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Outstation Support Server Handbook

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1. INTRODUCTION

1.1 PURPOSE

This document describes the Outstation Support Server (OSS) installation and use.

The OSS provides software package management and configuration backup facilities for Siemens networked outstations.

1.2 SCOPE

This document covers the OSS installation and operation. The OSS software covered in this handbook is identified as part number 667/TZ/32450/000 issue 9.0.

1.3 REFERENCE DOCUMENTS

GVP Reference Manual	667/HB/31760/000
Gemini ² UTMC OTU Handbook	667/HB/31601/000

1.4 ABBREVIATIONS AND DEFINITIONS

ASCII	American Standard Code for Information Interchange
Bit	Binary Digit
BOOTP	Bootstrap Protocol
CCITT	International Co-ordinating Committee for Telephony and Telegraphy
CHAP	Challenge Handshake Authentication Protocol
CPU	Central Processing Unit
DCE	Data Communication Equipment
DDNS	Dynamic DNS
DNS	Domain Name System
DSL	Digital Subscriber Line
DST	Daylight Saving Time
EMC	Electromagnetic Compatibility
eCos	Embedded Configurable Operating System
FLASH	Non-volatile memory that may be programmed under software control
GMT	Greenwich Mean Time
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communication
GV	Generic Versatile
GVP	Generic Versatile Platform
IO	Input and Output
ICG	Inter-Cycle Gap - A Siespace Protocol Parameter
ICMP	Internet Control Message Protocol
IMG	Inter-Message Gap - A Siespace Protocol Parameter
IP	Internet Protocol

JFFS2	Journaling Flash File System Version 2
LAN	Local Area Network
LED	Light Emitting Diode
LMU	Lamp Monitoring Unit
MD5	Message Digest 5
MIB	Management Information Base
MIB-II	Management Information Base II (Two)
NTP	Network Time Protocol
MOVA7	Microprocessor Optimised Vehicle Activation
OEM	Other Electrical Manufacturers
OSS	Outstation Support Server
OTU	Outstation Transmission Unit
PAP	Password Authentication Protocol
PC	Personal Computer
PCB	Printed Circuit Board
PIN	Personal Identification Number
PPP	Point-to-Point Protocol
PSTN	Public Switched Telephone Network
PSU	Power Supply Unit
RAM	Random Access Memory
ROM	Read Only Memory
ROMFS	ROM File System
RS232	EIA Data Communications Interface - Level based serial communications standard
RS485	EIA Differential Data Communications Interface - Differential serial communications standard
SHA-1	Secure Hash Algorithm 1
Siespace	A Siemens car park guidance system
SNMP	Simple Network Management Protocol
SNMPv1	SNMP Version 1
SNMPv2	SNMP Version 2
SNMPv3	SNMP Version 3
SNTP	Simple Network Time Protocol
STC	Siemens Traffic Controls
Telnet	Telnet Protocol
TFTP	Trivial File Transfer Protocol
TMA	Traffic Management Act
TS	Siemens Traffic Solutions, Mobility Division (formerly Siemens Traffic Controls)
UDP	User Datagram Protocol
UTMC	Urban Traffic Management and Control
UVMS	Urban VMS
VMS	Variable Message Sign
VPN	Virtual Private Network
XML	Extensible Markup Language
ZXO	A Zero Crossover Interface

2. PRODUCT DESCRIPTION

2.1 INTRODUCTION

The Outstation Support Server software runs on a PC, usually located at the local authority's instation. The OSS provides software package management and configuration backup facilities for Siemens networked outstations. The IP network employed will be dependent on the system application.

The outstations monitor and control on-street equipment. Several hardware and software versions are available to interface to equipment such as Variable Message Signs, Car Parks and Traffic Controllers

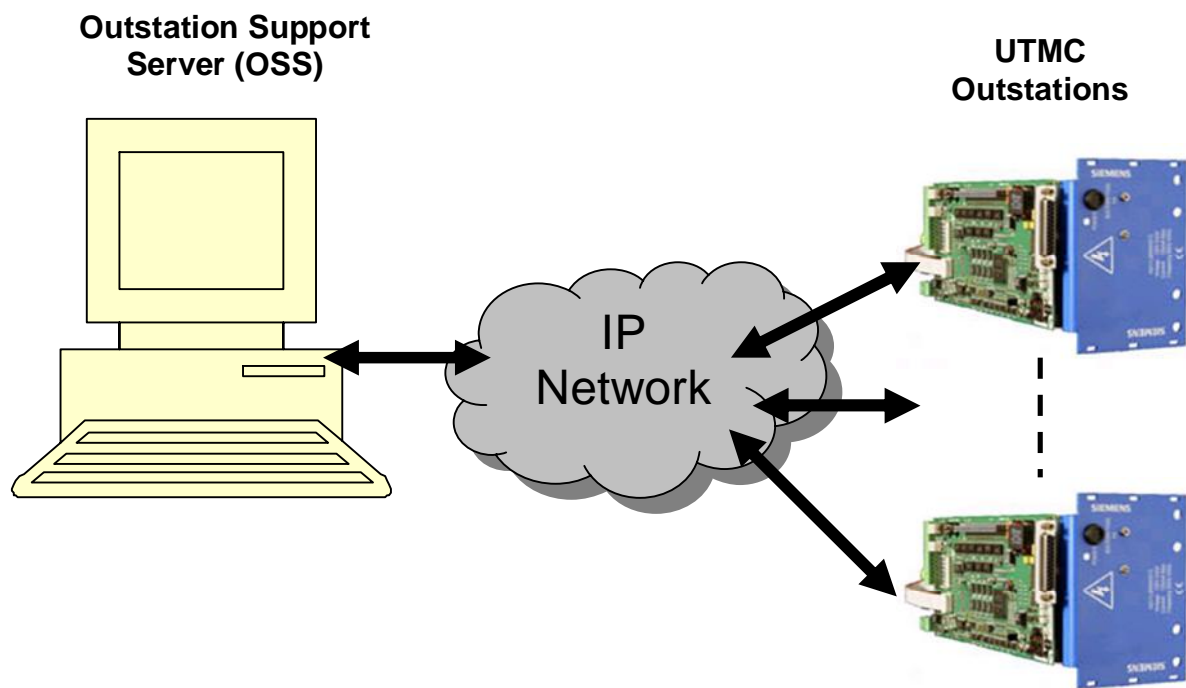


Figure 1 – OSS and Outstations

3. OSS Operation

3.1 INSTALLATION

The PC on which the OSS software is installed must have network access to the UTMC outstations on IP ports 80 and 69 i.e. these ports must not be blocked by intervening firewalls or routers.

The OSS software is compatible with Windows XP, Windows 7, Windows Server 2003, Windows Server 2008 and Windows Server 2012.

Windows XP and Windows server 2003 not recommended for new installs.

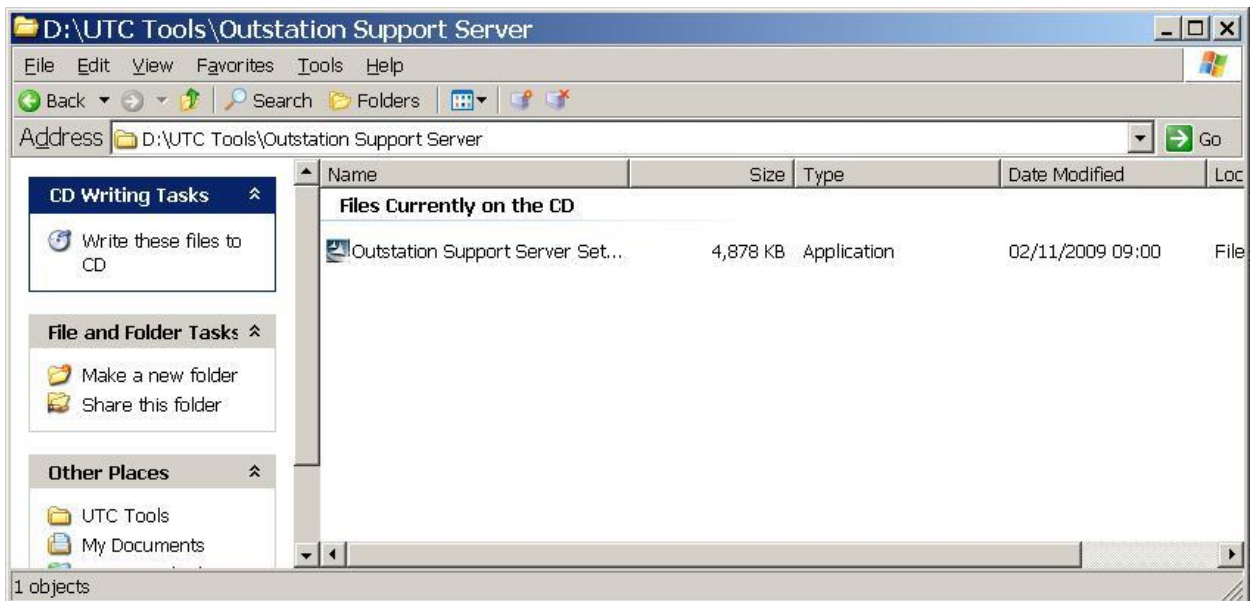
Installation pre-requisites;

- Java JRE (32bit version) 1.7 or later must be installed on host PC.

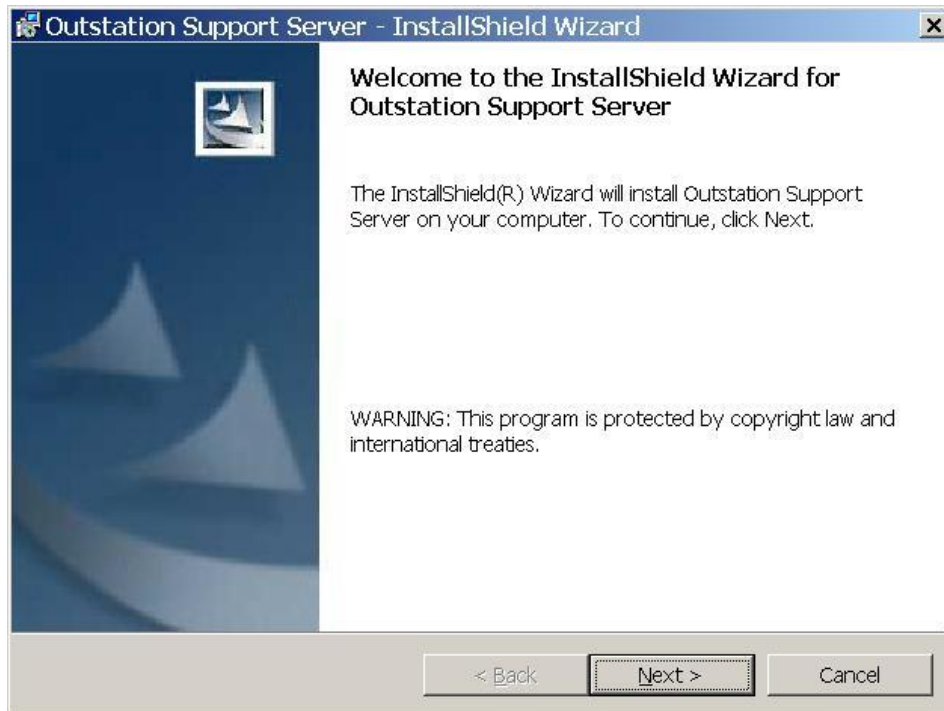
The OSS installation sequence, using the UTC instation CD is described below. Installation from other sources (e.g. executable 667-TZ-32450-000.exe) will follow the same overall procedure.

Using windows explorer, open the UTC instation CD and navigate to the following folder

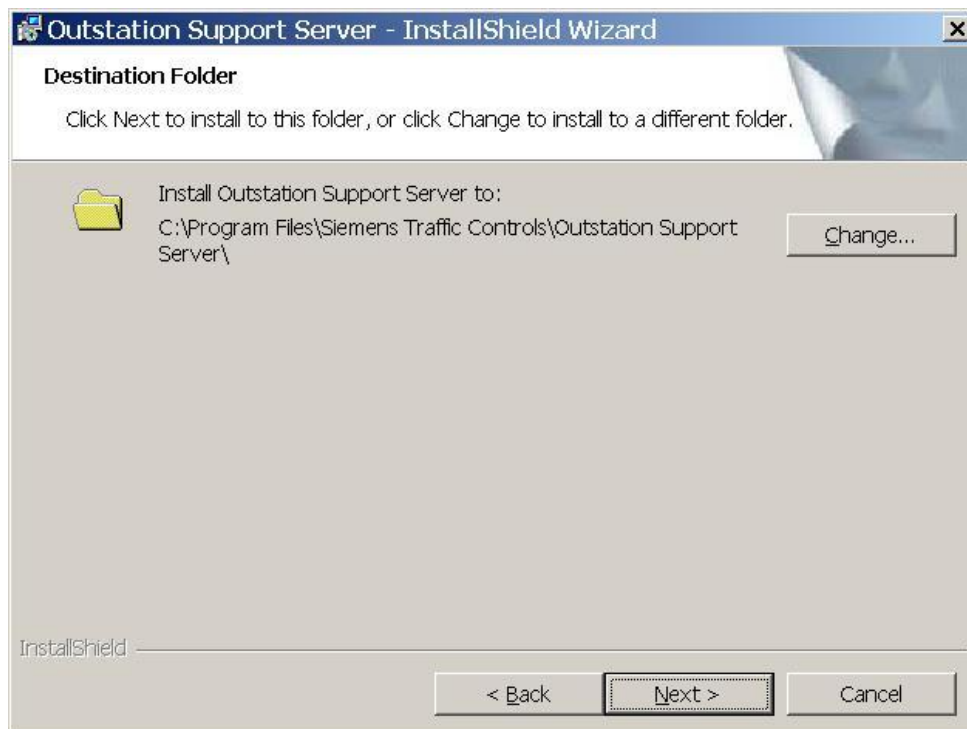
\UTC Tools\Outstation Support Server



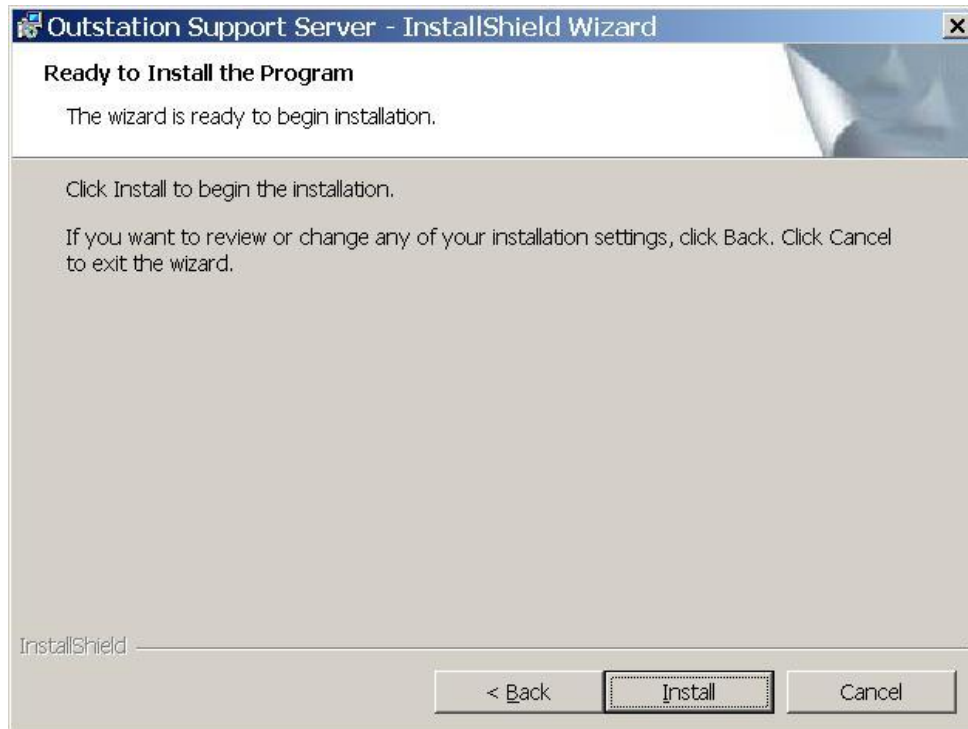
Double-click on the “Outstation Support Server Setup.exe” icon.



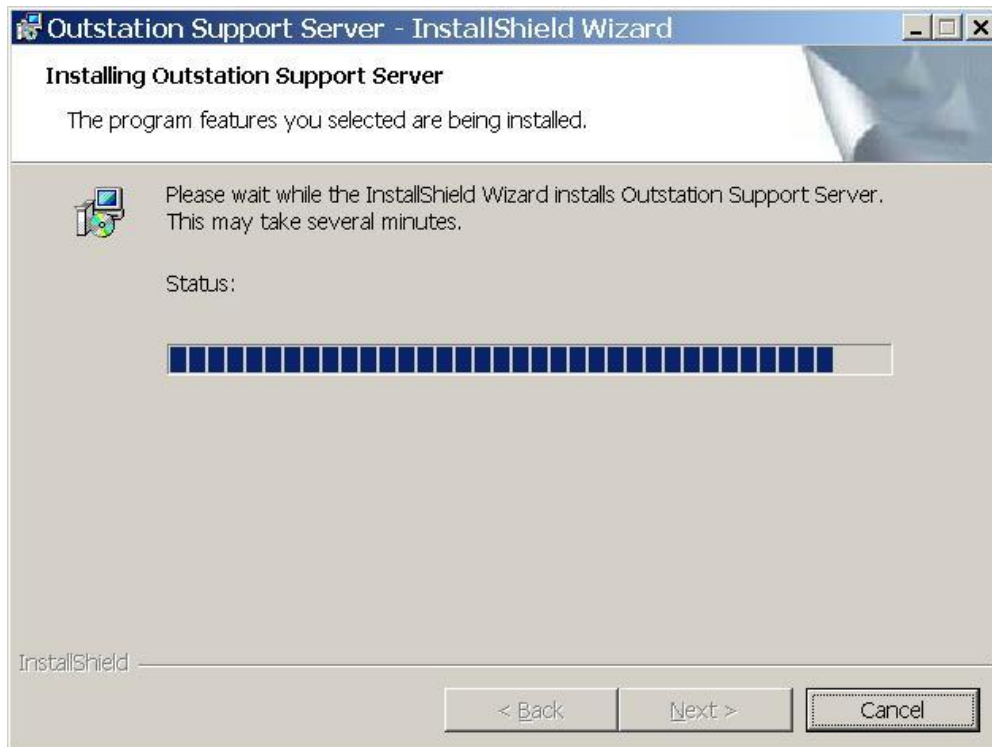
Click "Next".



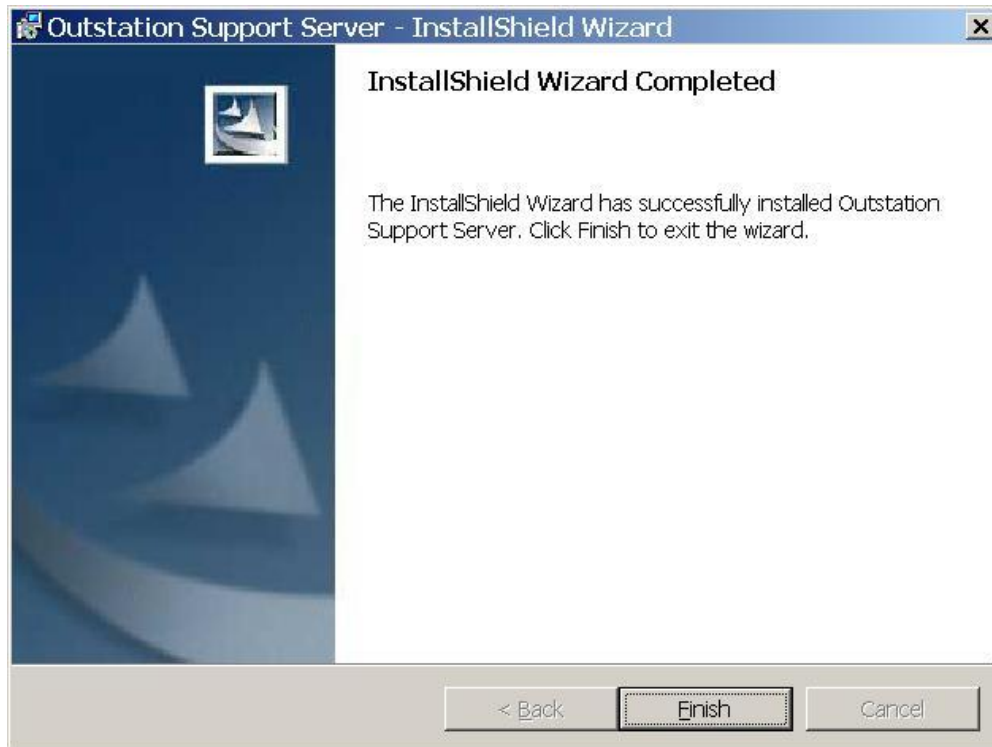
Change the installation directory if required or leave at the recommended install path and click "Next".



Click on "Install".



The installation will then proceed as shown above.



Click "Finish" to complete the installation procedure.

To access the OSS, open Internet Explorer and type in the IP address of the OSS PC, using https, and followed by :9180, for example, <https://137.223.72.58:9180>. If the browser reports a problem with the security certificate, accept the certificate and continue.

On the login dialogue box, enter the oss username and password.

3.2 OSS LICENSING

The OSS requires a license code in order to provide all facilities. The license code is provided by Siemens, Poole and is entered into the OSS on the OSS “Admin – License Manager” screen.

The screenshot shows the 'OSS Admin License Manager' interface. The top navigation bar includes the Siemens logo, 'Outstation Support Server', and a status message: 'Licensed to . License Code is out of date, OSS disabled'. The left sidebar contains a menu with 'License Manager' highlighted. The main content area is titled 'OSS Admin License Manager' and contains a form with the following fields and buttons:

- License Code: (text input)
- Authority Name: (text input)
- Expiry Date: (text input)
- New License Code: (text input)
- Buttons: 'Use new License code' and 'Reset'

A message 'License Code not Valid' is displayed next to the License Code field.

The license code is a 30-character string so it is preferable to copy the license code electronically e.g. from an email.

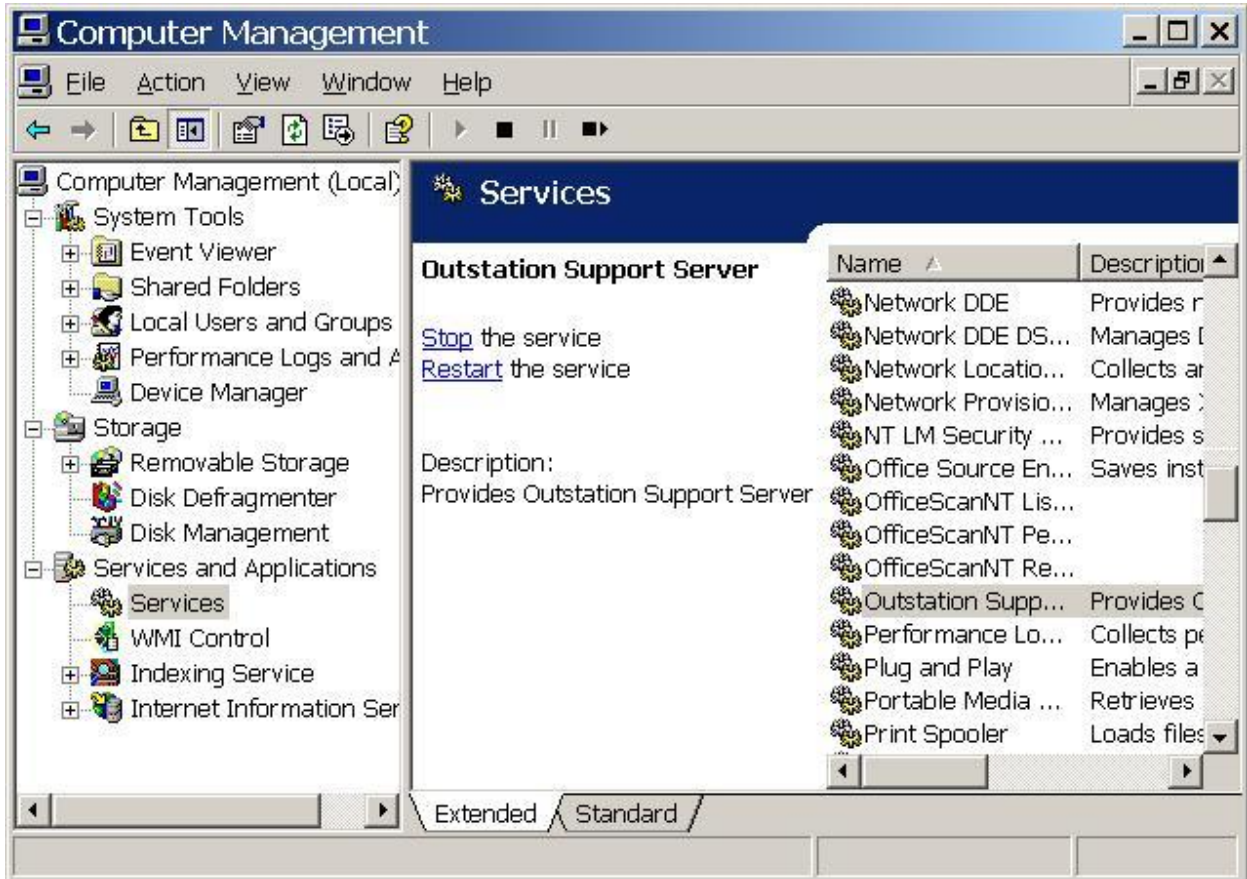
Paste the license code into the "New License Code" field and use the "Use New License Code" button to activate the license.

Refresh the browser page – typically by using the “F5” key or the “refresh” menu icon – and then the new license user name and expiry date will be displayed in the top menu bar.

See section 3.4.13 for additional information on the license code operation.

3.3 OSS MAINTENANCE AND FAULT FINDING

The OSS is run as a windows service. It can be started and stopped using the windows Computer Management facilities as shows below:-



3.3.1 Network and Firewall Settings

In order to allow outstations to register with the OSS, the OSS PC must be accessible on the outstation network.

If the OSS is not showing any outstation registrations, check that the windows firewall on the OSS PC is not blocking access. Also check network settings in any firewalls and routers. Access is required on ports 69 and 8080.

3.3.2 Data File Location

The outstation configuration and package files are stored in sub-directories at:-
 C:\Documents and Settings\All Users\OSSFileStore

3.4 OSS SCREEN DESCRIPTIONS

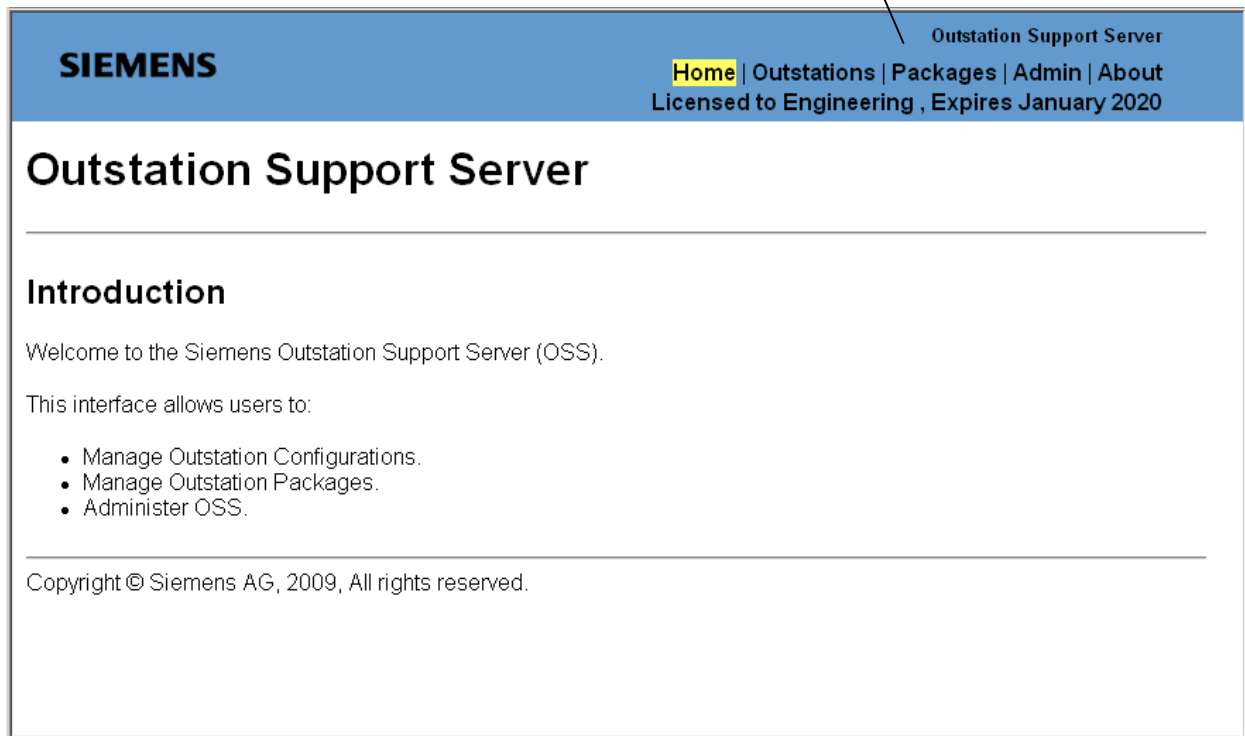
The following sections describe the operations which can be carried out on the OSS via the web interface.

3.4.1 Home Screen and Navigation

The “Home” screen displays a summary of the OSS features, as shown below.

Navigation is achieved by selecting from the options available on the top right.

Use these controls to select the required screen



3.4.2 Outstation List Screen

The “Outstation” screen displays a list of the registered outstations.

The screenshot shows the 'Outstation Management' interface. It features a table of outstations with columns for Site Id, Location, Description, Registered, Package, Version, Latest, and Upgrade Status. Callouts indicate that outstations with red highlights in the 'Registered' column have not been registered recently, and those with yellow highlights in the 'Latest' column are not running the latest software package.

Site Id	Location	Description	Registered	Package	Version	Latest	Upgrade Status
J0122435	-	-	30 Apr 13	667/TZ /32378/000	1.3	1.99	
J99111	-	-	30 Apr 13	667/TZ /32378/000	1.3	1.99	
X002	-	-	22 Jan 13	667/TZ /32378/000	1.0	1.99	
X0100555	-	-	16 May 13	667/TZ /32378/000	1.3	1.99	
X80130	-	-	16:12:09	667/TZ /32378/000	1.99	1.99	ok
X88110	-	-	2 May 13	667/TZ /32378/000	1.3	1.99	
X99110	-	-	2 May 13	667/TZ /32378/000	1.3	1.99	

Siteld

This field lists the Site Name as set in the outstation configuration data.

Location

Location information obtained from the outstation where available.

Description

Outstation description obtained from the outstation where available.

Registered

If the outstation has registered with the OSS recently, then this will contain the last registration time. If the outstation has not registered with the OSS today, then this will contain the last registration date.

The field is highlighted in **RED** if the outstation has not registered for more than the timeout interval (normally 25 hours). Each outstation registers with the OSS at 60 minute intervals. The registration/backup interval is configurable at the outstation.

Package

This is the outstation software package part number.

Version

This is the outstation software package version number.

Latest

This is the latest available version of outstations software package which has been loaded onto the OSS.

The field is highlighted in **ORANGE** if the outstation version is older than the latest.

Upgrade Status

This field indicates “OK” if the outstation is already running the latest software package which has been loaded onto the OSS.

The text is updated when a scheduled upgrade of the outstations is taking place, in order to display the result of the upgrade. The possible displays are:-

Display	Meaning
OK	Upgrade completed successfully
up-to-date	Upgrade not required, package is up to date
no package	Upgrade abandoned, package not found
no address	Upgrade abandoned, outstation has no IP address
timed-out	Upgrade abandoned, outstation timed-out
no outstation	Upgrade abandoned, register entry not found
no site id	Upgrade abandoned, invalid site identifier
xml-rpc error	Upgrade postponed, protocol error

Delete

Use the “Delete” button to remove the outstation registration from the OSS. This would be used, for example, where an outstation has been removed from the system or re-located.

Configs

Use the “Configs” button to display a list of the outstation configuration files which are held on the OSS for that outstation.

Data

Data relevant to applications running on the outstation. Section 3.4.3 describes the MOVA7 TMA log files and how to access them.

3.4.3 MOVA 7 TMA Log Files

The application data screen displays after clicking on the data button on the Outstation Management screen. This screen lists applications that report data back to the OSS, in this case MOVA 7. To view the data click on the view button beside the application name.

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Outstation Management

Application Data

The following Application Data are available for X80130.

Application	
MOVA7	view

[Refresh](#)

Data directories organised by stream. Click on view to display directories containing TMA log categories.

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Outstation Management

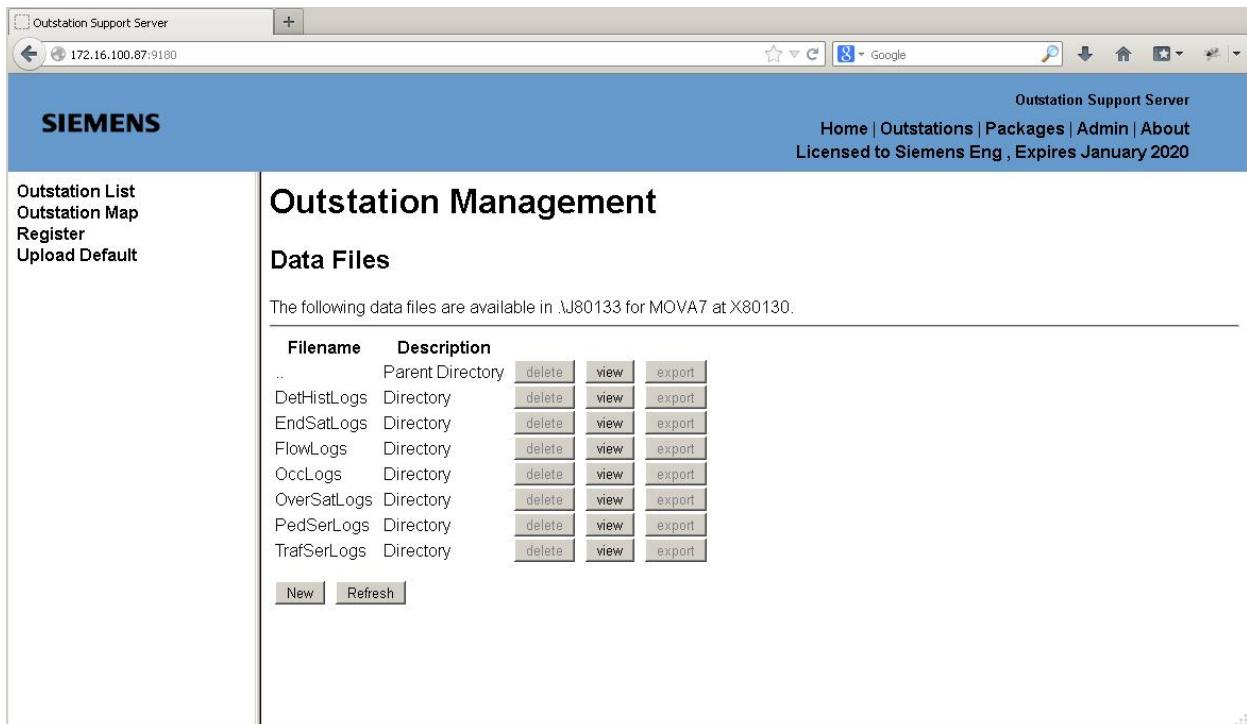
Data Files

The following data files are available in . for MOVA7 at X80130.

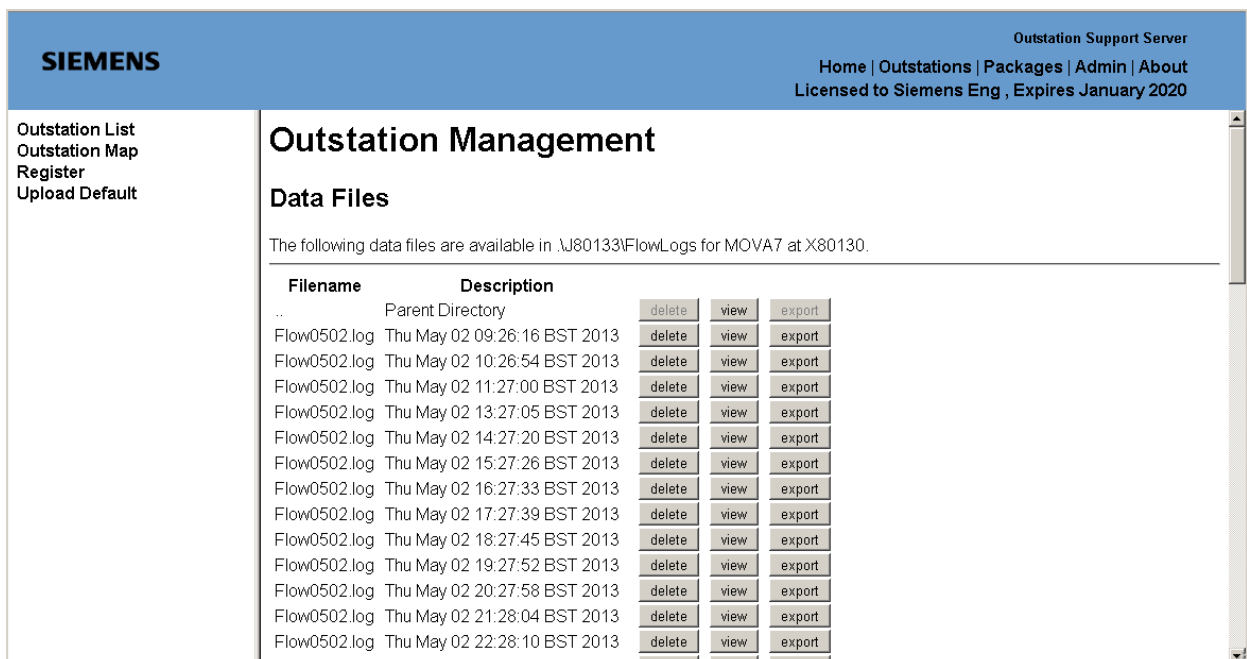
Filename	Description			
J80131	Directory	delete	view	export
J80132	Directory	delete	view	export
J80133	Directory	delete	view	export
J80134	Directory	delete	view	export

[New](#) [Refresh](#)

TMA log categories, click on view to display a list of log files for that category



List of log files, click on delete to delete that file, view to display its contents in a text box (see next screen display) or export to export the file.



Text box displaying contents of flow log file in csv format.

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- Outstation List
- Outstation Map
- Register
- Upload Default

Flow0523.log Thu May 23 14:30:33 BST 2013	delete	view	export
Flow0524.log Fri May 24 09:14:43 BST 2013	delete	view	export
Flow0525.log Fri May 24 10:50:47 BST 2013	delete	view	export
Flow0526.log Fri May 24 11:27:41 BST 2013	delete	view	export
Flow0527.log Fri May 24 23:04:50 BST 2013	delete	view	export
Flow0528.log Sat May 25 23:06:09 BST 2013	delete	view	export
Flow0530.log Tue May 28 07:51:16 BST 2013	delete	view	export
Flow0601.log Tue May 28 12:27:23 BST 2013	delete	view	export
Flow0602.log Tue May 28 14:07:59 BST 2013	delete	view	export
Flow0603.log Wed May 29 14:10:12 BST 2013	delete	view	export

Directory .\J80133\FlowLogs, File Flow0603.log for X80130

```

                Counts across IN-detector and X-detectors (flow) by lane
                Lane number, 1,,,2,,,,3,,,,4,,,5,,,,6,,,,7,,,,8,,,,9,,,,10,,,,11,,,,12,,,,13,,,,14,,
                Detector type, Date/time,IN,S?,X,S?,IN,S?,X,S?,IN,S?,X,S?,IN,S?,X,S?,IN,S?,X,S?,IN,S?,X,S?,
                Sunday, 02/06/13 to 01:15:00 hrs.,112, ,112, ,83, ,83, ,122, ,107, ,39, ,40, ,68, ,74,
                Sunday, 02/06/13 to 01:30:00 hrs.,120, ,120, ,96, ,89, ,113, ,113, ,48, ,48, ,82, ,75,
                Sunday, 02/06/13 to 01:45:00 hrs.,115, ,115, ,98, ,106, ,139, ,143, ,41, ,41, ,98, ,105
                Sunday, 02/06/13 to 02:00:00 hrs.,34, ,36, ,25, ,24, ,26, ,37, ,14, ,14, ,24, ,21, ,26,
                Sunday, 02/06/13 to 02:15:00 hrs.,0, ,0, ,0, ,0, ,0, ,0, ,0, ,0, ,0, ,0, ,0, ,0, ,0, ,0, ,0, ,0,
            
```

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3.4.4 Outstation Manual Registration Screen

The “Register” screen allows an outstation to be registered manually.

When an outstation is installed and commissioned, it is normally configured with the OSS IP address and the OSS interface is enabled. The outstation will then register with the OSS automatically and so manual registration is unnecessary.

The screenshot shows the Siemens Outstation Management web interface. The top navigation bar includes the Siemens logo and the text 'Outstation Support Server' with links for Home, Outstations, Packages, Admin, and About. On the left, a sidebar menu contains 'Outstation List', 'Register' (highlighted in yellow), and 'Upload Default'. The main content area is titled 'Outstation Management' and 'Outstation Registration'. It contains a prompt: 'Please enter a Site Id and IP address.' Below this are three input fields labeled 'Site Id:', 'IP Address:', and 'HTTP Port:'. At the bottom of the form are two buttons: 'Register' and 'Reset'.

Siteld

The Site Name as set in the outstation configuration data. This is normally the same name as used on the instation system e.g. for a UTC system it would be the site SCN, such as X11910 or X01220. The OSS uses this information to recognise an outstation when it registers.

IP Address

The IP network address to be allocated to the outstation by the network administrator.

HTTP Port

The IP port used by the outstation when it registers with the OSS. The HTTP port is normally set to 8080.

3.4.5 Configuration Upload Screen

The “Configuration Upload” screen allows a configuration file to be imported and this file will become the default configuration file for the specified outstation. This allows a configuration to be pre-loaded onto the OSS, in preparation for downloading to the outstation when it is installed and commissioned.

Alternatively, the configuration can be created on the outstation when the outstation is commissioned and the outstation configuration file will be backed up to the OSS automatically, provided that the OSS backup facility has been enabled on the outstation.

Siteld

Enter the Site Name of the outstation whose configuration is about to be imported.

FileName / Browse

Use the “Browse” button and then use the file selection dialogue box to navigate and select the outstation configuration file to be imported.

Upload

Use the “Upload” button to import the selected outstation configuration file to the OSS.

Reset

Use the “Reset” button to clear the Siteld and FileName fields.

3.4.6 Packages Screen

The “Packages” screen displays a list of the outstation software packages currently held on the OSS.

The screenshot shows the 'Package Management' interface. On the left, there are navigation links: 'Packages', 'Upload Package', and 'Schedule'. The main content area is titled 'Package Management' and contains a sub-section 'Package' with the text: 'The following package is available for download to outstations.' Below this is a table with the following data:

Part No	Version	Description	Filename	
667/TZ/32289/000	1.0	UTMC CarPark and VMS	REL_32289_1_0.zip	Delete
667/TZ/32369/000	01.00	UTMC OTU (4MB RAM)	REL_32369_01_00.zip	Delete
667/TZ/32369/000	01.09	UTMC OTU (4MB RAM)	REL_32369_01_09.zip	Delete
667/TZ/32369/000	02.00	UTMC OTU (4MB RAM)	REL_32369_02_00.zip	Delete
667/TZ/32370/000	1.6	UTMC OTU (16MB RAM)	REL_32370_01_06.zip	Delete
667/TZ/32370/000	1.7	UTMC OTU (16MB RAM)	REL_32370_01_07.zip	Delete
667/TZ/32370/000	1.8	UTMC OTU (16MB RAM)	REL_32370_01_08.zip	Delete
667/TZ/32370/000	1.9	UTMC OTU (16MB RAM)	REL_32370_01_09.zip	Delete

PartNo

This is the Siemens part number which uniquely identifies the software package.

Version

This is the version number of the package, as read from the information in the package file. The number is of the form:-

mm.nn where mm is the major version and nn is the minor version

Description

This is the text description of the software package, as read from the package file.

Filename

This is the file name of the package file in the directory on the OSS PC.

Delete

Use the “Delete” button to remove the corresponding package file from the OSS.

3.4.7 Upload Package Screen

The “Upload Package” screen allows the user to import a new outstation software packages onto the OSS.

FileName / Browse

Use the “Browse” button and then use the file selection dialogue box to navigate and select the outstation software package file to be imported.

Upload

Use the “Upload” button to import the selected outstation software package file to the OSS. Once uploaded, the new package will appear on the packages screen (see section 3.4.6) and be available on the outstation’s “Upgrade” screen.

Reset

Use the “Reset” button to clear the FileName field.

3.4.8 Upgrade Schedule Screen

The “Upgrade Schedule” screen allows the user to enable the scheduling of software package upgrades to all registered outstations between the specified start and stop times.

Start time

Enter the time at which automatic upgrade of outstations is to start:-

Day

Day of the week i.e. Sun, Mon, Tue, Wed, Thu, Fri, Sat or leave blank to represent any day.

Hour

Hour value from 0 to 23

Min

Minutes value from 0 to 59

Stop time

Enter the time at which automatic upgrade of outstations is to stop:-

Day

Day of the week i.e. Sun, Mon, Tue, Wed, Thu, Fri, Sat or leave blank to represent any day.

Hour

Hour value from 0 to 23

Min

Minutes value from 0 to 59

Enable

Tick this box to enable the automatic upgrade scheduling and use the "Update" button to apply the change.

Similarly, un-tick the box to disable automatic upgrade scheduling and then use the "Update" button to apply the change.

Update

Use the "Update" button to submit the new values. If the new values are accepted then a "Success" message will be displayed on the screen. If there is a problem, then an "Error" message will be displayed on the screen indicating the cause of the problem.

Reset

Use the "Reset" button to discard any changes which have not yet been submitted and re-load the current values.

3.4.9 OSS Admin – User List Screen

The “User List” screen allows users to be added and removed and security details to be updated.



User Name

This is the user name as entered when the user is first added. The user name is used for logging into the OSS.

Roles

The available roles are:-

- User Ordinary user privileges to operate the OSS
- Security Can add and edit users.

Delete

Remove the user from the OSS.

Edit

Edit the details for the associated user.

New

Register a new OSS user.

Refresh

Update the screen with the latest user information.

3.4.10 OSS Admin – User Edit Screen

The “User Edit” screen allows users details to be updated.

The screenshot shows the 'OSS Admin' interface. At the top, there is a blue navigation bar with the Siemens logo on the left and the text 'Outstation Support Server' and 'Home | Outstations | Packages | Admin | About Licensed to Engineering , Expires January 2020' on the right. Below this is a sidebar menu with the following items: 'User List', 'User Edit' (highlighted in yellow), 'Network', 'Configuration', 'OSS', 'Configuration', and 'License Manager'. The main content area is titled 'OSS Admin' and 'User Registration'. It contains the instruction 'Please enter a username and password.' followed by a horizontal line. Below the line are three input fields: 'Username:', 'Password:', and 'Roles:'. The 'Roles:' field has a checkbox labeled 'security'. At the bottom of the form are two buttons: 'Register' and 'Reset'.

User Name

User name to be edited or added. The user name is used for logging into the OSS.

Password

Enter the new user password.

Roles

Tick the “security” box if the user can add and edit other users.

Register

Submit the details for the specified user.

Reset

Discard any screen changes and update the screen with the latest user information.

3.4.11 OSS Admin – Network Configuration Screen

The “Network Configuration” screen allows the IP port details to be updated.

OSS Port Number

This is the IP port number of the OSS web interface. The default port number 9180 is used to avoid clashing with other web servers which may be running on the PC.

Application Port Number

This is the IP port number of the application interface.

Update

Submit the new port settings.

Reset

Discard any screen changes and update the screen with the latest information.

3.4.12 OSS Admin – OSS Configuration Screen

The “OSS Configuration” screen displays the current OSS configuration values.

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User List
User Edit
Network Configuration
OSS Configuration
License Manager

OSS Admin

OSS Configuration

The OSS configuration is summarised below.

File System

Root Directory: /Documents and Settings/All Users/OSSFileStore
Temporary File Directory: /Documents and Settings/All Users/OSSFileStore\trmp

Web Service

Port: 80
Root Directory: htdocs
Realm Name: OSS
Roles: user, security
Authentication: DIGEST
User: oss

Web Security

Filename: /Documents and Settings/All Users/OSSFileStore/realms.properties

The information on the screen is read-only.

3.4.13 OSS Admin – License Manager Screen

The “License Manager” screen displays the current OSS license code and allows a new license code to be entered.

The license expires on the first day of the month specified as the license expiry date. Once the license has expired, outstations will no longer be able to backup their configurations to the OSS. Outstations will also be prevented from updating their firmware package from the OSS.

For 30 days before the license expiry, the number of days remaining will be displayed on the top menu bar. Note that this display is only updated when logging in to the OSS or when the browser refresh button is used.

License codes are supplied by Siemens, Poole.

The screenshot shows the 'OSS Admin License Manager' interface. At the top, there is a blue header with the SIEMENS logo on the left and navigation links: Home | Outstations | Packages | Admin | About. Below the navigation links, it says 'Licensed to Engineering , Expires January 2020'. On the left side, there is a vertical menu with the following items: User List, User Edit, Network, Configuration, OSS, Configuration, and License Manager (which is highlighted in yellow). The main content area is titled 'OSS Admin License Manager'. It contains the following fields and buttons:

- License Code: [Redacted]
- Authority Name: Engineering
- Expiry Date: January 2020
- New License Code: [Input field]
- Buttons: Use new License code, Reset

License Code

This is the License code currently in use by the OSS. This field is read only.

Authority Name

This is the Local Authority to whom the OSS is licensed. The Authority Name is derived from the License Code. This field is read only.

Expiry Date

This is the month and year when the license will expire (on the first day of the month). This field is read only.

New License Code

Paste the supplied license code into the "New License Code" field and use the "Use New License Code" button to activate the license.

Refresh the browser page – typically by using the “F5” key or the “refresh” menu icon – and then the new license user name and expiry date will be displayed in the top menu bar.

3.4.14 OSS Admin – Disc Usage Screen

The “Disc Usage” screen displays the number of files currently being backed up by the OSS and the amount of disc space used up by these files.

If export of TMA logs to the OSS is enabled there will be a periodic addition of files to the disk drive. It will therefore be necessary to archive the TMA log files from time to time.

This webpage can help to determine when the host PC disc usage is high, and archiving is required to ensure disc space is available for new files.

Outstation Support Server
Home | Outstations | Packages | Admin | About
Licensed to Engineering , Expires January 2030

SIEMENS

User List
User Edit
Network Configuration
OSS Configuration
License Manager
Disc Usage

OSS Admin

Disc Usage

Data Type	Directories	Files	Bytes
Config	44	669	388746201
Package	1	50	302479267
Data	45	1448	3659668
Total	90	2167	694885136

Disc Space

Free space: 77669.22 MB
Total space: 152617.47 MB

<https://172.16.30.247:9180/discUsage>

Disc Usage

Shows the disc usage of the different file types (config, package, and data). The total disc usage of each file type is shown in Bytes on the right most column.

Disc Space

Shows the free space and total size of the main disc drive on the host PC.

3.4.15 OSS About Screen

The “About” screen displays information on the OSS software, including its Siemens part number and copyright information for its associated software components.

SIEMENS Outstation Support Server

Home | Outstations | Packages | Admin | **About**
Licensed to Engineering , Expires January 2020

Outstation Support Server (667/TZ/32450/000 issue 2.0 build 1)

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Apache Commons IO	Copyright 2001-2008 The Apache Software Foundation.
Apache log4j	Copyright 2007 The Apache Software Foundation.
Apache XML-RPC	Copyright 2001-2008 The Apache Software Foundation.
Java Service Wrapper	Copyright © 1999, 2006 Tanuki Software, Inc. Some software Copyright © 2001 Silver Egg Technology.
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tftp4java	Copyright © Roses B.V. 2003.

The information on the screen is read-only.

Appendix A

The text following is the licence for the open software that is included in the Outstation Support Software.

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the version number 2.1.]

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you. You must make sure that they, too, receive or can get the source
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complete object files to the recipients, so that they can relink them
with the library after making changes to the library and recompiling
it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the
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```
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```

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```
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library `Frob' (a library for tweaking knobs) written by James Random Hacker.
```

```
<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice
```

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