5		
Processor Affinit	y Enabled	False		_
Processor Affinit	y Mask	4294967295		
Processor Affinit	y Mask I	4294967295		
Processor Affinit Process Mode Identity	y Mask I	4294967295		
Processor Affinit Process Model Identity Idle Time-out (mi	y Mask I nutes)	4294967295 LocalSystem 20		
Processor Affinit Process Mode Identity Idle Time-out (m Load User Profile	y Mask I nutes)	4294967295 LocalSystem 20 False		
Processor Affinit Process Mode Identity Identity Identity Load User Profile Maximum Worker	y Mask I nutes) ; r Processes	4294967295 LocalSystem 20 False 1		
Processor Affinit Process Model Identity Idle Time-out (mi Load User Profile Maximum Worket Ping Enabled	y Mask I nutes) ; r Processes	4294967295 20 False 1 True		
Processor Affinit Process Model Identity Idle Time-out (mi Load User Profile Maximum Worke Ping Enabled Ping Maximum Re	y Mask I Inutes) ; r Processes esponse Time (sec	4294967295 LocalSystem 20 False 1 True onc 90		
Processor Affinit Process Model Identity Idie Ime-out (m Load User Profile Maximum Workee Ping Maximum Rr Ping Period (seco	y Mask I nutes) r Processes esponse Time (sec unds)	4294967295 20 False 1 True onc 90 30		
Processor Affinit Process Model Identity Idle Time-out (m Load User Profile Maximum Worker Ping Brabled Ping Maximum Re Ping Period (secc Shutdown Time L	y Mask Inutes) e r Processes esponse Time (sec unds) .imit (seconds)	4294967295		

Figure A-8: Advance Settings

• Click OK to save the new settings and then close the IIS Manager.

 Lastly, when you run the Perception Web installer ensure that you select the ASP.NETv4.0 application pool as shown in Figure A-9.

🛃 Perception Web Setup		
Perception Web Application Setting Specify IIS details for Perception Web appli	s in IIS cation, then click Next to continue.	88
Install Perception Web to the website:		
Default Web Site		•
Install Perception Web to the application nam	ned:	
PerceptionWeb		
✓ Use a Custom Application Pool instead of the selected website default. Install Perception Web to use the Custom Application Pool:		
ASP.NET v4.0		-
,		
	Back Next	Cancel

Figure A-9: Perception Web Application Settings in IIS

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