7SIGNAL®
THE WI-FI PERFORMANCE COMPANY

7signal Sapphire

Deployment Guide

Release 5.0

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PREFACE

Document scope

This document is aimed at people familiarizing themselves with the 7signal Sapphire system before deployment and to aid the actual deployment. After completion of this document, 7signal Sapphire is installed, up and running ready for Wireless Performance Optimization.

This document does not describe how the software operates, how to configure testing or how to read the measurements. The actual use of 7signal Sapphire applications is explained in documents *7signal Sapphire Carat User Guide* and *7signal Sapphire Analyzer User Guide.*

FCC Compliance

Human RF Exposure

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be located or operating in conjunction with any other antenna or transmitter.

Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Antenna

This device has been designed to operate on internal antennas or with an external patch type antenna having a maximum gain of 6dBi. Antennas having a gain greater than 6dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Notes to the user

Any unauthorized modification of 7signal products may result in violation of FCC requirements which would void the user's authority to operate the equipment.

This device is restricted to indoor-only use in 5180.0 - 5250.0 MHz and 5470.0 - 5725.0 MHz bands

- The FCC ID for the 7signal Sapphire Eye IEEE802.11a/b/g Eye Unit is YLF-2010-08-APU2.
- The FCC ID for the 7signal Sapphire Eye, Model 1001 (802.11a/b/g/n), is YLF-EYE-ABGN-APU3
- The FCC ID for the 7signal Sapphire Eye, Model 2001 (802.11a/b/g/n) is YLF-INEY2001.

Industry Canada Compliance

- The Industry Canada ID for 7signal Sapphire Eye, Model 2001 (802.11a/b/g/n) is 11766A-INEY2001

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Limitations in 5GHz Radar and Mobile Satellite Bands:

(i) operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
(ii) the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall comply with the e.i.r.p. limit; and
(iii) the maximum antenna gain permitted for devices in the band 5725-5825 MHz shall comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate.

(i) les dispositifs fonctionnant dans la bande 5 150-5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;
(ii) le gain maximal d'antenne permis pour les dispositifs utilisant les bandes 5 250-5 350 MHz et 5 470-5 725 MHz doit se conformer à la limite de p.i.r.e.;
(iii) le gain maximal d'antenne permis (pour les dispositifs utilisant la bande 5 725-5 825 MHz) doit se conformer à la limite de p.i.r.e. spécifiée pour l'exploitation point à point et non point à point, selon le cas.

Note: High-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to LE-LAN devices.

De plus, les utilisateurs devraient aussi être avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5 250-5 350 MHz et 5 650-5 850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

Contact information

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TABLE OF CONTENTS

1 7signal solution

7signal Sapphire provides you a new way to continuously and automatically measure the health and quality of a wireless network from the user's perspective. Companies and their business processes are becoming increasingly dependent on the performance and service quality of their wireless networks. Thanks to the Sapphire solution, companies can integrate the quality management of wireless networks with their existing IT and communications technology services.

7signal Sapphire uses monitoring sensors called Eyes to monitor performance and quality in WLAN networks. It also monitors the surrounding radio frequency environment. The performance of the customer’s network is tested against the 7signal Sonar, a test server that helps simulate client activity on the network. Interactive tests, Eyes and parameters for automatic measurement are managed with a centralized application called the Sapphire Carat. The measurement results are reported via an application called the Sapphire Analyzer.

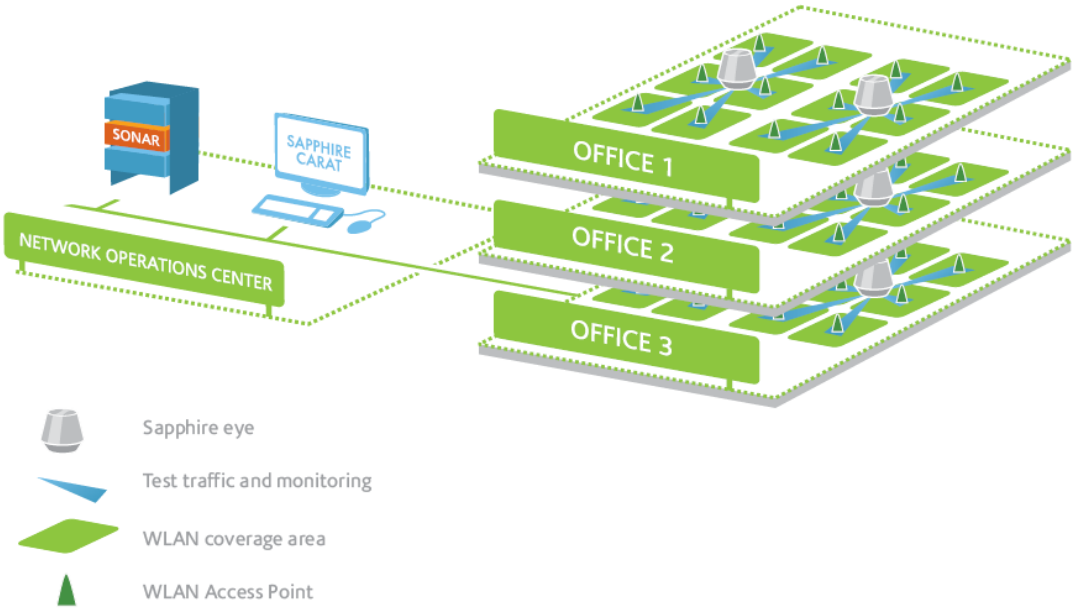
The Eye, continuously monitors the selected WLAN channels via passive listening, which does not have an impact on network performance. It can also emulate a client device in the target network and then use the network and the services provided through it. By analyzing the measurement results, the solution can detect network performance and quality-of-service (QoS) issues. The solution can also produce proactive statistics on the predicted user experience of network performance, which enables the company to increase network capacity before the users notice a loss of performance.

In user emulation tests, also known as active tests, the Eye connects to the Sonar over the wireless network and uses it like an ordinary production service. The usage may include mass file transfers, browser downloads, wireless VoIP calls, or connections to another production server. Sapphire tests the end-user experience by examining the entire data chain from the client to the production service. Active tests can monitor the network even when there are no users in the network. This makes it possible to forecast performance problems and take corrective actions before the service level suffers. Active tests show the availability and quality of services offered over the network and they help administrators see why some applications with their various demands for network performance do not work as expected in the network or some of its areas. When problems occur, active tests can also aid to locate of the problem area in the network topology, which often includes WLAN, LAN, and WAN elements.

The key differentiators of 7signal Sapphire are user emulation, superb coverage, continuous monitoring, and visibility of network health. Other solutions are often based on monitoring the access point settings. As a result, they do not give any indication of the service quality experienced by the end user. In such limited solutions, the service quality parameters measured are the same as in wired networks. Sapphire, by contrast, produces a comprehensive picture of the radio connection quality, where delay, number of retransmissions, and packet loss are taken into account, in addition to other commonly measured parameters.

1.1 Solution Overview

The 7signal Sapphire quality monitoring solution consists of Sapphire Eye monitoring sensors, Sonar test servers, the Sapphire Carat management software, and Sapphire Analyzer for viewing and reporting on results.



1.2 Hardware

7signal Sapphire Eye is a wireless probe or a monitoring station that is installed in a central position within the WLAN network. Currently there are five different hardware variants: the Standard Eye supporting 802.11a/b/g standards, Standard Eye supporting 802.11a/b/g/n standards, Indoor Eye supporting 802.11a/b/g/n standards, and the Micro Eye and Soft Eye supporting 802.11a/b/g/n standards.

1.2.1 802.11a/b/g Standard Eye

802.11a/b/g version of Eye has the following main features (partly optional):

- Mechanical parts injection molded polycarbonate plastic
- Linux computer, 1GB Flash memory
- WLAN radio module, 802.11 a/b/g support (2.4 GHz, 5.180 GHz - 5.825 GHz)
- Spectrum Analyzer component
- 6 sectored high gain antennas covering 360 degrees in horizontal directions, 1 sectored high gain antenna in vertical direction
- RF board with antenna beam selection capability and low noise amplifiers in receiver chain
- Heating element
- Electronic compass

1.2.2 802.11a/b/g/n Standard Eye

802.11a/b/g/n version of Eye has the following main features (partly optional):

- Mechanical parts injection molded polycarbonate plastic
- Linux computer, 1GB Flash memory

- WLAN radio module, 802.11 a/b/g/n support (2.4 GHz, 5.180 GHz - 5.825 GHz)
- Expansion card slots inside the unit: One Mini-PCI and one PCI Express for future use
- Micro SD card slot inside the unit
- Spectrum Analyzer component
- 6 sectored high gain antennas covering 360 degrees in horizontal directions, 1 sectored high gain antenna in vertical direction
- RF board with antenna beam selection capability and low noise amplifiers in the receiver chain
- Heating element
- Electronic compass
- Reset button
- LED indicating status

1.2.3 802.11a/b/g/n Indoor Eye

802.11a/b/g/n version of the Eye has the following main features (partly optional):

- Mechanical parts injection molded polycarbonate plastic
- Linux computer, 1GB Flash memory
- WLAN radio module, 802.11 a/b/g/n support (2.4 GHz, 5.180 GHz - 5.825 GHz)
- Expansion card slots inside the unit: One PCI Express for future use
- Micro SD card slot inside the unit
- Spectrum Analyzer component
- 6 sectored high gain antennas covering 360 degrees in horizontal directions
- RF board with antenna beam selection and low noise amplifiers in the receiver chain
- Heating element
- Electronic compass
- Reset button
- LED indicating status

1.2.4 Soft Eye

Sapphire Eye software can be installed to standard x86 architecture laptop PC, equipped with suitable WLAN network interface card (Supported WLAN cards are listed in Release Notes document).

1.2.5 Micro Eye

Micro Eye is a Raspberry PI (rev B) computer board, equipped with suitable WLAN network interface card (supported WLAN cards are listed in Release Notes document). Micro Eye is shipped with pre-installed SDHC memory card, which contains operating system and Sapphire Eye software.

2 REQUIREMENTS

2.1 Carat server requirements

The Carat server controls the Eye units and collects and stores measurement results in the database. Carat server runs on the Linux operating system and can be installed on a dedicated server or virtual environment.

The Carat server minimum requirements are below:

- Quad core x86 32-bit or x86_64 64-bit Intel and AMD processors
- minimum 6 GB RAM
- installation minimum 10GB hard disk space required
- recommended minimum database space 500GB
    - depending on target network size, (for reference, typical data volume = uncompressed raw measurement data /AP/month = circa 50MB)
    - separate 100GB partition for database backups
- Network connection
- CentOS 5/6 or Red Hat Enterprise Linux 5/6

2.2 Sonar server requirements

Sonar is an end-point software for Sapphire active tests. Sonar server runs on Linux operating system and can be installed to dedicated server or virtual environment.

The Sonar server minimum requirements are below:

- Dual core x86 32-bit or x86_64 64-bit Intel and AMD processors
- Network connection
- CentOS 5/6 or Red Hat Enterprise Linux 5/6
- Minimum 2GB RAM

To best reflect the business-application behavior, Sonar server would benefit from similar characteristics than the server running the business application. For example, the Windows TCP/IP stack implementation may limit performance by default.

2.3 Soft Eye laptop PC requirements

The Soft Eye laptop PC minimum requirements are listed below:

- Dual core x86 32-bit or x86_64 64-bit Intel and AMD processors
- Network connection
- CentOS 6 or Red Hat Enterprise Linux 6
- Minimum 2GB RAM
- WLAN network interface card
    - Suitable cards are listed in Release Notes document
    - Both PCI and USB cards are supported.
    - If the PC has both PCI and USB WLAN cards, Sapphire Eye will use USB card.

- Firewall settings

The following ports should be opened in firewalls:

Source IP/Mask	Destination IP/Mask	Protocol/Port	Comments
Carat server connections to Eye			
Carat server IP/32	Eye Ethernet IP/32	TCP/7799[1]	Eye management
Carat server IP/32	Eye Ethernet IP/32	TCP/22	Eye (SSH)
Carat GUI connections to Carat server			
Carat GUI IP/32	Carat server IP/32	TCP/47777[1]	Carat GUI
Carat GUI IP/32	Carat server IP/32	TCP/1099	Carat GUI RMI
Analyzer client (web browsers) connections to Carat server			
Browser host IP/32	Carat server IP/32	TCP/80[1]	Analyzer (HTTP)
Browser host IP/32	Carat server IP/32	TCP/443[1]	Analyzer (HTTPS)
Eye connections to Sonar server			
Eye WLAN IP/32	Sonar server IP/32	TCP/80[1]	Sonar tests
Eye WLAN IP/32	Sonar server IP/32	ICMP	Sonar RTT
Eye WLAN IP/32	Sonar server IP/32	UDP/50000-50009[1]	Sonar VoIP
Eye WLAN IP/32	SIP server IP/32	UDP/5060 TCP/5060	SIP REGISTER test (SIP server is not part of Sapphire distribution)
Eye Ethernet IP/32	Sonar server IP/32	TCP/80[1]	Sonar Ethernet tests
Eye Ethernet IP/32	Sonar server IP/32	ICMP	Sonar Ethernet RTT
Eye Ethernet IP/32	Sonar server IP/32	UDP/50000-50009[1]	Sonar Ethernet VoIP
Eye Ethernet IP/32	SIP server IP/32	UDP/5060 TCP/5060	SIP REGISTER Ethernet test (SIP server is not part of Sapphire distribution)
Sonar server connection to Eye			
Sonar server IP/32	Eye WLAN IP/32	UDP/9999[1]	Sonar VoIP
Sonar server IP/32	Eye Ethernet IP/32	UDP/9999[1]	Sonar Ethernet VoIP

[1] This is the default port number. All TCP/UDP ports in Sapphire are configurable.

3 7SIGNAL SAPPHIRE CONNECTIVITY

3.1 Communication security

All connections containing meaningful traffic are being encrypted. The used encryption methods are TLS and SSL. The PKI infrastructure (certificates) is being used throughout the solution.

Every customer has individual set of certificates, delivered within containers called *certificate packages*. It is not possible to use the delivered certificates to decrypt traffic of other 7signal Sapphire systems.

> **Q: Where can I find my certificates?** All the customer certificates and certificate packages are located in the *Certificates CD*.

It is neither necessary nor encouraged to handle the certificate container files. Install and upgrade processes of 7signal Sapphire take care of all the typical cases. In untypical cases the 7signal staff shall be involved with all the help necessary.

3.2 Supportive connections

3.2.1 SSH for Eye

SSH connection is required in deployment phase: IP address configuration is done with 7config command line utility, and Carat server utilizes SSH connection when it is setting management traffic encryption certificates in Eye units. Eye firmware can be also managed with SSH (not recommended normally).

4 INSTALLING 7SIGNAL SAPPHIRE

4.1 Operating System installation tips

It is recommended to install the operating system by using the graphical installer.

4.1.1 Hard disk partitioning

This chapter gives some guidelines for hard disk partitioning. It is assumed that readers have comprehensive knowledge about Linux file systems, RAID, LVM and disk partitioning. This chapter does not cover basic partitioning requirements, e.g. configuring boot and swap partitions are not covered.

> Swap is required by the DB2 database. Size of the swap must be 2 x RAM size.

Laptop installations

Default partitioning suggested by the OS installer is suitable for most of the cases. As laptops are rarely equipped with multiple hard drives, RAID configurations are not possible.

Server installations

It is recommended to configure at least one RAID array: 7signal databases and database log files should reside on a file system on top of RAIDed disks (RAID level 1 or higher, LVM on top of RAID). Multiple RAIDed file systems are also suitable, for example, OS installation could be on file system on RAID1, and databases on file system on top of RAID5.

It is suggested that LVM is used on top of RAIDs: this makes possible to easily add a new RAID array as a LVM physical volume, if the existing ones run out of disk space. On large server installations (having tens of monitoring stations producing large amount of measurement data), it is also suggested that database log files should be placed on different physical disk than the actual databases. This will improve database performance by reducing serialized disk access.

Example #1

- Two physical disks
- Boot and swap partitions
- RAID1 on top of disks, formatted as LVM physical volume
- Physical volume split into three logical volumes
    - 10% of space for OS installation, mount point “/” (LV1)
    - 70% of space for databases and database log files, mount point /opt/7signal/databases (LV2)
    - 20% of space for database backups, mount point /opt/7signal/backups (LV3)
- Sapphire installation
    - Sapphire components are installed to /opt/7signal (on LV1)
    - Sapphire databases are installed to /opt/7signal/databases (on LV2) (7signal DBMS installer asks for location of databases and database log files)
    - Sapphire database backups will be placed on /opt/7signal/backups (on LV3)

Example #2

- Five physical disks
- Boot and swap partitions
- RAID1 on top of two disk, RAID5 on top of tree disks, all formatted as LVM physical volume
- Physical volume on RAID1 has two logical volumes

    - 50% of space for OS installation, mount point "/" (LV1)
    - 50% of space for database logs, mount point "/opt/7signal/database-logs" (LV2)
- Physical volume on RAID5 has two logical volumes
    - 70% of space for databases, mount point /opt/7signal/databases (LV3)
    - 30% of space for database backups, mount point /opt/7signal/backups (LV4)
- Sapphire installation
    - Sapphire components are installed to /opt/7signal (on LV1)
    - Sapphire databases are installed to /opt/7signal/databases (on LV3) and database logs are directed to /opt/7signal/database-logs (on LV2) (7signal DBMS installer asks for location of databases and database log files).
    - Sapphire database backups will be placed on /opt/7signal/backups (on LV4)

4.2 Setting up Eyes

From Release 5.0 onwards, the only mandatory setup phase is Eye IP address configuration. Carat will install Eye software automatically while adding a new Eye to the system.

4.2.1 Eye IP address configuration

Step 1: Connect to Eye unit

By default Eye units have IP address 192.168.0.1 with net mask 255.255.255.0.

Connect to address 192.168.0.1 as root by using a SSH client.

 # ssh root@<Eye IP address>

The root default password is '7signal'. It is strongly advised to change this password as it is factory default for every single Eye unit.

Step 2: Configure IP settings

Setting IP address of the management interface:

 # 7config ip set addr <IP address>

Setting network mask of the management interface:

 # 7config ip set mask <dot-format-mask>

Setting port of the management interface (optional):

 # 7config ip set port <port>

Verify the settings with the 'show' command:

 # 7config ip show

Step 3: Reboot Eye unit

Reboot the Eye unit to make the changes effective:

 # reboot

4.3 Setting up Soft Eyes

4.3.1 Prerequisites

- CentOS/Red Hat Enterprise Linux 6 installation media
- Internet connection (connect to Ethernet port of the laptop)
- Soft Eye installer (7signal-eye-x.y-x86.bin)
- Certificate package file
- Soft Eye license (*.elic file)
    - License is bound to MAC address of the WLAN card

4.3.2 Install and configure operating system

Step 1: Install WLAN card

Install WLAN card either to mini-PCI-Express slot or to USB port.

Step 2: Install operating system

Install operating system by using default partitioning, a “Desktop” installation is suitable for most of the purposes (for example, if Carat and Carat GUI will be run in the same laptop).

Step 3: Configure IP address

Configure static IP address.

Step 4: Upgrade OS installation to the latest version

Open a console, use yum to upgrade OS installation:

 # yum upgrade

Remove NetworkManager:

 # yum remove NetworkManager

Step 5: Configure services

Enable network service:

 # chkconfig network on

Enable SSH service:

 # chkconfig sshd on

Step 6: Check network interface naming rules

If the laptop has multiple WLAN cards (e.g. an internal and an USB card), rules related to network interface naming need to be checked in order to get correct names for network interfaces. Network interfaces used by Sapphire Eye Software must be “wlan0” and “wlan1”.

Open file /etc/udev/rules.d/70-persistent-net.rules in an editor

Lines concerning WLAN devices could be like the following:

PCI device 0xxxxx:0xxxxx (iwlwifi)

SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ATTR{address}=="00:27:10:xx:xx:xx", ATTR{type}=="1", KERNEL=="wlan*", NAME="wlan0"

USB device 0xxxx:0xxxx (usb)

SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ATTR{address}=="50:46:5d:xx:xx:xx", ATTR{type}=="1", KERNEL=="wlan*", NAME="wlan1"

As it can be seen, “wlan0” is allocated for PCI device, and “wlan1” is allocated for USB device. If USB WLAN card is to be used, change the name of network interface of the PCI device to “wlan10”, and name of the USB device to “wlan0”. Using “wlan10” for PCI device leaves “wlan1” free, as “wlan1” will be later created by Sapphire Eye Software:

PCI device 0xxxxx:0xxxxx (iwlwifi)

SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ATTR{address}=="00:27:10:xx:xx:xx", ATTR{type}=="1", KERNEL=="wlan*", NAME="wlan10"

USB device 0xxxx:0xxxx (usb)

SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ATTR{address}=="50:46:5d:xx:xx:xx", ATTR{type}=="1", KERNEL=="wlan*", NAME="wlan0"

Save the file and reboot the system. After reboot, verify that “wlan0” is dedicated for USB WLAN card:

 # ifconfig –a

…

wlan0 Link encap:Ethernet HWaddr 50:46:5D:xx:xx:xx

BROADCAST MULTICAST MTU:1500 Metric:1

…

wlan10 Link encap:Ethernet HWaddr 00:27:10:xxx:xxx:xx

BROADCAST MULTICAST MTU:1500 Metric:1

Step 7: Verify network interface configuration

Open file /etc/sysconfig/networking/devices/ifcfg-eth0 in an editor

- Check and change if necessary:
  - Change "NM_CONTROLLED" to "no"
  - Change "ONBOOT" to "yes"
- Save file
- If the file “/etc/sysconfig/networking/devices/ifcfg-wlan0” exists:
  - Open file /etc/sysconfig/networking/devices/ifcfg-wlan0
  - Change "NM_CONTROLLED" to "no"
  - Change “HWADDR” to contain MAC address of the WLAN card, if necessary
- Save file

Step 8: Reboot

Reboot the laptop

4.3.3 Install latest mainline kernel

In order to get latest WLAN drivers into use, the Linux kernel must be upgraded to latest mainline kernel.

Step 1: Install ELRepo repository configuration

Open a console and install ELRepo repository configuration:

 # rpm -Uvh http://elrepo.org/elrepo-release-6-5.el6.elrepo.noarch.rpm

Step 2: Install latest kernel from ELRepo

 # yum --enablerepo=elrepo-kernel install kernel-ml

Step 3: Configure boot loader

Open file /boot/grub/menu.lst in editor:

- Change line "default=1" to "default=0"
- Save the file.
- Reboot the laptop

4.3.4 Configure firewall

Open a console and start firewall configuration tool:

 # system-config-firewall-tui

- On “Other ports” menu, select “Add” for each port to be added:
  - Add port 7799, protocol “tcp”
  - Add port 9999, protocol “udp”
- Select “Close”
- Accept new firewall rules

4.3.5 Install Soft Eye software

Step 1: Copy files to laptop

Copy Soft Eye installer, certificate package and license file to the laptop.

Step 2: Execute installer

Open a console and execute the installer:

 # ./7signal-eye-vx.y-x86-installer.bin

Select install location

Enter location to which 7signal Sapphire Eye will be installed [/opt/7signal]:

Select management interface

IMPORTANT: Network interface **MUST** be “lo” if the Sapphire Carat is/will be installed to the same laptop. Ethernet interface must be used if Carat will connect to the Soft Eye remotely.

Enter name of the Eye management network interface:

- Use e.g. 'eth0' if Sapphire Carat will connect to Eye remotely

- Use 'lo' if Sapphire Carat will connect to Eye locally

Interface name: [eth0]: **lo**

Confirm installation

Install 7signal Sapphire Eye to directory /opt/7signal/Eye, management network interface **lo** [Y/n]? **y**

4.3.6 Install certificate and license

Step 1: Install certificate from certificate package

7config conn encryption install <full path name of the certificate package>

Step 2: Install license file

7config license install <full path name of the license file>

4.3.7 Start Soft Eye

Start Eye software by issuing a command:

 # service 7signalEye initial-start

4.3.8 Known issues

Network interface renaming

After installation, CentOS/RHEL 6 sometimes decides to rename network interfaces, e.g. from “wlan0” to “wlan4” or “rename11”. This prevents proper operation of Soft Eye, as it no longer recognizes the network interfaces.

Symptoms:

- Tests are not running.
- Following entry can be found from system log:

  7signalCore: WLANDriverManager: Failed to set interface mode: Could not resolve device index of net device

Solution:

- Open file /etc/udev/rules.d/70-persistent-net.rules in editor
- Locate lines:

  # PCI device <device ID> (<driver name>)
  SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ATTR{address}=="<WLAN MAC address>", ATTR{type}=="1", KERNEL=="wlan*", NAME="wlan0"

  # PCI device <device ID> (<driver name>)
  SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ATTR{address}=="<WLAN MAC address>", ATTR{type}=="803", KERNEL=="wlan*", NAME="wlan1"
- Verify that on line containing text "ATTR{type}=="1"", the value of the NAME parameter is “wlan0”
- Verify that on line containing text "ATTR{type}=="803"", the value of the NAME parameter is “wlan1”
- Remove all other lines referring to WLAN interfaces

- Restart Eye software:

  # 7config run restart

Same problem can occur also on Ethernet interface. In that case, set the interface name back to “eth0”

4.4 Setting up Micro Eyes

4.4.1 Set IP configuration

Login to Micro Eye as root by using SSH client. Default IP address is 192.168.0.1 and password is “7signal”:

 # ssh root@192.168.0.1

Use system-config-network-tui tool to configure desired IP address, network mask and default gateway:

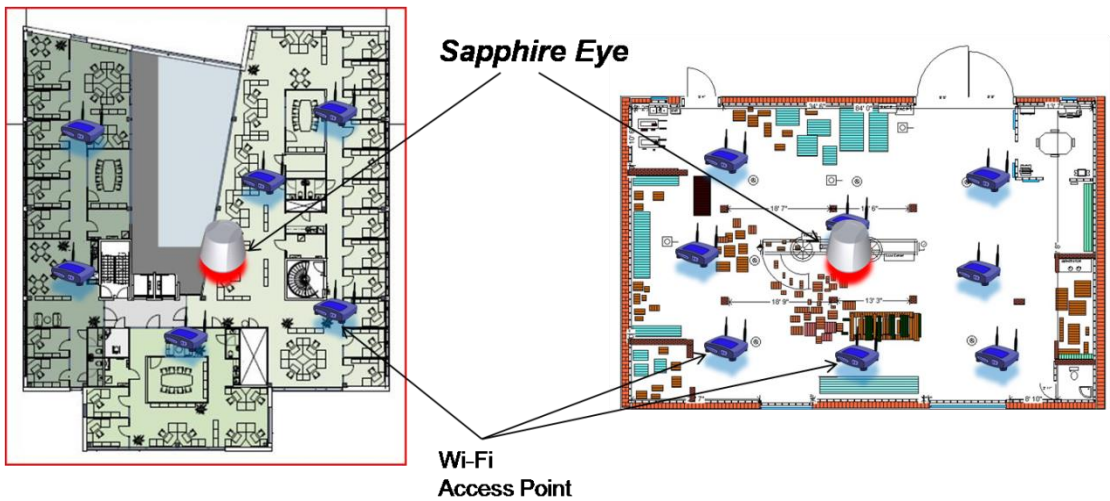
 # system-config-network-tui

Save the configuration and reboot Micro Eye:

 # reboot

4.5 Mounting Eyes

Mount Sapphire Eye in the most centralized location of the WLAN area. Eye can be installed on the ceiling, wall or mast.



Sapphire Eye has extremely sensitive radio technology inside

- The receiving signal is 10-20dB stronger than the basic WLAN end-user
- The transmitted signal is 5-6dB stronger at the access point side than with the basic WLAN end-user

For best accuracy of the WLAN performance, the Sapphire Eye location should be selected so that:

- The average signal level for the managed WLAN access points are between -65dBm and -30dBm. The distance from access point should be > 10ft/3m.

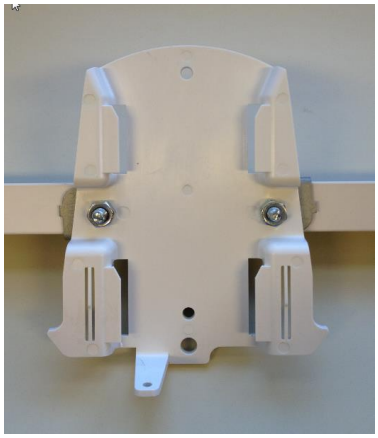
NOTE: Eyes must not be located too close (> 3ft/1m) to any metal objects and places surrounded by concrete walls.

The best installation location is easily verified with:

- Site Miner: The Site Miner kit includes a Carat laptop and an Eye unit (with battery).
- Site Survey signal level results

4.5.1 Indoor Eye Ceiling Installation

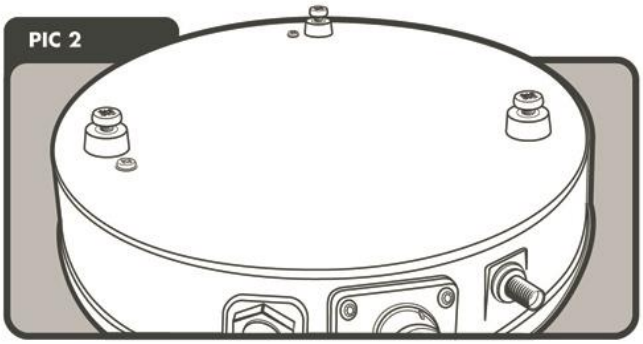
Attach the Indoor Eye sliding bracket onto a suspended ceiling T-rail using the two Twist Clips included with the Eye, and two ¼-inch nuts. Or, secure the bracket with screws to any solid ceiling structure.



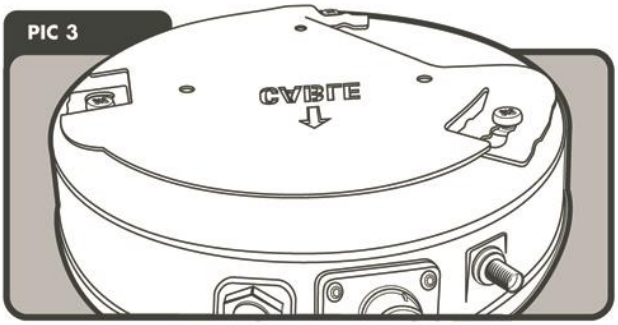
Slide the Indoor Eye onto the bracket and secure it with the #6 Phillips head screw.

4.5.2 Standard Eye Ceiling Installation

On top of Eye unit there are three slots for screws. Insert screws (Pan Head Stainless Screw, DIN 7985 M5x12) on top of the Eye unit. The head of the screw is supposed to have few millimeters of space between the inserts on the unit top.



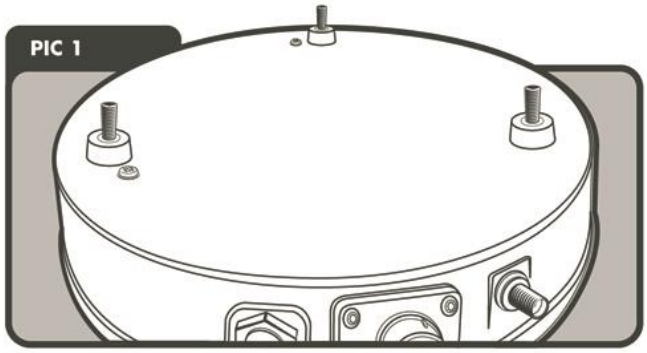
Afix the ceiling mounting plate to the ceiling (pictured right below).



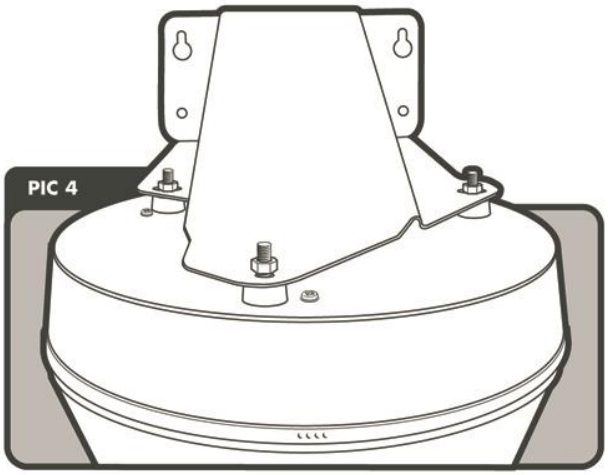
Mount the Eye unit on the ceiling mounting plate by inserting the screw tops into the plate holes. Make sure that the marking ‘CABLE’ is pointed towards connectors. Turn the unit and feel it snatching into the plate.

4.5.3 Wall Mount Installation (optional)

On top of Eye unit there are three slots for screws. Insert screw thread taps (Socket Set Screw Cone Point, DIN 914, M5x20) on top of the Eye unit. In wall-mounting the screw does not have any head.



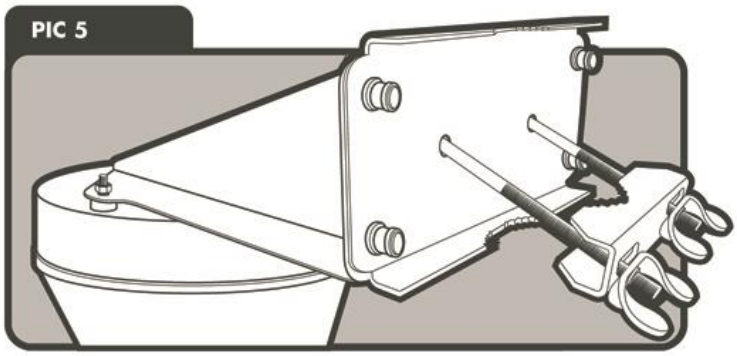
Attach the wall mount bracket to the wall on its rectangular side. The longest side of the triangle should face downward towards the ground.



There are three elliptical holes in the wall-mount mechanics. Mount the Eye unit by pushing the screws on top of the unit through the wall-mount mechanics. From the top-side of the mechanics use the nuts to attach the unit to the mechanics.

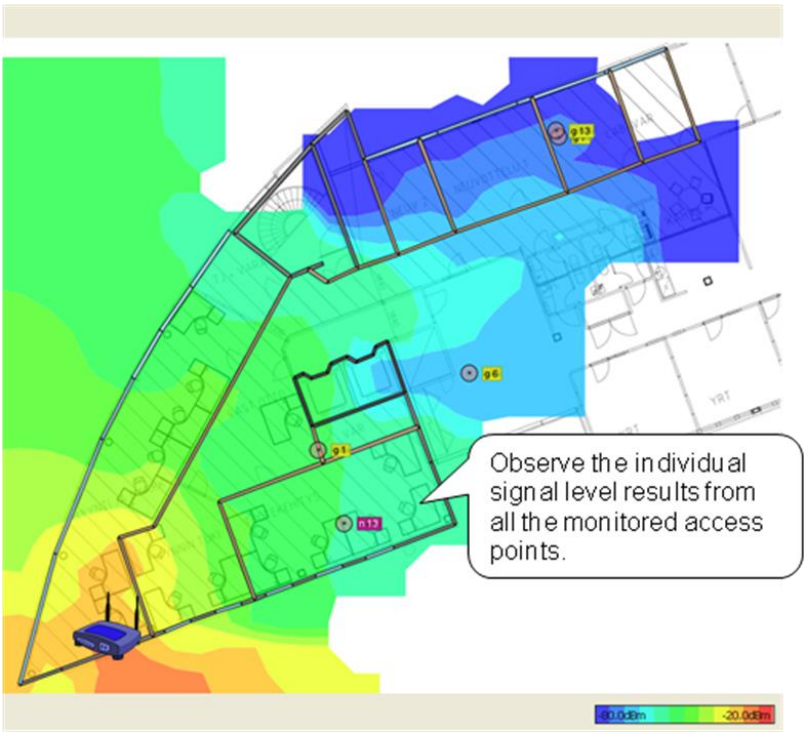
4.5.4 Pole Mount (optional)

In pole install, the wall-mount is attached to any pole by using mechanics. Screw the provided back plate to the wall-mount mechanics. Push the U bar through the back plate. Follow the wall-mount instructions from here on.

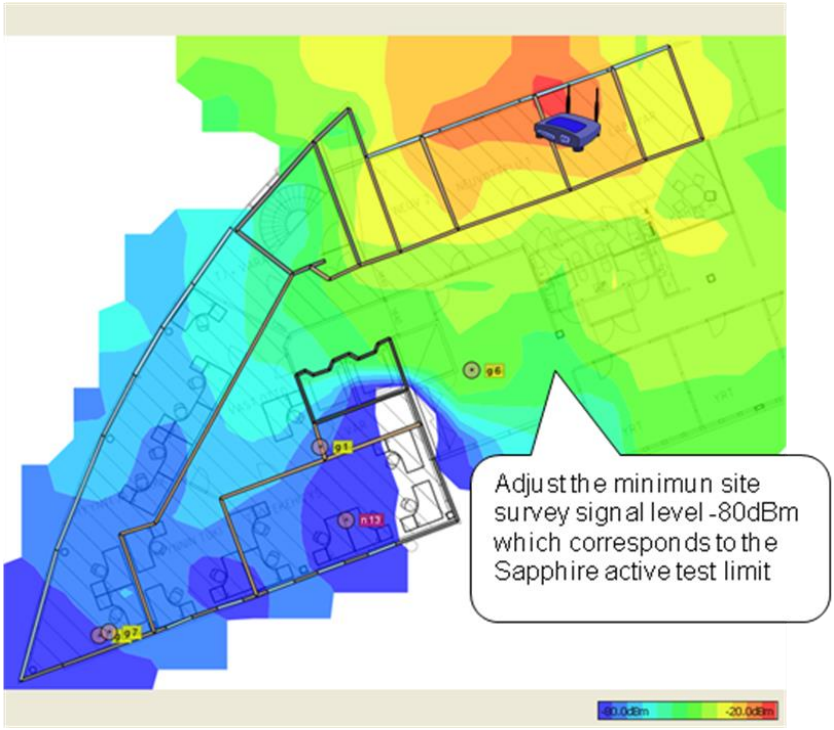


4.5.5 Eye installation examples

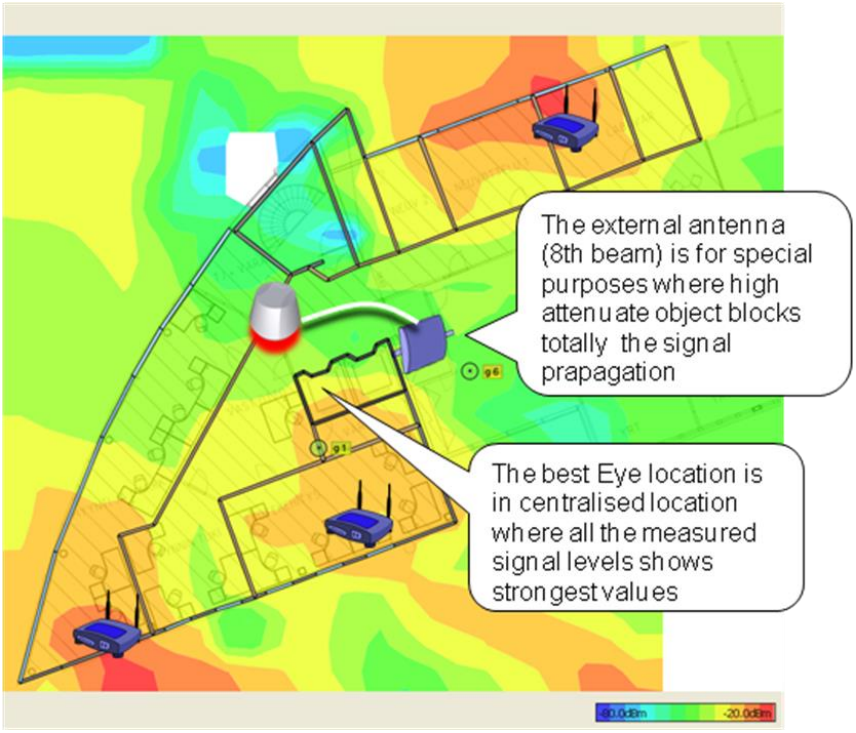
The Site Survey results are valuable for Eye location estimation. The Eye location is good if the Site Survey heat map shows >-80dBm signal level from all the access points.



The Site Survey results are valuable for Eye location selection



Verify the signal levels also from the far end access points



The external antenna is useful in the environment where shafts or thick walls are attenuating radio too much.

4.6 Installing 7signal Sapphire software

The 7signal Sapphire software can be found from *7signal Sapphire Installation CD*.

> Root privileges are needed for installation of Sapphire components, except for Carat GUI.

4.6.1 Carat server installation (Linux 32 bit and 64 bit)

Copy the installer files from the delivery medium to for example /home directory.

> NOTE! Do not use /tmp directory.
> - The installation can be cancelled and restarted anytime by typing CTRL+C

32 bit system:

Step 1: Change to the directory where installer was copied and execute the installer.

If you wish to install the Carat server without in-bundled Eye software packages, issue command:

./7signal-Carat-x.x-x.x-i686-installer.bin

If you wish to install the Carat server within-bundled Eye software packages, issue command:

./7signal-Carat-x.x-x.x-full-i686-installer.bin

64 bit system:

Step 1: Change to the directory where installer was copied and execute the installer.

If you wish to install the Carat server without in-bundled Eye software packages, issue command:

./7signal-Carat-x.x-x.x-x64-installer.bin

If you wish to install the Carat server within-bundled Eye software packages, issue command:

./7signal-Carat-x.x-x.x-full-x64-installer.bin

Step 2: Define the database essential parameters:

Alternative 1: Carat DBMS is not installed yet

As the DBMS will be running in the same host, it is recommended to use the defaults.

Checking md5sum .. OK
…
Extracting installer, please wait ...
Verifying installer, please wait ...
Checksum : da5730017b795b61bd8d9c55d7c76f78
Calculated : da5730017b795b61bd8d9c55d7c76f78
Unpacking data files ...
Launching installer.
Checking for required tools..
Checking unzip .. OK
Checking sed .. OK
…
Checking previous installations...
Installations were not found
Enter location to which 7signal Sapphire Carat server will be installed [/opt/7signal]: **<enter>**
Copying Eye softwares to SW repository..
Trying to locate 7signal DBMS installation. Please wait ...
DBMS installation was not found. Do you want to specify DB properties manually
(defaults: database host localhost, username 'db7sign', TCP port 7722) [y/N]? **<enter>**

Alternative 2: Carat DBMS is already installed

Since the DBMS is already installed, the Carat installer can determine DB configuration automatically. Defaults values should be applied.

…
Extracting installer, please wait ...
Verifying installer, please wait ...
…
Unpacking data files ...
Launching installer.
…
Checking previous installations...
Installations were not found
Enter location to which 7signal Sapphire Carat server will be installed [/opt/7signal]: **<enter>**
Trying to locate 7signal DBMS installation. Please wait ...
DBMS installation found at /opt/7signal/dbms.
Do you want to use DB user configuration found from this location [Y/n]? **<enter>**

Configured DB user is db7sign
Configured DB port number is 7722

Step 3: Setup host address for RMI server:

Localhost or 127.0.0.1 for the IP address should not be used, as this information shall be used by RMI server and it needs to know the external address in order to serve the remotely connecting clients:

Please enter host name or IP address to which the Carat clients will be connecting to [192.168.0.2]: ***<IP address or DNS name>*** **<enter>**

Step 4: Setup maximum memory

The installer asks for the maximum memory that Carat server is allowed to use. Typical amount of memory is about 30-50% of available RAM in megabytes:

Please enter max. amount of memory that the Carat server can use (MB): ***<512-8192>***

> **IMPORTANT:**
> Notice that maximum amount of memory that can be configured in 32 bit systems is 2048

Step 5: Install certificate package (and passwords):

The certificate packages and related password are in separate delivery medium.

Alternative 1: Install certificates and passwords from separate packages

Typically, certificate packages and password packages are delivered separately. Press enter when the installer asks location of 7signal-all.tar.gz certificate package:

Please enter location of archive file (<prefix>-7signal-all.tar.gz): **<enter>**

Next, the installer asks for location of the certificate package 7signal-certs.tar.gz. Enter the name of the directory in which the certificate package resides:

Please enter location of certificate archive file (<prefix>-7signal-certs.tar.gz): ***<directory path>***

Found file /<*directory path*>/<*customer name*>-7signal-certs.tar.gz. Do wish to use it [Y/n]? **<enter>**

The installer extracts and verifies required certificates from the certificate package:

Validating archive..
Archive valid.

Next, the installer asks for location of the password package 7signal-pwds.tar.gz. Enter the name of the directory in which the password package resides:

Please enter location of certificate archive file (<prefix>-7signal-pwds.tar.gz): ***<directory path>***

Found file /<*directory path*>/<*customer name*>-7signal-pwds.tar.gz. Do wish to use it [Y/n]? **<enter>**

The installer extracts and installs required certificates and passwords from the certificate and password packages:

Validating archive..
Archive valid.
Extracting files..
Extracting passwords..

Alternative 2: Install certificates and passwords from single package

Certificates and passwords are delivered in a single package. The installer asks for location of the package 7signal-all.tar.gz. Enter the name of the directory in which the package resides:

Please enter location of archive file (<prefix>-7signal-all.tar.gz): ***<directory path>***

Found file /<*directory path*>/<*customer name*> -7signal-all.tar.gz. Do wish to use it [Y/n]? **<enter>**

The installer extracts, verifies and installs required certificates and passwords from the package:

Validating archive..

Archive valid.
Extracting files..
Extracting passwords..

Step 6: The license file location:

The license file is created for each customer individually. It is in the same delivery medium with the certificate packages.
The installer asks for location of the license file. Enter path and file name of the license file and press enter:

Please enter location and name of Carat license file (/<path>/<license>.lic): ***<full path and name of the license file>***

It is also possible to not install the license file at this point. This can be done by pressing enter without any input.

Alternatives:
a) Enter location and name of the license (.lic) file
b) Proceed installation without installing license. You must
install the license by using '7carat install set' command before
starting the Carat server.
c) Cancel installation

If b) is selected, user can install license later with command '7carat license set *<license_file>*'

Step 7: Finish installation:

After the license file has been installed, the installation finishes automatically:

Creating carat7 user...
Copying init script..
Installing init script..
Extracting Carat package...
Copying Carat to /opt/7signal...
Installing Java runtime environment...
Extracting JRE...
Installing JRE...
JRE install directory is jre1.6.0_17
JRE already installed, checking if it is up to date
Installed version: 1.6.0_17-b04
New version : 1.6.0_17-b04
JRE does not need to be updated.
Installing configuration file.
Installing license file...
Installing 7carat tool...
Installing 7edp tool...
Modifying file permissions...
Creating uninstaller...
Saving configuration.
Done.

The installation is now finished.

4.6.2 DBMS installation (Linux 32 bit and 64 bit)

Prerequisities

The operating system installation may not have all the necessary components for DBMS installation. Please check the following items:

- IP address of the server must be resolvable to DNS name. This can be achieved by following procedures:
  - Server has been added to DNS
  - Hosts file contain the DNS name.
    - more /etc/hosts
    - edit the hosts file if needed

Installation

The DBMS for Linux comes as a file of type bin that contains both the script and 3rd party installation package for DB2 database. There is another version of the DBMS installer that does not contain the actual DB2 package, which is suitable for upgrades.

Copy 7signal-DBMS-installer from delivery medium to for example /root directory.

> NOTE! Do not use /tmp directory.

Alternative 1: Install DBMS database uninterrupted with default settings

32 bit systems:

Issue command:

 # ./7signal-DBMS-with-DB2-x.x-x.x-i686-installer.bin –s

64 bit systems:

Issue command:

 # ./7signal-DBMS-with-DB2-x.x-x.x-x64-installer.bin –s

The silent install does not require input as all the options shall use default settings. After the installation is finished, the DB2 has been installed and databases have been created.

Alternative 2: Install DBMS database interactively

32 bit systems:

Issue command:

 # ./7signal-DBMS-with-DB2-x.x-x.x-i686-installer.bin

64 bit systems:

Issue command:

 # ./7signal-DBMS-with-DB2-x.x-x.x-x64-installer.bin

The installer starts to install 7signal DBMS:
Checking md5sum .. OK
…
Extracting installer, please wait ...
Verifying installer, please wait ...
…

Unpacking data files ...
Launching installer.
Using v10.5fp1_linux.._expc.tar.gz installer.
Trying to locate existing installation...
Checking host <*hostname*> reachability.. OK.
Checking libaio .. OK
Checking mktemp .. OK
Checking sed .. OK
Checking tar .. OK
Checking su .. OK
Checking chmod .. OK
Checking chown .. OK
Checking basename .. OK
Checking dirname .. OK
Checking grep .. OK
Locating 7signal Sapphire Carat installation. Please wait ...
Carat installation found at /opt/7signal/Carat.
DB tools directory will be /opt/7signal/dbms
Do you want to use DB configuration found from this location [Y/n]? **<enter>**

The question above is asked if there is a 7signal Carat installation on the host[2].

DBMS directory : /opt/7signal/dbms
DB2 installation package location : .installer/v10.5fp1_linux...tar.gz
Target directory : /opt/ibm/db2

untarring DB2...
Creating DB user..
Configured DB user is db7sign
Configured DB port number is 7722

Are db7sign and db7adm user accounts already created [y/N]?

If you have pre-created db7sign and db7adm users (this is sometimes necessary, depending on host system configuration), answer “y”, otherwise you can let the installer create the user accounts by answering “n”.

Creating group db7sign..
Group GID is 487. Creating user db7sign..
User db7sign home directory is in directory /home. Setting user password...
User UID is 493.
DB2 instance user home directory is /home/db7sign
Do you want to specify DB admin manually [y/N]? **<enter>**

The installer allows defining the database user and the communication port. As supposedly the host is dedicated to 7signal Sapphire, the defaults should work fine and are encouraged to be used.

The installer continues by installing DB2:

Instance user: db7sign
  UID: 493
  GID: 487
DAS user: db7adm
  UID: 492
  GID: 486
Preparing response file...
Installing DB2...
DBI1191I db2setup is installing and configuring DB2 according to the

[2] If the Carat server is not installed yet, the installer asks some configuration parameters for the database. Default values for these parameters are preferred.

response file provided. Please wait.

The execution completed successfully.

For more information see the DB2 installation log at "/tmp/db2setup.log".
IBM DB2 installed.
Creating uninstaller...
Creating DB schema generator...
Creating directory /opt/7signal/dbms/vx.x-x.x
Installing 7db tool..
Installing 7signal DB backup & restore tool..
Installing 7signal DB2 library..
Installing 7signal DB2 utilities..
SQL1063N DB2START processing was successful.
Enter location for databases [/home/db7sign]:**(See NOTE below)**

The database location defaults to the /home file system just like the database logs that are configured below.

> NOTE! This default database location is not recommended, if the /home file system is not backed up or otherwise replicated, or does not have enough disk space. The logs and the actual database should always reside in separate file systems, preferably on RAIDed, separate physical devices.
>
> Database must be always on local disk, for example, not on NFS mount!

The installer continues and the database creation takes several minutes:

7SIGNAL creating management database...
7SIGNAL creating measurement database...
7SIGNAL creating security database...
.
.
.

Do you want to change the default database logging method (circular logging) to infinite archival logging [y/N]? **<enter>**

It is encouraged to make the install with circular logging. The infinite archival logging requires design and practically endless storage device. The instructions for moving to infinite archival logging are in the Carat User Manual among other detailed backup process design issues.

The next step is to specify location for database log files. Log file location defaults to the /home file system just like the actual database.

Enter location for Management DB log files
[/home/db7sign/db7sign/NODE0000/SQL00001/SQLOGDIR/]: **<enter>**

OK. Using default.
Enter location for Measurement DB log files
[/home/db7sign/db7sign/NODE0000/SQL00002/SQLOGDIR/]: **<enter>**

OK. Using default.

Enter location for Security DB log files
[/home/db7sign/db7sign/NODE0000/SQL00003/SQLOGDIR/]: **<enter>**
OK. Using default.

The installer is now finished. The DB2 is now installed, up and running.

4.6.3 Analyzer server installation (Linux 32 bit and 64 bit)

Copy 7signal-Analyzer-installer from the delivery medium to e.g. /home directory.

> NOTE! Do not use /tmp directory.

Step 1: Change to the directory where installer was copied and install Analyzer server

32 bit systems:

Issue command:

./7signal-Analyzer-x.x-x.x-i686-installer.bin

64 bit systems:

Issue command:

./7signal-Analyzer-x.x-x.x-x64-installer.bin

Step 2: The installation directory:

Give the location in the file system to install the Analyzer server:

Checking md5sum .. OK
…
Extracting installer, please wait ...
Verifying installer, please wait ...
…
Unpacking data files ...
Launching installer.
Checking previous installations ...
Checking sed .. OK
…
No previous installation found.
Enter location to which 7signal Sapphire Analyzer will be installed,
installer will create a '/Analyzer/' directory under the given path [/opt/7signal]: **<enter>**

Step 3: Carat server IP address:

The Analyzer server should run in the same host than the Carat server and therefore localhost IP address is suitable:

Configuration for:
* /opt/7signal/Analyzer/apache-tomcat-5.5.26/conf/Catalina/localhost/7signal.xml
* /opt/7signal/Analyzer/webapps/WEB-INF/web.xml
Enter the DB2 username [db7sign]: **<enter>**

Enter the DB2 password (empty keeps the existing password):
Password: **<enter>**
OK. Keeping old password
Enter the location of Carat server [127.0.0.1]: **<enter>**

Step 4: Ports for Analyzer service:

As the host is expected to be dedicated for 7signal Sapphire, the default ports for HTTP and HTTPS should work fine. However, the ports are freely configurable.

Configuration for:/opt/7signal/Analyzer/apache-tomcat-5.5.26/conf/server.xml
Enter the port for Analyzer HTTP server, most commonly 80 or 8080 [80]: **<enter>**
When the non-SSL port is 80, then the preferred SSL port is 443.
Enter the SSL port for Analyzer HTTPS server [443]: **<enter>**

Step 5: Install certificate package (and passwords):

The certificate packages and related password are in separate delivery medium.

Alternative 1: Install certificates and passwords from separate packages

Typically, certificate packages and password packages are delivered separately. Press enter when the installer asks location of 7signal-all.tar.gz certificate package:

Please enter location of archive file (<prefix>-7signal-all.tar.gz): **<enter>**

Next, the installer asks for location of the certificate package 7signal-certs.tar.gz. Enter the name of the directory in which the certificate package resides:

Please enter location of certificate archive file (<prefix>-7signal-certs.tar.gz): ***<directory path>***

Found file /<*directory path*>/<*customer name*>-7signal-certs.tar.gz. Do wish to use it [Y/n]? **<enter>**

The installer extracts and verifies required certificates from the certificate package:

Validating archive..
Archive valid.

Next, the installer asks for location of the password package 7signal-pwds.tar.gz. Enter the name of the directory in which the password package resides:

Please enter location of certificate archive file (<prefix>-7signal-pwds.tar.gz): ***<directory path>***

Found file /<*directory path*>/<*customer name*>-7signal-pwds.tar.gz. Do wish to use it [Y/n]? **<enter>**

The installer extracts and installs required certificates and passwords from the certificate and password packages:

Validating archive..
Archive valid.
Extracting files..
Extracting passwords..

Alternative 2: Install certificates and passwords from single package

Certificates and passwords are delivered in a single package. The installer asks for location of the package 7signal-all.tar.gz. Enter the name of the directory in which the package resides:

Please enter location of archive file (<prefix>-7signal-all.tar.gz): ***<directory path>***

Found file /<*directory path*>/<*customer name*> -7signal-all.tar.gz. Do wish to use it [Y/n]? **<enter>**

The installer extracts, verifies and installs required certificates and passwords from the package:

Validating archive..
Archive valid.
Extracting files..
Extracting passwords..

Step 6: Starting of Analyzer server:

It is possible to start the server immediately. The requirement is that the database is up and running at the Analyzer start-up:

Updating files according to configuration ...
Installing Java runtime environment...
Extracting JRE...
Installing JRE...
JRE install directory is jre1.6.0_17
JRE already installed, checking if it is up to date
Installed version: 1.6.0_17-b04
New version : 1.6.0_17-b04
JRE does not need to be updated.
JRE installed to /opt/7signal/jre
Copying init script ...
Installing init script ...
Installing 7analyzer tool ...
Creating uninstaller ...
Checking Carat user ....
Creating and linking report directory ...

7signal Sapphire Analyzer install process finished.
HTTP server configured to URL: http://localhost:80/

Do you want to start Analyzer server now? [Y/n] **<enter>**

Installation is finished.

4.6.4 Sonar Installation (Linux 32 bit and 64 bit)

Copy 7signal Sonar installer from the delivery medium e.g. to /home directory.

> NOTE! Do not use /tmp directory.

Step 1: Change to the directory where installer was copied and install Sonar server

32 bit systems:

Issue command:

./7signal-Sonar-x.x-x.x-i686-installer.bin

64 bit systems:

Issue command:

./7signal-Sonar-x.x-x.x-x64-installer.bin

Step 2: Specify installation directory:

The installer extracts installation files and asks location for the installation:

…

Extracting installer, please wait ...

Verifying installer, please wait ...

…

Enter location to which 7signal Sonar server will be installed [/opt/7signal]: **<enter>**

Step 3: Specify configuration parameters:

The installer asks some configuration parameters for Sonar installation. In general, default values can be used:

Enter name for the Sonar server [Sonar]: **<enter>**

Enter port number for the server [80]: **<enter>**

Checking that TCP port 80 is not in use.. Port 80 free.

Number of simultaneous clients reflects to the number of Eyes running tests against this Sonar installation:

Enter number of maximum simultaneous clients (1..50) [10]: *<number of Eyes>* **<enter>**

VoIP tests require individual UDP port for each simultaneously running VoIP test. Ports are reserved as a port range, starting from a port number specified by the user (default: 50000):

Enter first UDP port of UDP port pool [50000]: *<starting port>* **<enter>**

Next, enter the size of the port range. The default is 10, which means that 10 simultaneous VoIP tests can be run against this Sonar:

Enter size of port pool (1..20) [10]: **<enter>**

Last, specify the default logging level. By default, only errors are logged:

Enter log level (DEBUG,INFO,WARN,ERROR) [ERROR]: **<enter>**

Step 4: Verify configuration:

The installer outputs the specified configuration. Verify the configuration and accept it:

```
Sonar configuration:
-----------------------------------------------------
Server name        : Sonar
Server port        : 80
Max. clients       : 10
MOS port pool start: 50000
MOS port pool size : 10
Log level          : ERROR

Is this configuration OK [Y/n] <enter>
```

Step 5: Finish installation:

The installer finishes installation automatically:

```
Copying Sonar to /opt/7signal...
Configuring Sonar...
Extracting JRE...
Installing JRE…
JRE already installed, checking if it is up to date
Installed version: 1.6.0_17-b04
New version      : 1.6.0_17-b04
JRE does not need to be updated.
Updating files according to configuration...
Copying init script..
Installing init script..
Creating uninstaller...
Done.
```

4.6.5 Carat GUI Installation (Linux)

Copy 7signal-Carat-GUI-installer from the delivery medium e.g. to /home directory.

> NOTE! Do not use /tmp directory.

Step 1: Change to the directory where installer was copied and install Carat GUI

32 bit systems:

Issue command:

./7signal-Carat-Client-x.x-x.x-i686-installer.bin

64 bit systems:

Issue command:

./7signal-Carat-Client-x.x-x.x-x64-installer.bin

The installer starts:

Checking md5sum .. OK
…
Extracting installer, please wait ...
Verifying installer, please wait ...
…
Unpacking data files ...
Launching installer.

Step 2: Choose destination folder:

Enter the path for the desired destination folder:

Enter location to which 7signal Sapphire Carat client will be installed [/opt/7signal]: **<enter>**

Checking unzip .. OK
…
Extracting Carat client package...
Copying Carat to /opt/7signal...
Installing Java runtime environment...
Extracting JRE...
Installing JRE...
JRE install directory is jre1.6.0_17
JRE already installed, checking if it is up to date
Installed version: 1.6.0_17-b04
New version : 1.6.0_17-b04
JRE does not need to be updated.
Updating files according to configuration...
Text viewer is gedit
PDF viewer is evince
Creating uninstaller...

Step 3: Install certificate package (and passwords):

The certificate packages and related password are in separate delivery medium.

Alternative 1: Install certificates and passwords from separate packages

Typically, certificate packages and password packages are delivered separately. Press enter when the installer asks location of 7signal-all.tar.gz certificate package:

Please enter location of archive file (<prefix>-7signal-all.tar.gz): **<enter>**

Next, the installer asks for location of the certificate package 7signal-certs.tar.gz. Enter the name of the directory in which the certificate package resides:

Please enter location of certificate archive file (<prefix>-7signal-certs.tar.gz): ***<directory path>***

Found file /<*directory path*>/<*customer name*>-7signal-certs.tar.gz. Do wish to use it [Y/n]? **<enter>**

The installer extracts and verifies required certificates from the certificate package:

Validating archive..
Archive valid.

Next, the installer asks for location of the password package 7signal-pwds.tar.gz. Enter the name of the directory in which the password package resides:

Please enter location of certificate archive file (<prefix>-7signal-pwds.tar.gz): ***<directory path>***

Found file /<*directory path*>/<*customer name*>-7signal-pwds.tar.gz. Do wish to use it [Y/n]? **<enter>**

The installer extracts and installs required certificates and passwords from the certificate and password packages:

Validating archive..
Archive valid.
Extracting files..
Extracting passwords..

Alternative 2: Install certificates and passwords from single package

Certificates and passwords are delivered in a single package. The installer asks for location of the package 7signal-all.tar.gz. Enter the name of the directory in which the package resides:

Please enter location of archive file (<prefix>-7signal-all.tar.gz): ***<directory path>***

Found file /<*directory path*>/<*customer name*> -7signal-all.tar.gz. Do wish to use it [Y/n]? **<enter>**

The installer extracts, verifies and installs required certificates and passwords from the package:

Validating archive..
Archive valid.
Extracting files..
Extracting passwords..

Step 4: Finish installation:

The installer finishes installation automatically:

Finished.

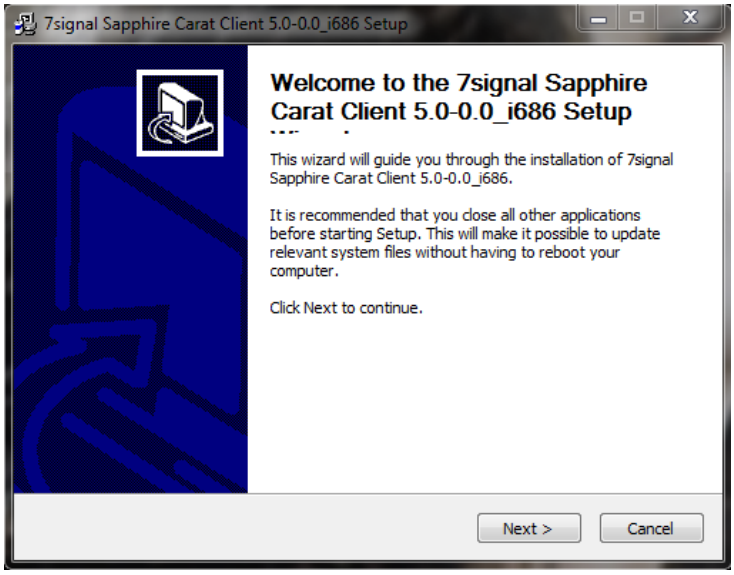
The GUI client may be started from the install directory with the script run_client.sh. A desktop icon or launcher is not generated automatically by the installer, because of lack of generic support for desktop icons in Linux distributions.

4.6.6 Carat GUI Installation (Windows)

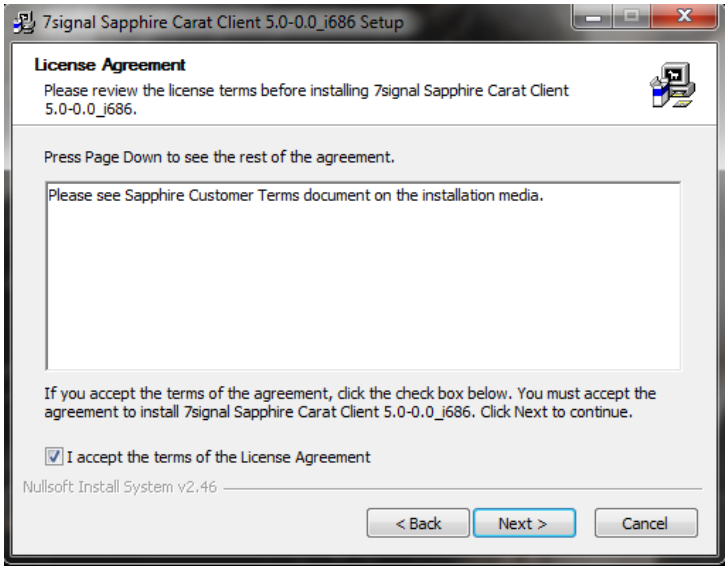
> Note: Version number of Carat GUI used in these instructions may not be the one that is going to be installed. However, the instructions are applicable to all Carat GUI versions.

Step 1: Execute Carat GUI installer:

A double-click on the icon launches the following panel:

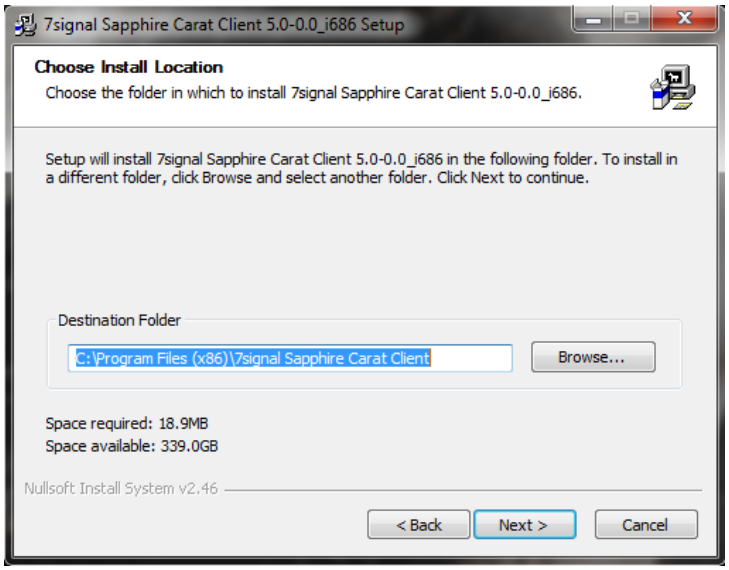


Step 2: Accept the License Agreement:



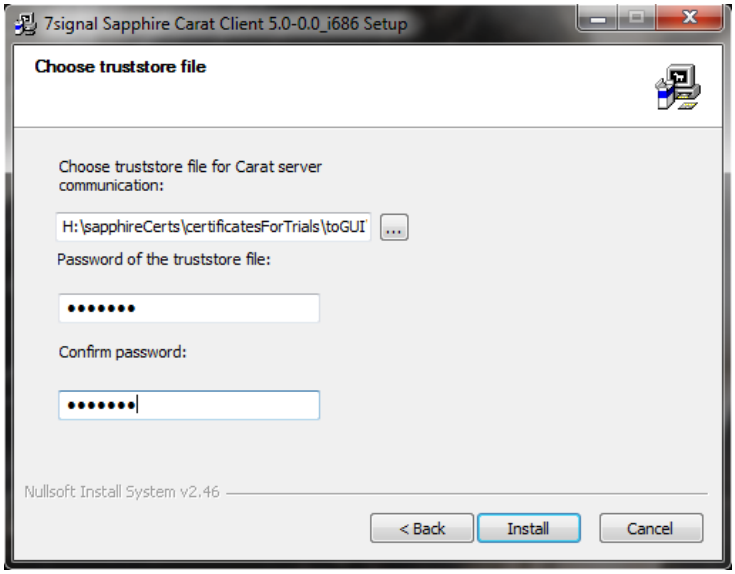
The distribution medium contains *7signal Sapphire Customer Terms* document in the Documents folder.

Step 3: Define the installation destination folder:

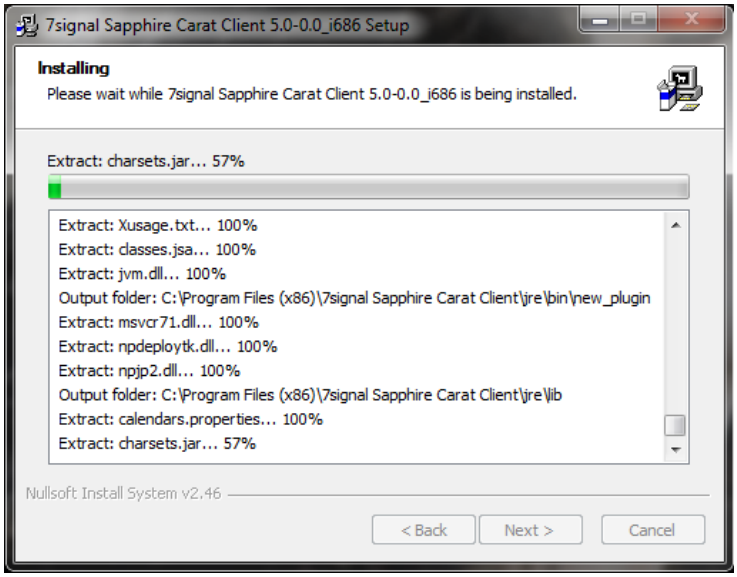


Step 4: Select your 7signal.truststore file and type your truststore password:

The PKI encryption infrastructure requires Carat GUI to provide a certificate. The certificate is stored in a *truststore* file. The truststore file and the password are delivered within the product package.

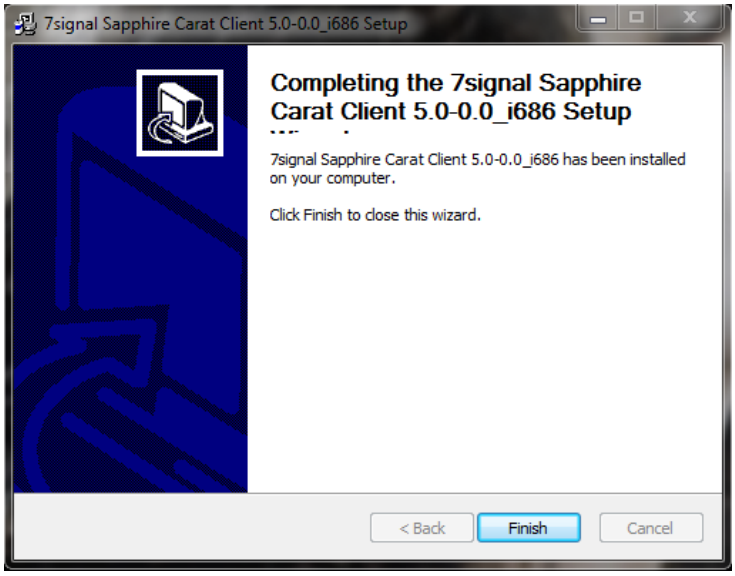


Step 5: The package is being installed:



Step 6: Finish the installation:

Finish the installation. An icon for launching the Carat GUI client should be available on the desktop.



5 UPGRADING SAPPHIRE

5.1 Copy the latest Sapphire release to the hard disk (Linux)

Step 1: Create new directory to the Carat server:

 # mkdir /root/SapphireXXYY

Step 2: Change to the installer directory:

 # cd /root/SapphireXXYY

Step 3: Copy the Sapphire Carat CD (X.X-Y.Y) to the install directory:

 # cp –r /<*path to installation media*>/* /root/SapphireXXYY/

> IMPORTANT: When upgrading from versions prior to 5.0, certificate package file needs to be available on file system of the Carat server host.

5.2 Stop Sapphire solution (Linux)

> **NOTE:** All Sapphire components running on the Carat server must be stopped before upgrade.

Step 1: Stop the Carat server:

Stop the Carat server by issuing the command:

 # 7carat stop

Command output should be the following:

7signal Sapphire Carat is running

Shutting down 7signal Sapphire Carat: OK

7signal Sapphire Carat is not running

Step 2: Stop the Analyzer server:

Stop the Analyzer server by issuing the command:

 # 7analyzer stop (7loupe stop in version 3.2 or older)

Command output should be the following:

Shutting down 7signal Analyzer server: JRE_HOME is now set to = /opt/7signal/jre

```
 in /opt/7signal/Analyzer/shutdown_analyzer_server.sh
Attempting to shutdown the Apache Tomcat server... finished.
Killing possible Analyzer processes.. no processes to kill
7signal Analyzer server shutdown complete
```

5.3 Carat server upgrade (Linux 32 bit and 64 bit)

Step 1: Change to the Carat server installer directory:

 # cd /root/SapphireXXYY/Carat_Server/linux

Step 2: Execute Carat server installer:

It is preferable to use “full” installer, as it contains in-bundled Eye software packages that make Eye software updates more easier.

32 bit systems:

Start the installer by issuing the command:

 # ./7signal-Carat-X.X-Y.Y-i686-full-installer.bin

64 bit systems:

Start the installer by issuing the command:

 # ./7signal-Carat-X.X-Y.Y-x64-full-installer.bin

The installer starts and finds an existing installation:

Checking md5sum .. OK
…
Extracting installer, please wait ...
Verifying installer, please wait ...
…
Unpacking data files ...
Launching installer.
Checking for required tools..
Checking unzip .. OK
…
Checking previous installations...
Installations were found from /opt/7signal
Currently active version in directory /opt/7signal/Carat/vx.x-x.x/7signal
Active version is x.x.y.y
Found existing 7signal Sapphire Carat installations.

Confirm upgrade:

Do you want to upgrade from currently active version x.x.y.y to version X.X-Y.Y [Y/n]? **<enter>**

Installer starts the upgrade process:

OK. Starting upgrade process.
Copying Eye softwares to SW repository..

The following configuration was found:

Used JRE : /opt/7signal/jre
DB host : localhost
DB port number : 7722
DB username : db7sign
DB password (MD5) : 98005a88379612249f9b656a6dfe8811 -
Copy keystore from : /opt/7signal/Carat/v4.1-0.1/7signal/conf/carat.keystore
Copy GUI truststore from : /opt/7signal/Carat/v4.1-0.1/7signal/conf/7signal.keystore
Copy license from : /opt/7signal/Carat/v4.1-0.1/7signal/conf/license.xml
Collect clients : true true
Eye keystore passwd (MD5) : 236e61626c20c2358626cd6547575ffc -
GUI truststore password (MD5) : 236e61626c20c2358626cd6547575ffc -
RMI host address : 10.10.10.8
Maximum memory (MB) : 1024
Eye encryption certificate :
Eye encryption certificate pwd :

Target directory : /opt/7signal

Is this configuration OK [Y/n]? **<enter>**

OK. Performing installation by using previous configuration.
Extracting Carat package...
Copying Carat to /opt/7signal...
Installing Java runtime environment...
Extracting JRE...
Installing JRE...
JRE install directory is jre1.6.0_17
JRE already installed, checking if it is up to date
Installed version: 1.6.0_17-b04
New version : 1.6.0_17-b04
JRE does not need to be updated.
Installing configuration file.

When upgrading to the next major version, the installer asks for location of the new license file. Enter path and file name of the license file and press enter:

Please enter location and name of Carat license file (/<path>/<license>.lic): *<path and name of the license file>* **<enter>**

Installing license file...
Copying init script..
Installing init script..

When upgrading from versions prior to 5.0, installer asks location of certificate package. Enter full path name of the certificate package file:

Eye encryption certificate cannot be found in /opt/7signal/Carat/v5.0-0.0/7signal/conf/
Please enter location of archive file (<prefix>-7signal-all.tar.gz): ***<certificate package path and name>***

Found file /xxxx/yyyy/zzzzzz-7signal-all.tar.gz. Do wish to use it [Y/n]? **<enter>**

Validating archive..
Archive valid.
Extracting files..
Extracting passwords..

Installing 7carat tool...
Installing 7edp tool...
Modifying file permissions...
Creating uninstaller...
Saving configuration.
Done.

Upgrade is ready after installer finishes.

5.4 DBMS upgrade (Linux)

Step 1: Change to the Carat database installer directory:

cd /root/SapphireXXYY/Carat-output/Carat_DBMS/linux

Step 2: Execute DBMS installer in upgrade mode:

32 bit systems:

Issue command:

./7signal-DBMS-X.X-Y.Y-i686-installer.bin **upgrade**

64 bit systems:

Issue command:

./7signal-DBMS-X.X-Y.Y-x64-installer.bin **upgrade**

NOTE: The upgrade command must be used in order to save old measurement data!

The DBMS installer starts to upgrade the DBMS. When the installer asks some upgrade parameters, default values provided are applicable in most of the installations. Upgrade process may take several minutes.

Checking md5sum .. OK
Checking tar .. OK
Checking tail .. OK
Checking awk .. OK
Extracting installer, please wait ...
Verifying installer, please wait ...
Checksum : 3f630f68384c9e9f785e3e086d559206
Calculated : 3f630f68384c9e9f785e3e086d559206
Unpacking data files ...
Launching installer.
Trying to locate existing installation...
Found existing DB installation.
Starting to upgrade.
DBMS location : /opt/7signal/dbms

Configured DB user is db7sign
Configured DB port number is 7722

DB2 installed to : /opt/ibm/db2
Current version : 4.1-0.0
Version to which upgrade: 5.0-0.0

Enter location of JRE [/opt/7signal/jre]: **<enter>**

JRE location : /opt/7signal/jre
Java location : /opt/7signal/jre/bin/java

Do you wish to backup databases before proceeding [Y/n] **<enter>**

Enter directory to which the backed up databases are copied [/var/opt/7signal/dbms/backups]:

Do you wish to start database upgrade now [Y/n] **<enter>**

Creating directory /opt/7signal/dbms/v5.0-0.0
connect to mgmt7

Database Connection Information

Database server = DB2/LINUX 10.5.1
SQL authorization ID = DB7SIGN
Local database alias = MGMT7
…
Creating uninstaller...
Updating version information...
Database upgrade done.

DBMS upgrade is ready when the installer finishes.

5.5 Carat GUI upgrade (Linux 32 bit and 64 bit)

Step 1: Change to the Carat GUI installer directory:

 # cd /root/SapphireXXYY/Carat_GUI/linux

Step 2: Execute Carat GUI installer:

32 bit systems:

Start the installer by issuing the command:

 # ./7signal-Carat-Client-X.X-Y.Y-i686-installer.bin

64 bit systems:

Start the installer by issuing the command:

 # ./7signal-Carat-Client-X.X-Y.Y-x64-installer.bin

The installer starts to upgrade the GUI. Confirm the upgrade when the installer asks for confirmation:

Checking md5sum .. OK
Checking tar .. OK
Checking tail .. OK
Checking awk .. OK
Extracting installer, please wait ...
Verifying installer, please wait ...
Checksum : caf31f50763ec344e4f39c6c0adaba70
Calculated : caf31f50763ec344e4f39c6c0adaba70
Unpacking data files ...
Launching installer.
Enter location to which 7signal Sapphire Carat client will be installed [/opt/7signal]: **<enter>**
Checking unzip .. OK
Checking tar .. OK

Checking mktemp .. OK
Checking sed .. OK
Checking grep .. OK
Checking awk .. OK
Extracting Carat client package...
Found existing installation on given location.
Do you want to upgrade [Y/n]? **<enter>**

Copying Carat to /opt/7signal...
Installing Java runtime environment...
Extracting JRE...
Installing JRE...
JRE install directory is jre1.6.0_17
JRE already installed, checking if it is up to date
Installed version: 1.6.0_17-b04
New version : 1.6.0_17-b04
JRE does not need to be updated.
Updating files according to configuration...
Restoring configuration files..
Creating uninstaller...
Finished.

The GUI upgrade is ready when the installer finishes.

5.6 Analyzer server upgrade (Linux 32 bit and 64 bit)

Step 1: Change to the installer directory:

 # cd /root/SapphireXXYY/Analyzer/linux

Step 2: Execute Analyzer server installer:

32 bit systems:

Start the installer by issuing the command:

 # ./7signal-Analyzer-X.X-Y.Y-i686-installer.bin

64 bit systems:

Start the installer by issuing the command:

 # ./7signal-Analyzer-X.X-Y.Y-x64-installer.bin

The installer starts to upgrade the Analyzer installation. Confirm the upgrade and apply default values for questions asked by the installer:

Checking md5sum .. OK
…
Extracting installer, please wait ...
Verifying installer, please wait ...
…
Unpacking data files ...
Launching installer.
Checking previous installations ...
Checking sed .. OK
…
7signal Sapphire Analyzer installation found from /opt/7signal
Do you want to upgrade the previous Analyzer installation [Y/n]? **<enter>**

Loading configuration from previous web.xml ...
Loading configuration from previous server.xml ...

TARGET_DIR : /opt/7signal
…

Do you want to continue the upgrade with this configuration [Y/n]? ***<enter>***

Stopping currently running Analyzer ... Shutting down 7signal Sapphire Analyzer server:
Attempting to shutdown the Apache Tomcat server... finished.
7signal Sapphire Analyzer server shutdown complete
shutdown successful.

Extracting Analyzer package ...
Updating files according to configuration ...
Installing Java runtime environment...
Extracting JRE...
Installing JRE...
JRE install directory is jre1.6.0_17
JRE already installed, checking if it is up to date
Installed version: 1.6.0_17-b04
New version : 1.6.0_17-b04
JRE does not need to be updated.

JRE installed to /opt/7signal/jre
Copying init script ...
Installing init script ...
Installing 7analyzer tool ...
Creating uninstaller ...
Checking Carat user ....
Creating and linking report directory ...

7signal Sapphire Analyzer install process finished.
HTTP server configured to URL: http://localhost:80/

Do you want to start Analyzer server now? [Y/n] **<enter>**

Starting 7signal Sapphire Analyzer server: 7signal Sapphire Analyzer server start complete

7signal Sapphire Analyzer service commands:
service 7signalAnalyzer start : Starts Analyzer server (Shortcut: 7analyzer s)
service 7signalAnalyzer stop : Stops Analyzer server (Shortcut: 7analyzer x)
service 7signalAnalyzer restart : Restarts Analyzer server (Shortcut: 7analyzer r)
service 7signalAnalyzer status : Shows if the server is running or not (Shortcut: 7analyzer status)

To learn more about the 7analyzer-command, simply type command '7analyzer' without any parameters.

7signal Sapphire Analyzer server is running

The Analyzer server upgrade is ready when the installer finishes.

5.7 Sonar upgrade (Linux 32 bit and 64 bit)

Step 1: Create install directory to the Sonar server:

 # mkdir /root/SapphireXXYY/

Step 3: Copy the Sapphire Sonar CD (X.X-Y.Y) to the install directory:

 # cp –r /<*path to installation media*> /root/SapphireXXYY/

Step 4: Change to the installer directory:

 # cd /root/SapphireXXYY/Sonar/linux

Step 5: Execute Sonar server installer:

32 bit systems:

Start the installer by issuing the command:

 # ./7signal-Sonar-X.X-Y.Y-i686-installer.bin

64 bit systems:

Start the installer by issuing the command:

 # ./7signal-Sonar-X.X-Y.Y-i686-installer.bin

The installer starts to upgrade the Sonar installation. Confirm the upgrade and accept the current configuration:

Checking md5sum .. OK
Checking tar .. OK
Checking tail .. OK
Checking awk .. OK
Extracting installer, please wait ...
Verifying installer, please wait ...
Checksum : 197c6a5fd66d9bb1fd30c1147243acb2
Calculated : 197c6a5fd66d9bb1fd30c1147243acb2
Unpacking data files ...
Launching installer.
Sonar installation found from /opt/7signal.
Do you want to upgrade [Y/n]? **<enter>**

Starting to upgrade.
Stopping Sonar..
Waiting until Sonar has shut down ...
Getting current configuration..
Checking that TCP port 80 is not in use.. Port 80 free.
Sonar configuration:

Server name : Sonar
Server port : 80
Max. clients : 10
MOS port pool start: 50000
MOS port pool size : 10
Log level : ERROR

Is this configuration OK [Y/n] **<enter>**

Copying Sonar to /opt/7signal...
Configuring Sonar...
Installing Java runtime environment...
Extracting JRE...
Installing JRE...
JRE install directory is jre1.6.0_17
JRE already installed, checking if it is up to date
Installed version: 1.6.0_17-b04
New version : 1.6.0_17-b04
JRE does not need to be updated.
Updating files according to configuration...
Copying init script..
Installing init script..
Creating uninstaller...
Starting Sonar server..
Starting 7signal Sonar: OK
Done.

The Sonar server upgrade is ready when the installer finishes.

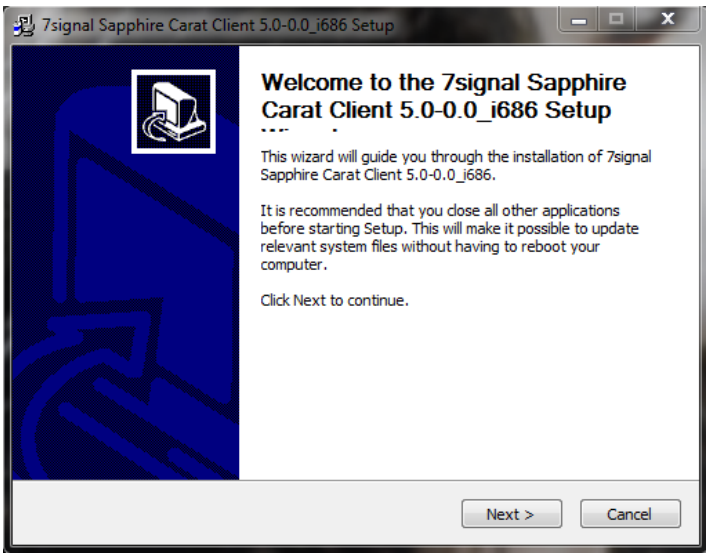
5.8 Carat GUI upgrade (Windows)

Step 1: Install the installation CD to the Windows host:

Step 2: Execute Carat GUI installer:

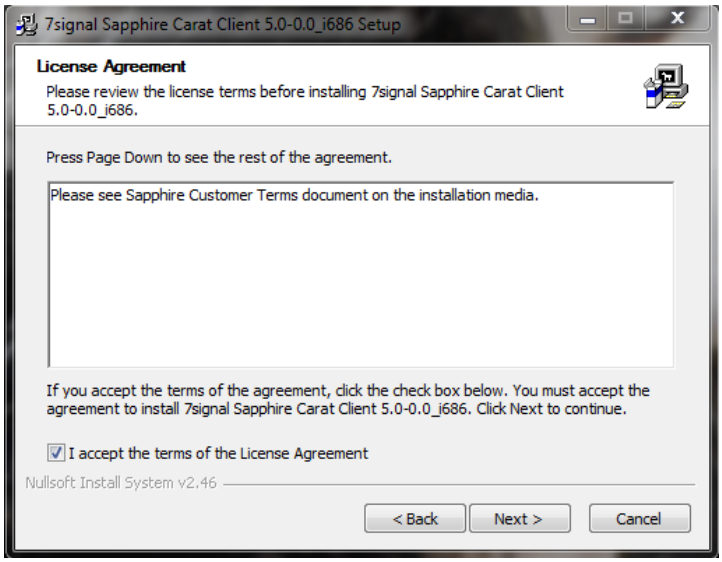
Execute the windows installer Carat_GUI/win folder.

The installer starts and Welcome dialog is shown:



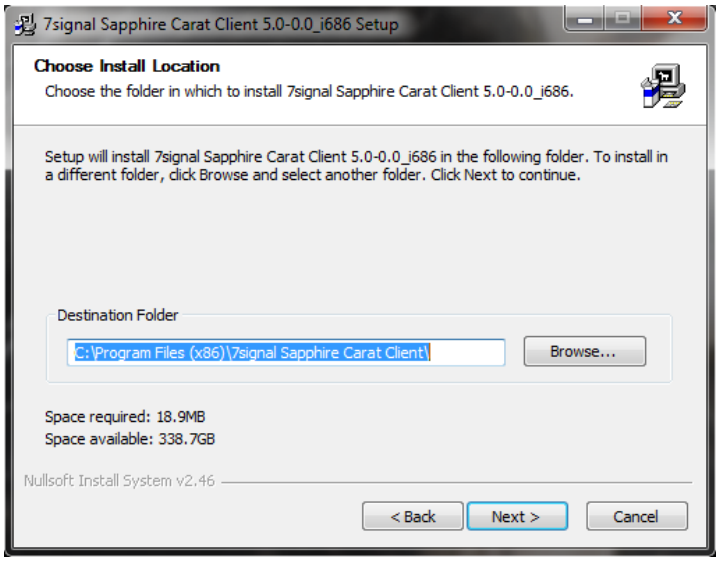
Click “Next” to proceed.

Step 3: Accept the License Agreement:



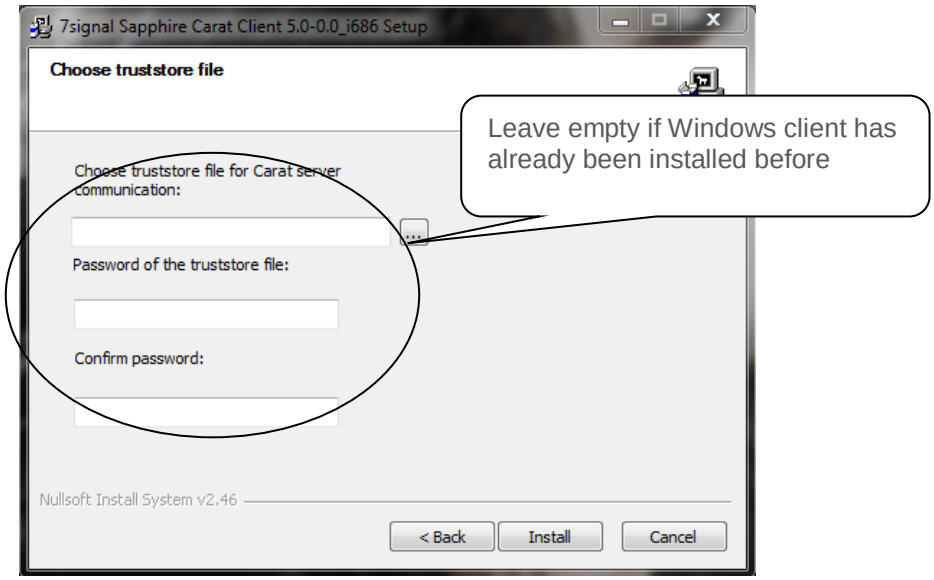
Click “Next” to proceed.

Step 4: Select the installation destination folder



Browse the folder to which the Carat GUI is currently installed. Click “Next” to proceed.

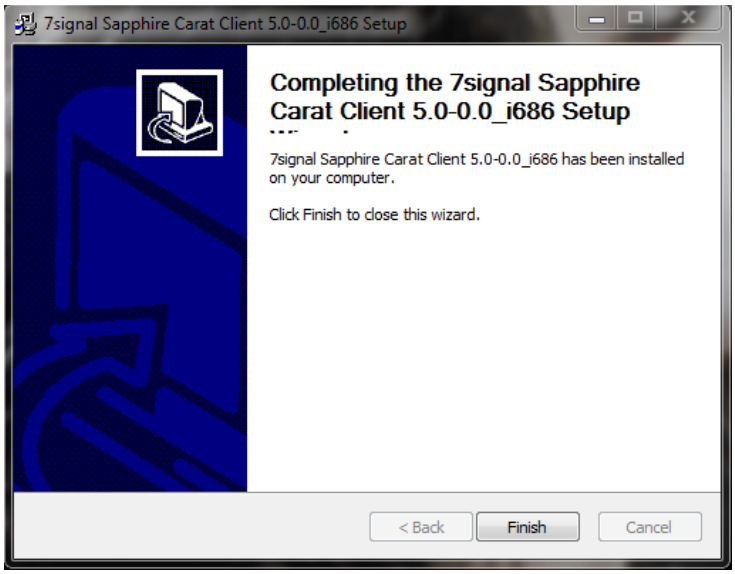
Step 5: Proceed with the current encryption certificates:



Click “Install” button (the original 7signal.truststore file and truststore password will be selected automatically).

Step 6: Wait installation to be completed:

Click “Finish” button after installation is complete:



5.9 Start Sapphire solution (Linux)

After all components have been upgraded, start the Carat and Analyzer servers.

Step 1: Start the Carat server:

Start the Carat server by issuing the command:

 # 7carat start

The Carat server starts in couple of seconds:

7signal Sapphire Carat is not running
Starting 7signal Sapphire Carat: OK
7signal Sapphire Carat is not running
7signal Sapphire Carat is not running
7signal Sapphire Carat is running

Step 2: Start the Analyzer server:

Start the Analyzer server by issuing the command:

 # 7analyzer start

The Analyzer server starts in couple of seconds:

Starting 7signal Analyzer server: 7signal Analyzer server start complete
7signal Analyzer server is not running
7signal Analyzer server is running

5.10 Eye upgrade

5.10.1 Eye upgrade (GUI)

> Note: The Eye SW version numbers in these instructions may not be the one that is going to be installed. However, the instructions are applicable to all SW versions.

Step 1: Start the Carat GUI:

Step 2: If necessary, install new software version to Carat,:

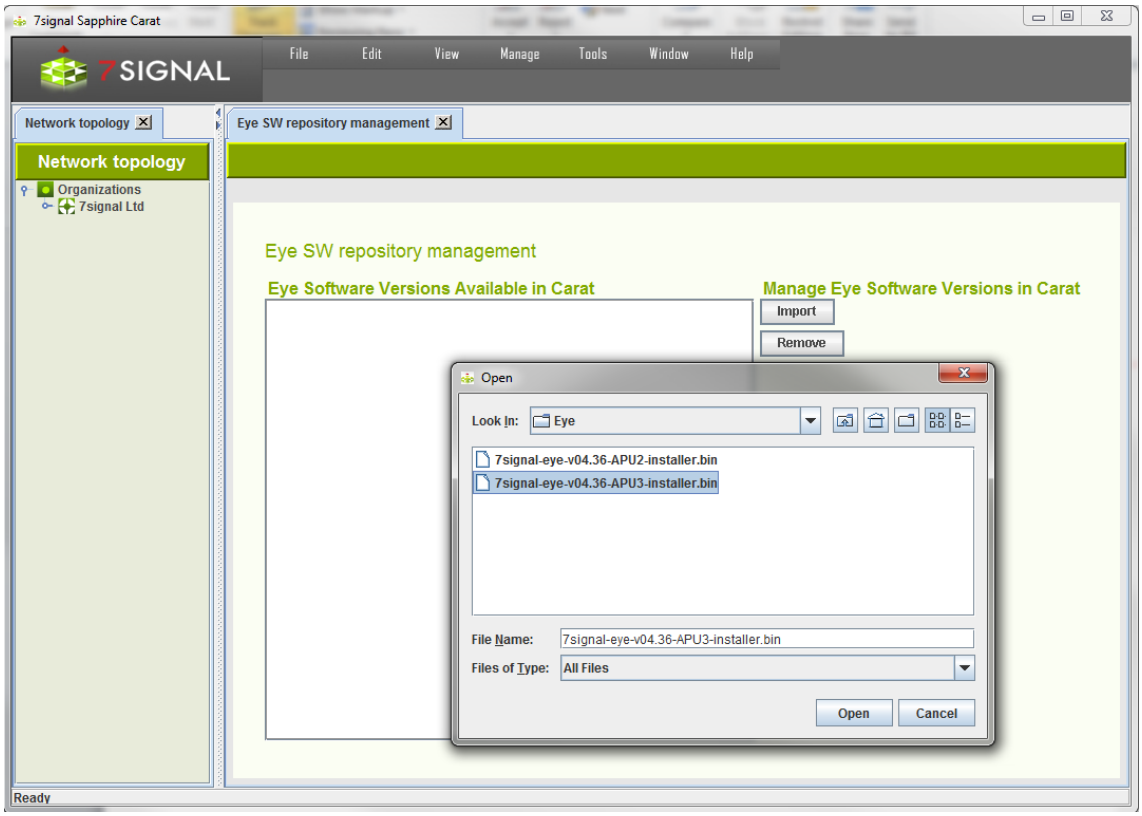
This step needs to be executed only if Carat was updated without in-bundled Eye software packages (i.e. “full” version was not used).

Login as solution admin user.

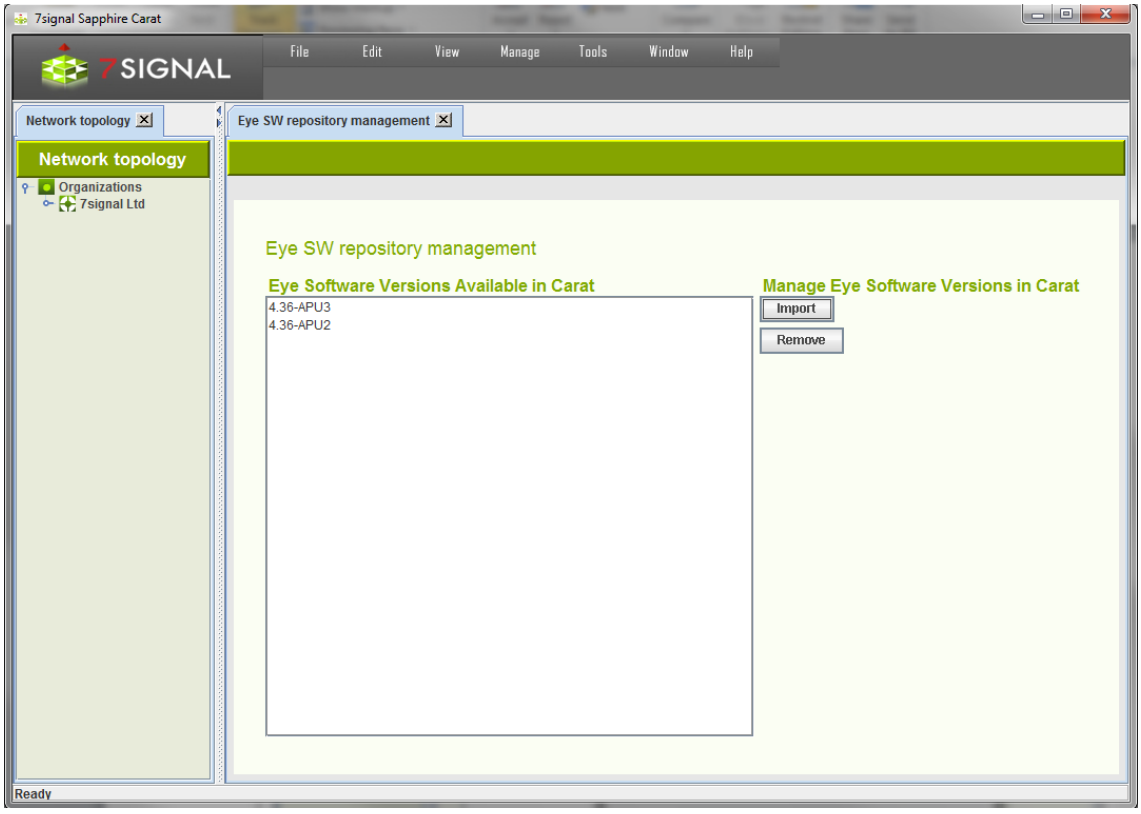
Open the “Manage | Eye Software Management | SW repository management” view

- Select “Import”
- Browse the Eye software installer
    - APU3 installers are for 802.11a/b/g/n Eyes
    - APU2 installers are for 802.11a/b/g Eyes
    - x86 installers are for Soft Eyes
    - armv6 installers are for Micro Eyes

- Select the desired installer, select “Open”



- Eye software versions available is Carat are populated on the list:



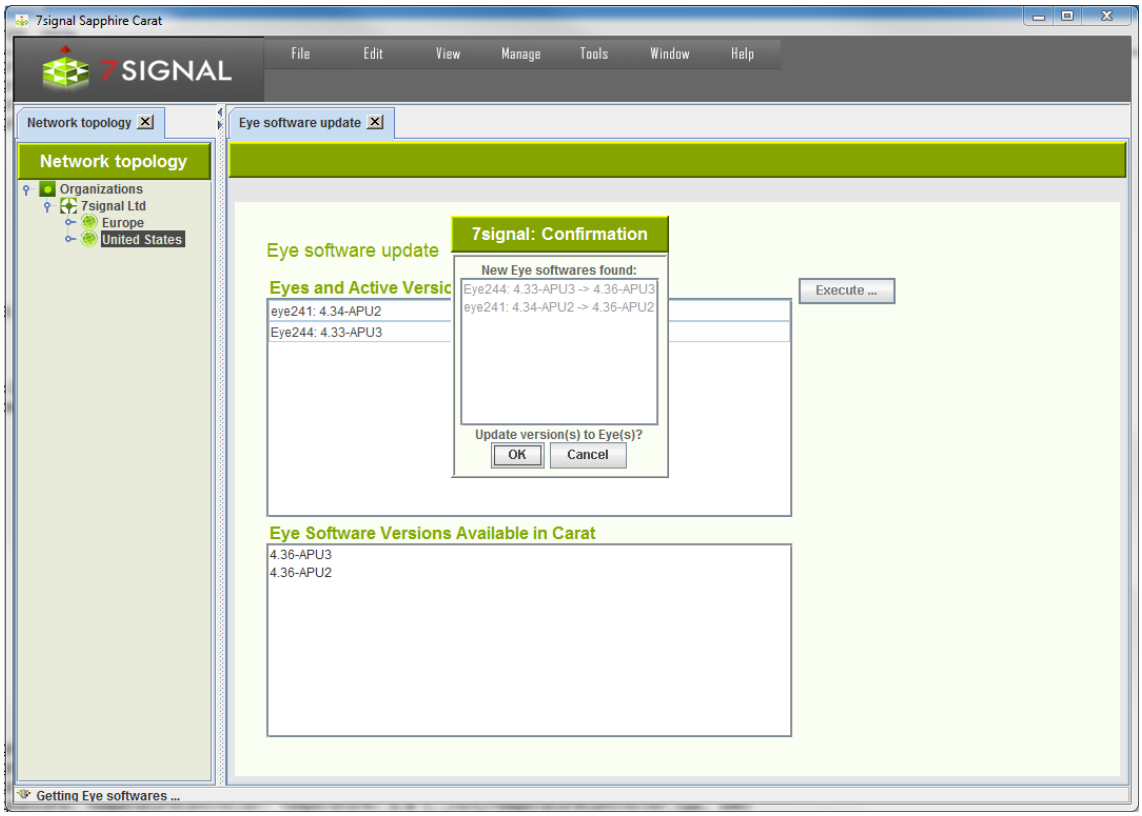
- Import installers for all needed platforms (Soft and Micro Eye SWs, if necessary)
- Close the “Eye SW repository management” view.

Step 3: Upgrade Eye software to Eye units:

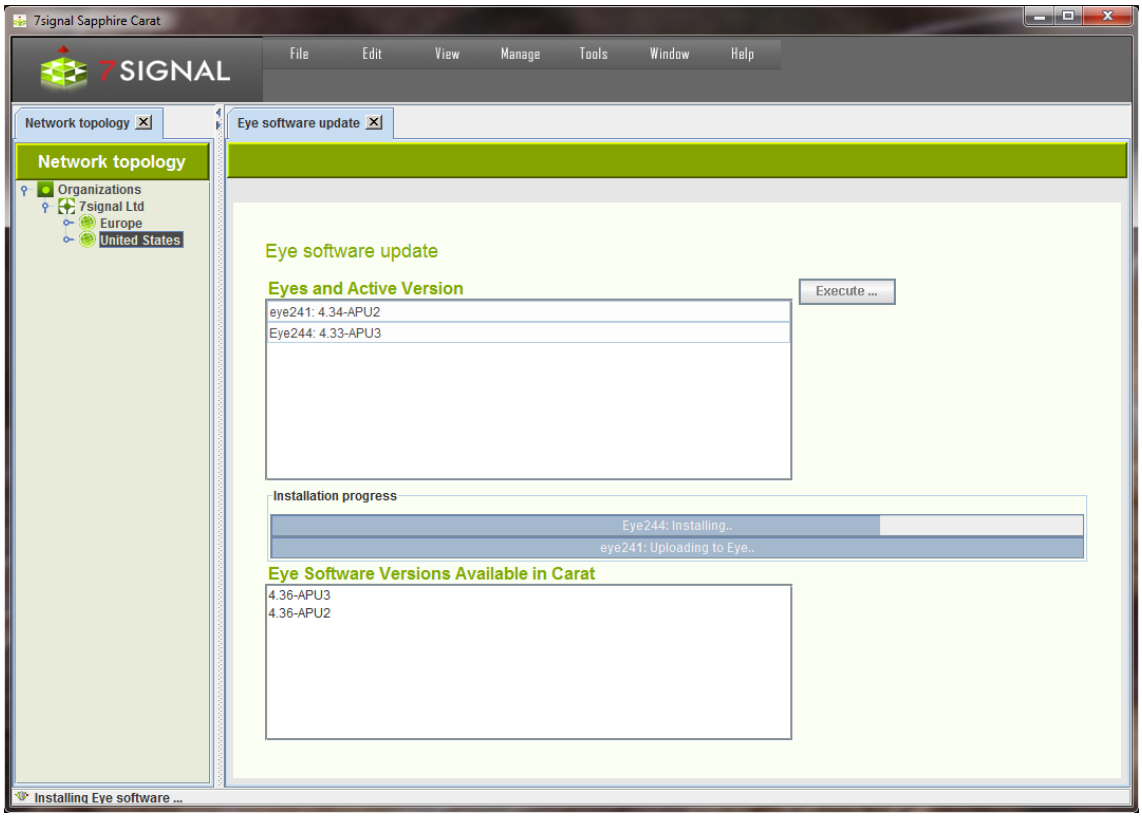
Login as configurator user.

Open the “Manage | Eye Software Management | Eye software update” view

- If a software update is available for some Eyes, the software version and the name of the Eye unit appear on a popup-window:



- To update software version to Eye, select “OK”
- Software is uploaded and installed to Eye units



- After the installation is complete, close the “Eye software update view”

5.10.2 Eye upgrade (command line)

Step 1: Change to the Eye installer directory:

 # cd /root/Sapphire*XXYY*/Carat_CD/Eye

Step 2: Copy the SW to Eye unit:

802.11a/b/g unit:
 # scp 7signal-eye-v0*X.YY-APU2*–installer.bin root@<*IP_address*>:/nand

802.11a/b/g/n unit:
 # scp 7signal-eye-v0*X.YY-APU3*–installer.bin root@<*IP_address*>:/nand

Soft Eye:

 # scp 7signal-eye-v0*X.YY-x86*–installer.bin root@<*IP_address*>:

Micro Eye:

 # scp 7signal-eye-v0*X.YY-armv6*–installer.bin root@<*IP_address*>:

Step 3: Login to Eye:

 # ssh root@<*eye_ip_address*>

Step 4: Install the Eye new SW package:

802.11a/b/g unit and 802.11a/b/g/n units:

[root@Eye]# cd /nand

802.11a/b/g unit:

[root@Eye]# ./7signal-eye-v0*X.YY*-APU*2*–installer.bin

802.11a/b/g/n unit:

[root@Eye]# ./7signal-eye-v0*X.YY*-APU*3*–installer.bin

Soft Eye:

[root@Eye]# ./7signal-eye-v0*X.YY*-x86–installer.bin

Micro Eye:

[root@raspi]# ./7signal-eye-v0*X.YY*-armv6–installer.bin

Step 5: Restart:

802.11a/b/g unit and 802.11a/b/g/n units:

[root@Eye]# reboot

Soft Eye:

[root@Eye]# service 7signalEye restart

Micro Eye:

[root@Eye]# systemctl restart 7signalEye.service

5.11 Start Automated Testing

Automated testing is in stopped state after the Sapphire has been upgraded.

Step 1: Start Carat GUI:

Step 2: Start Automated Testing:

Select “Tools | Start Automated Testing”.

6 UNINSTALLING SAPPHIRE

6.1 Uninstall Analyzer server (Linux 32 bit and 64 bit)

Step 1: Stop Analyzer server:

Login to Carat host and stop the Analyzer server by issuing the command:

 # 7analyzer stop

Step 2: Uninstall Analyzer server:

Change to Analyzer installation directory:

 # cd *<Analyzer installation directory>*

Uninstall the Analyzer server by issuing the command:

 # ./analyzer_server_uninstall.sh

The uninstaller script starts. Confirm uninstall by entering “y”:

7signal Sapphire Analyzer server will be removed (/opt/7signal/Analyzer). Are you sure [y/N]? **y**

The uninstaller script starts to uninstall the Analyzer server:

Removing files...
Done.

The uninstallation is finished when the script is ready.

6.2 Uninstall Carat server (Linux 32 bit and 64 bit)

Step 1: Stop Carat server:

Login to Carat host and stop the Carat server by issuing the command:

 # 7carat stop

Step 2: Uninstall Carat server:

Change to Carat installation directory:

 # cd */<Carat installation directory>/vX.X-Y.Y/*

Uninstall the Carat server by issuing the command:

 # ./carat_uninstall.sh

The uninstaller script starts. Confirm uninstall by entering “y”:

7signal Sapphire Carat, related user account and home directory will be removed. Are you sure [y/N]? **y**

The uninstaller script starts to uninstall the Carat server:

Stopping 7signal Sapphire Carat..
Shutting down 7signal Sapphire Carat: 7signal Sapphire Carat is not running
Removing init script..
Removing files...
Removing user account and group...
Done.

The uninstallation is finished when the script is ready.

6.3 Uninstall DBMS (Linux 32 and 64 bit)

> The Carat and Analyzer servers must be uninstalled before DBMS can be uninstalled. See chapters 6.1 and 6.2.

Login to Carat host and change to DBMS installation directory. It is the parent directory of former Carat installation[3]:

 # cd /<*DBMS installation directory*>

Uninstall the DBMS by issuing the command:

 # ./uninstall-dbms.sh

The uninstaller script starts. Confirm uninstall by entering “y”:

DB2 and related user accounts will be removed. Are you sure [y/N]? **y**

Resolving log directories...

- MGMT7 log directory is /home/db7sign/db7sign/NODE0000/SQL00001/LOGSTREAM0000/

- MEAS7 log directory is /home/db7sign/db7sign/NODE0000/SQL00002/LOGSTREAM0000/

- SECUR7 log directory is /home/db7sign/db7sign/NODE0000/SQL00003/LOGSTREAM0000/

Resolve logging method...

- MGMT7 database uses circular logging.

- MEAS7 database uses circular logging.

- SECUR7 database uses circular logging.

Resolving database directory ...

- Databases on /home/db7sign

Stopping DB2...

SQL1064N DB2STOP processing was successful.

Stopping applications...

Removing DB instance...

DBI1446I The db2idrop command is running.

DB2 installation is being initialized.

Total number of tasks to be performed: 2

Total estimated time for all tasks to be performed: 305 second(s)

Task #1 start

Description: Initializing instance list

Estimated time 5 second(s)

[3] For example, if Carat server was installed to `/opt/7signal/Carat`, the DBMS installation directory is `/opt/7dignal/dbms`.

Task #1 end

Task #2 start
Description: Configuring DB2 instances
Estimated time 300 second(s)
Task #2 end

The execution completed successfully.

For more information see the DB2 installation log at "/tmp/db2idrop.log.15436".
Required: Review the following log file also for warnings or errors:
"/tmp/db2idrop_local.log.*"
DBI1070I Program db2idrop completed successfully.

Dropping DAS...
DBI1070I Program dasdrop completed successfully.

Running DB2 uninstaller...
DBI1016I Program db2_deinstall is performing uninstallation. Please
wait.

The execution completed successfully.

For more information see the DB2 uninstallation log at
"/tmp/db2_deinstall.log.20127".
Removing files...
Removing service definitions..
DB2 uninstalled. Removing database users..
Removing product information..
Removing remaining directories ..
Done.
The uninstallation is finished when the script is ready.

6.4 Uninstall Carat GUI (Linux 32 bit and 64 bit)

Login to host and change to Carat GUI installation directory (directory ClientGUICarat on installation path):

 # cd /<Carat GUI installation directory>

Uninstall the DBMS by issuing the command:

 # ./carat_client_uninstall.sh

The uninstaller script starts. Confirm uninstall by entering “y”:

7signal Sapphire Carat client will be removed. Are you sure [y/N]? **y**

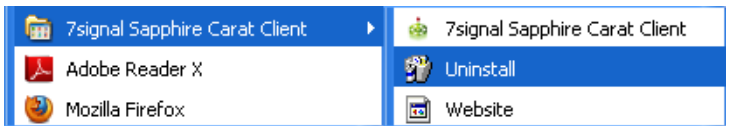
The uninstaller script starts to uninstall the Carat server:

Removing files...
Done.

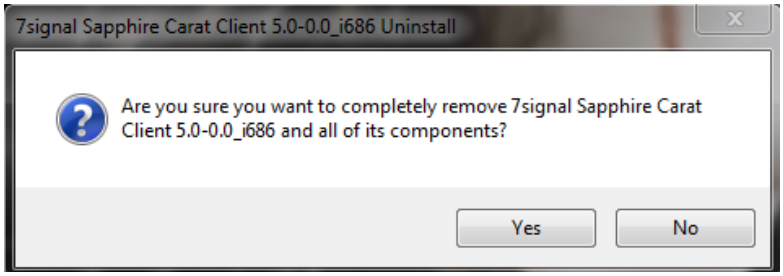
The uninstallation is finished when the script is ready.

6.5 Uninstall Carat GUI (Windows)

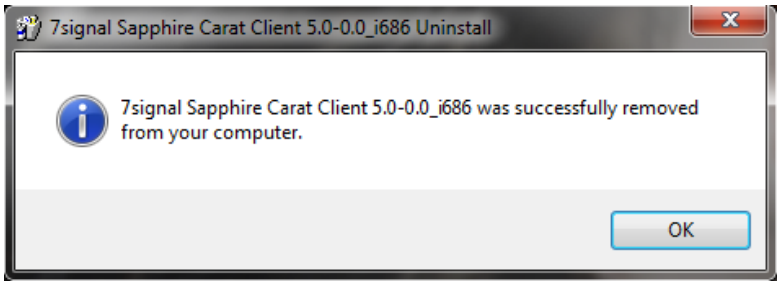
Open Start Menu, browse to “7signal Sapphire Carat Client” submenu. Choose “Uninstall”:



The uninstaller starts. Confirm uninstallation by clicking “Yes”:



The uninstaller uninstalls the Carat GUI. Click “Ok” when uninstaller has finished.



6.6 Uninstall Sonar (Linux 32 bit and 64 bit)

Step 1: Stop Sonar server:

Login to Sonar host and stop the Sonar server by issuing the command:

 # service 7signalSonar stop

Step 2: Uninstall Sonar server:

Change to Sonar installation directory (e.g. /opt/7signal/Sonar):

 # cd /<*Sonar installation directory*>

Uninstall Sonar by issuing the command:

 # ./sonar_uninstall.sh

The uninstaller script starts. Confirm uninstall by entering “y”:

7signal Sonar will be removed. Are you sure [y/N]? **y**

The uninstaller script starts to uninstall the Sonar server:

Stopping 7signal Sonar..
Shutting down 7signal Sonar: 7signal Sonar is not running
Removing init script..
Removing files...
Done.

The uninstallation is finished when the script is ready.

6.7 Uninstall Soft Eye

Login to Soft Eye laptop and change to Eye Software installation directory (e.g. /opt/7signal/Eye):

 # cd /<*Eye installation directory*>

Uninstall Eye Software by issuing the command:

 # ./eye_uninstall.sh

The uninstaller script starts. Confirm uninstall by entering “y”:

7signal Eye will be removed. Are you sure [y/N]? **y**
Stopping 7signal Eye..
Removing init script..
Removing 7config..
Removing files...
Done.

7 LOG SETTINGS

All 7signal Sapphire elements have logging capability.

7.1 Carat server log

The log file - server.log - is located in /opt/7signal/Carat/7signal. The directory contains older log files as well named server.log.* where by default the asterisk (*) is in range of 1..5. Altogether, there is one active log file named server.log and five files for circulating the files. The oldest logs do get overwritten.

To check the latest logs one should issue the following command:

7carat log

For continuous real-time logging:

7carat log -f

The Carat log level can be checked or changed by using loglevel command of 7carat tool (for example, from INFO to DEBUG which produces much more detailed information):

 # 7carat loglevel show

 # 7carat loglevel set DEBUG

> Notice that Carat server has to be restarted in order to take the changed log level into use.

7.2 Carat GUI log

- In Windows XP by default the log file - client.log - is located in folder

  \Program Files\7signal Sapphire Carat Client\7signal

- In Windows 7 by default the log file - client.log - is located in folder

  \Users\user_name\AppData\Roaming\7signal\logs

In Linux the log file - client.log - is located in start-up folder (if launched from desktop icon, user's home directory).

7.3 Eye log

> NOTE: as this is Eye logging, all the commands are to be given in the prompt of the monitoring station, not in Carat or Sonar server.

The Eye unit has an in-memory circular log that can be followed real-time with the following command:

logread -f

Without any arguments the command shows of the whole log and returns immediately:

logread

The logging can be directed to rotating log files instead of the ring buffer with 7config log – command. Name and location of the log files depends on Eye hardware version:

- Eye for 802.11a/b/g: /nand/syslog
- Eye for 802.11a/b/g/n: /var/log/messages

In order to change logging to log files, issue the following command:

 # 7config log set target persistent

To change logging back to ring buffer, use the following command:

 # 7config log set target buffer

The following command shows the log level and log target information:

7config log show

7.4 Soft and Micro Eye log

Soft and Micro Eyes utilize syslog of the OS distribution. By default, logs will appear to file /var/log/messages.

In order to get Eye Software debug log messages to a log file, debug logging must be enabled in syslog configuration file.

Log in to Soft or Micro Eye and open file /etc/rsyslog.conf in an editor. Add rule for debug logs, e.g. after cron log rule:

Log cron stuff

cron.* /var/log/cron

*.debug /var/log/debug

Save the file and restart rsyslog:

Soft Eye:

 # service rsyslog restart

Micro Eye:

 # systemctl restart rsyslog.service

In order to enable Eye Software debug logging mode, issue commands:

 # 7config log set default DEBUG

 # 7config run restart

7.5 Analyzer log

Analyzer is based on Tomcat so the log file is named *catalina.out* and is by default in directory /<*Analyzer installation directory*>/apache-tomcat-<*version*>/logs.

Tool to follow the most recent logging is

7analyzer log

and for continuous monitoring:

7analyzer log -f

7.6 Sonar log (Linux)

The log file - sonar-server.log - is located by default in /<*Sonar installation directory*>/Sonar/log.

8 SAPPHIRE PROCESS MANAGEMENT

8.1 Carat

Carat is a service in Linux systems. However, the Carat process is supposed to be used by 7signal tool called *7carat*:

7carat <parameter-from-the-bullet-list>
- start
- stop
- restart
- status

8.2 Analyzer

Analyzer is a service in Linux systems. However, the Analyzer process is supposed to be used by 7signal tool called *7analyzer*:

7analyzer <parameter-from-the-bullet-list>
- start
- stop
- restart
- status

8.3 Sonar

Sonar is a service in Linux systems:

service 7signalSonar <parameter-from-the-bullet-list>
- start
- stop
- restart
- status

8.4 Eye

NOTE: The following command requires session in the monitoring station.

The utility 7config controls the Eye configuration. See more details on the tool on chapter 10. The process is controlled with command group *run*.

7config run <parameter-from-the-bullet-list>
- start
- stop
- restart
- status

9 TROUBLESHOOT

9.1 GUI client cannot connect to Carat server

1. Check that username and password are correct in the GUI
2. Check that Carat server is running
    a. run 7carat status
    b. read the Carat server log
    c. if necessary, issue command 7carat start and go to b)
3. Check that GUI port 47777 (default) is open in the firewall of the GUI host
4. Check that RMI port 1099 (default) is open in the firewall of the GUI host
5. Check that the Carat server RMI address is the right one in the GUI host
    a. The script run_7signal_Carat_mgmt_server.sh contains the IP address as _rmiserver_prop variable.
        i. the default location for the script is /opt/7signal/Carat/7signal/
    b. Check that this variable has the right Carat server address

9.2 Cannot add Eye unit

1. Check that license.xml file is located in the Carat server
    a. Check the Carat server log for possible license errors
    b. Check the existence of the file
        i. The default location for the license file is /opt/7signal/Carat/7signal/conf
    c. The file permission should be 744.
    d. Check the contents of the file to see any anomalies
2. Run 7config verify command in Eye unit
3. Check that maximum number of Eye's (license defines) is not exceeded.
4. Check that carat.keystore is located in the Carat server
    a. the default folder location is /opt/7signal/Carat/7signal/conf

9.3 No access to Sonar server, active test failed

1. Check that Sonar server is configured correctly to Carat (Manage|Test endpoints)
    a. IP address and Sonar port
2. Check the process at the Sonar host with the command
    a. service 7signalSonar status
    b. Remotely one can telnet <sonar-ip-addr> <port-default-80>
        i. Sonar opens the connection and closes it after 1 second of idle time
3. Check Sonar log for error messages
4. Check that Sonar ports are open in the firewall(s)
5. Check that the WLAN encryption key has correct definition
6. Check that the key is bound to the managed network
7. Check connectivity options and requirements for Eye and Sonar

9.4 Analyzer client cannot connect to Carat server

Analyzer and Carat are both run in the Carat host machine.

1. Check that username and password are correct
2. Check Analyzer log for error messages
    a. Run command 7analyzer log
3. Check that Analyzer server is running
    a. Run command 7analyzer status
4. Check Carat log for error messages
    a. Run command 7carat log
5. Check that carat server is running
    a. Run command 7carat status

9.5 Eye IP address forgotten

In order to find out the Eyes IP address, the MAC (Ethernet) address of the Eye must be known.

1. Connect Eye to a Carat host directly with an Ethernet cable (i.e. Carat and Eye have to be in the same LAN).
2. Use the 7edp utility (part of the Carat installation) to find out Eye's IP address. The syntax of the tool is the following:

   7edp *<name of the Carat Ethernet interface> <MAC address of the Eye's Ethernet interface>*

   For example:

   # 7edp eth0 00:19:F4:EE:01:31

   7edp tool resolves the Eye's IP address:

   Sending EDP request
   Waiting response..
   Received EDP frame from Eye
   Eye IP address is 192.168.3.42

10 COMMAND-LINE UTILITY FOR EYE

10.1 Overview

7config is a command line utility for configuring various things in Eye unit. Commands are divided into thematic command groups so that each group contains one or more commands. A command may also have an argument and a value.

Currently supported command groups are the following:

- ip: IP address management.
- keys: Key storage management.
- ap: Access point configuration storage management.
- conn: Connection management.
- run: Software run-state management.
- txp: External antenna configuration.
- log: Log configuration
- iface: Global interface management.
- verify: System verification.

Command group specific help can be shown with command:

```
7config <group> help
```

General help can be shown with command:

```
7config help
```

10.2 7db IP command group[4]

This command group contains commands for configuring IP configuration of Eye Ethernet interface. Currently, it is possible to show current IP configuration, set IP address, network mask and default gateway address (or alternatively, use DHCP configuration) of the management interface. It is also possible to take a backup from current IP configuration, and restore the configuration from the backup.

```
7config ip <CMD> <ARG> [VALUE]
'set' command arguments:
   addr      Set IP address of management interface (eth0)
             VALUE = Valid IPv4 address
   mask      Set netmask of IP address of management address
             VALUE = Valid IPv4 netmask in dotted format
                  (x.x.x.x)
   port      Set management port
             VALUE = TCP port number
   gateway   Set IP address of default gateway (optional)
             VALUE = Valid IPv4 address
```

[4] IP command group is not available in Soft and Micro Eyes, as they have their own utilities and processes for IP configuration management.

```
                or 'remove' to remove configured gateway
    dhcp      Set DHCP on/off
              VALUE = on|off
  'show' command arguments: none
  'backup' command arguments:
    create    Create backup from existing IP configuration.
    restore   Restore IP configuration from backup.
```

Examples:

Setting IP address of the management interface:

```
# 7config ip set addr <IP_address>
```

Setting network mask of the management interface:

```
# 7config ip set mask <mask_in_dotted_format>
```

Setting port of the management interface:

```
# 7config ip set port <IP_address>
```

Create backup from current IP configuration:

```
# 7config ip backup create
```

Restore IP configuration from a backup:

```
# 7config ip backup restore
```

Show current IP configuration:

```
# 7config ip show
```

10.3 Keys command group

This command group contains command for managing WLAN network keys stored to Eye unit. Currently, the only supported operation is to destroy all WLAN keys from the Eye.

```
# 7config keys destroy
```

10.4 AP command group

This command group contains command for managing Access Point information stored to Eye unit. Currently, the only supported operation is to destroy all Access Point information from the Eye.

```
# 7config ap destroy
```

10.5 Conn command group

This command group contains commands for managing encryption settings of management traffic between Eye unit and Carat server. Currently supported operations are to show configured TLS encryption key file name, set TLS encryption key file name, set password of the encryption key file, and install certificates and passwords from certificate and password packages.

```
  7config conn <CMD> <ARG> [VALUE]
  'cert' command arguments:
    set       Set management connection encryption certificate file.
```

```
            VALUE = Certificate file name. File must reside
                  in /nand/etc/certificates directory.
    show      Show current encryption certificate file name.
    install   Install certificate from certificate archive.
            VALUE = Archive name (<prefix>-7signal-certs.tar.gz)
 'pwd' command arguments:
    set       Set encryption certificate password.
    install   Install password from password archive.
            VALUE = Archive name (<prefix>-7signal-pwds.tar.gz)
 'encryption' command arguments:
    install   Install encryption certificate and password
            from combined certificate and password archive.
            VALUE = Archive name (<prefix>-7signal-all.tar.gz)
```

Examples

Install certificate from certificate package:

```
# 7config conn cert install <certificate package file>
```

Install password from password package:

```
# 7config conn pwd install <password package file>
```

10.6 Run command group

This command group contains commands for managing Eye software run-state. Currently supported operations are to ask current status of the software, to start, stop and restart the software, activate software version, show installed version, uninstall a software version, and to reconfigure Eye unit without restarting it.

```
 7config run <CMD> [ARG]
    status    Show status of Eye software.
    start     Start Eye software.
    stop      Stop Eye software.
    restart   Restart Eye software.
    reconfig  Reconfigure unit and restart Eye software.
    show      Show active software version.
    list      List installed software versions.
    activate  Activate software version.
            Example: 7config run activate 02.80
                  Activates version 2.80
    remove    Uninstall Eye software version.
            Example: 7config run remove 02.61
                  Uninstalls SW version 2.61
```

Examples:

Query status of the Eye software:

```
# 7config run status
```

Start the Eye software:

```
# 7config run start
```

Stop the Eye software:

```
# 7config run stop
```

Restart the Eye software:

```
# 7config run restart
```

List installed Eye softwares:

```
# 7config run list
```

Reconfigure the Eye:

```
# 7config run reconfig
```

10.7 Txp command group

This command group contains commands for showing and setting of TX power related parameters. Currently supported operations are showing of TX power settings, setting default TX power, setting gain of an external antenna and setting cable loss of the external antenna.

```
7config txp  [ARG] [VALUE]
'show' command arguments:
  default    Show default TX power.
   ext       Show configured gain of external antenna.
   cable     Show configured cable loss of external antenna.
   If no arguments given, all information will be shown.

'set' command arguments:
   default   Set default TX power.
                              VALUE = TX power (dBm).
   ext       Set gain of external antenna.
                              VALUE = Gain of external antenna (dBi).
   cable     Set cable loss of external antenna.
                              VALUE = Cable loss of external antenna cable (dB).
```

Examples:

Show all information in TX power configuration:

```
# 7config txp show
```

Show configured cable loss:

```
# 7config txp show cable
```

Set external antenna gain to 10 dBi:

```
# 7config txp set ext 10
```

10.8 Log command group

This command group contains commands for configuring log production of the Eye. Logs can be produced either to a ring buffer on RAM (this is the default, can be read by logread command), or to persistent storage on NAND flash. In 802.11a/b/g, the persistent log resides in folder /nand/ as files named syslog*, and in 802.11a/b/g/n in folder /var/log as files named messages.

Reading of the log files is either from the chosen storage directly or with a command logread.

By default, only the critical messages are logged. Currently, the supported commands are:

- show which shows the current log configuration.
- set
  - level which sets the current level of logging
  - default which sets default level of logging at system start-up
  - target which sets logging target, ring buffer or NAND.

Log level set by 'set level' command remains active until restart of the system. Default log level after installation is "ERROR".

Log levels are the following:

- CRIT - Critical messages
- ERROR - Error messages
- WARN - Warning messages.
- INFO - Informational messages.
- DEBUG - Debug messages.

Log levels are cumulative, i.e. the level CRIT logs only critical messages, WARN logs all levels including CRITICAL, ERROR and WARN messages. DEBUG logs all possible messages.

Log command group arguments:

```
  'show'       Show log configuration.

  'set' command arguments:
     level     Set log level.
               VALUE = CRIT | ERROR | WARN | INFO | DEBUG
     default   Set default log level. This log level will be active
               when 7signal software starts.
               VALUE = CRIT | ERROR | WARN | INFO | DEBUG
     target    Set logging target.
               VALUE = buffer | persistent
```

Examples:

Set log level to DEBUG:

```
# 7config log set level DEBUG
```

Set log level to WARN:

```
# 7config log set level WARN
```

Set default log level to ERROR:

```
# 7config log set default ERROR
```

Show default log level:

```
# 7config log show
```

Set logging target to NAND flash:

```
# 7config log set target persistent
```

11 COMMAND-LINE TOOL FOR DATABASE MANAGEMENT

7db command is a tool for Carat database. It supports limited data retrieval, general management and database backup administrator for both immediate and automatic backups.

It is recommended that database backups should be taken regularly.

7db command groups:

- dump Dump export and import
- show Show status and configurations
- reinit Re-initialize databases
- backup Automatic backup management
- logsetup To change the current logging method
- reorg Reorganize the database
- db2 Access to database management system command-line tool

11.1 Logsetup command

Changes the way the underlying DBMS handles logging.

> NOTE: the command is trivial to issue but it's consequences are highly resource consuming. Observe awareness when using this command.

There are two different logging modes in 7signal Sapphire. This command switches between the modes. There is lots of informative output as this command should not be used carelessly or without proper planning and understanding of the consequences.

The command examines the current state of all three different underlying databases. In case they differ from each other, the processing shall stop as it is expected that all the databases are handled similarly. In case the logging method differs, there has been some significant error in DB administration and system otherwise.

The *logsetup* command may result in numerous backups for the safety reasons so the overall process duration is rather long.

11.2 Backup command group

Creates instant and automatic database backups. It is possible to schedule one offline and/or one online backup point.

> NOTE: the backup policy should be well-planned. Please see the 7signal Sapphire User Guide for further discussion on backup and the options available.

Backup commands:

- show Show automatic backup configuration
- remove Remove automatic backup configuration
- set Configure automatic backup
  - daily <HH:mm> <backup directory>
  - weekly <DDD> <HH:mm> <backup directory>
    <DDD> = Mon, Tue, Wed, etc.
  - monthly <day> <HH:mm> <backup directory>
  - directory <backup directory>
    Backup directory is optional if a backup configuration already exists.
- now Immediate backup.
  - online
  - offline

- restore Recovery command
- workdir Configure working directory used in backup and restore operations.

Examples:

Remove configuration

```
# 7db backup remove
```

Backup offline every Wednesday at 00:30 to /mnt/backups

```
# 7db backup set weekly Wed 00:30 /mnt/backups offline
```

Backup online every day at 03:00 to /mnt/backups

```
# 7db backup set daily 03:00 /mnt/backups online
```

Change backup directory to /mnt/newbackups, do not change time settings

```
# 7db backup set directory /mnt/newbackups
```

Backup every Sunday at 00:30, do not change backup directory

```
# 7db backup set weekly Sun 01:30
```

Back the system up immediately offline

```
# 7db backup now /mnt/backups offline
```

Back the system up immediately online (requires archival database logging)

```
# 7db backup now /mnt/backups online
```

Set working directory for backup and restore (highly recommended for larger databases)

```
# 7db backup workdir set /opt/largefilesystem
```

Restore a known-to-be-good system state

```
# 7db backup restore <backup-file>
```

11.3 Show command group

Shows the status and configuration of the database

Show commands:

- tabstatus Show the status of the tables.
  - all
  - <database_name>
- conf Show configuration of the database.

Examples

Show status of the tables in the MEAS7 and MGMT7 databases

```
# 7db show tabstatus all
```

Show status of the tables in the SECUR7 database

```
# 7db show tabstatus secur7
```

Show status of the CARAT7.ap_ftp_qos_test table in the MEAS7 database

```
# 7db show tabstatus meas7 ap_ftp_qos_test
```

Show configuration of the database

```
# 7db show conf
```

11.4 Reinit command group

Empty the database and resume initial state of the system.

```
# 7db reinit
```

Examples:

Re-initialize the MEAS7 and MGMT7 databases

```
# 7db reinit all
```

Re-initialize the MEAS7 database

```
# 7db reinit meas7
```

Re-initialize CARAT7.ap_ftp_qos_test table in the MEAS7 database

```
# 7db reinit meas7 ap_ftp_qos_test
```

11.5 Reorg command group

Reorganize the database.

```
# 7db reorg
```

Examples:

Re-organize the MEAS7 and MGMT7 databases

```
# 7db reorg all
```

Re-organize the MEAS7 database

```
# 7db reorg meas7
```

Re-organize the MGMT7 database

```
# 7db reorg mgmt7
```

12 COMMAND-LINE TOOL FOR CARAT SERVER

7carat command is a tool for Carat server management. It supports process management, loglevels, license and database integrity.

7carat command groups:

- start/stop/status/restart Manage the carat process
- log Show the log of the server
- conf Show the configuration of the server
- verify Verify the configuration
- loglevel Manage the carat loglevels
- license Manage the carat license
- integritycheck Verify database integrity
- certificate Update encryption certificates

12.1 License command group

Manage the carat license.

Examples:

Show the license information

```
# 7carat license
```

Install new carat license

```
# 7carat license set <full path and name of the license file>
```

12.2 Integritycheck command group

Verify the database integrity.

Examples:

Execute the integritycheck

```
# 7carat integritycheck
```

IMPORTANT: Sapphire Carat must not be running when issuing this command!

13 UPDATING ENCRYPTION CERTIFICATES

Sometimes it is necessary to update encryption certificates used throughout Sapphire solution. Certificates can be updated from certificate package file in Linux, separate truststore file and truststore password are needed in Windows (see certificates CD/DVD).

13.1 Updating Carat server certificates

Step 1: Login to Carat server host as root user

Step 2: Use 7carat tool to update certificate

7carat certificate set /path_to_package/mycerts-7signal-all.tar.gz

Validating archive file.....OK
Updating Carat server certificates.....
Found Carat configuration from /opt/7signal/Carat/7signal/conf...OK
Extracting carat keystore files.....OK
Extracting 7signal keystore.....OK
Extracting Eye certificate.....OK
Extracting Eye certificate password.....OK
Extracting carat keystore password.....OK
Extracting 7signal keystore password.....OK
Updating server configuration file.....OK
Updating setup configuration file.....OK

13.2 Updating Analyzer server certificates

Step 1: Login to Analyzer server host as root user

Step 2: Use 7analyzer tool to update certificates

7analyzer certificate set /path_to_package/mycerts-7signal-all.tar.gz

Validating archive file.....OK
Updating Analyzer certificates.....
Found /opt/7signal/Analyzer/webapps/WEB-INF/web.xml.....OK
Found /opt/7signal/Analyzer/apache-tomcat-5.5.26/conf/server.xml.OK
Found /opt/7signal/Analyzer/start_loupe_server.sh.....OK
Found current truststore file.....OK
Extracting 7signal truststore.....OK
Installing 7signal truststore.....OK
Extracting Analyzer keystore.....OK
Extracting truststore password.....OK
Extracting keystore password.....OK
Modifying configuration files.....OK

13.3 Updating Carat GUI certificates (Linux)

Step 1: Login to Carat GUI host

Step 2: Change to Carat GUI installation directory

For example:

cd /opt/7signal/ClientGUICarat

Step 3: Update certificates by using update_certificates tool

./update_certificates /path_to_package/mycerts-7signal-all.tar.gz

Validating archive file.....OK
Updating Carat GUI certificates.....
Extracting 7signal truststore.....OK
Extracting truststore password.....OK
Modifying configuration files.....OK

13.4 Updating Carat GUI certificates (Windows)

Step 1: Locate 7signal Sapphire Carat Client installation directory

Typically, it is found under "Program files (x86)" directory.

Step 2: Copy new 7signal.truststore file

Copy new 7signal.truststore file to 7signal\conf directory. Overwrite existing truststore file

Step 3: Open run_client.bat file in editor and change truststore password

Open run_client.bat file in an editor, locate password line:

set _truststore_pass=xxxxxxxxx

Change truststore password and save the file

13.5 Updating Eye certificates

Step 1: Transfer certificate package to Eye /tmp directory by using SCP

For example, in Carat server host:

scp /path_to_package/mycerts-7signal-all.tar.gz root@<Eye IP address>:/tmp

Step 2: Login to Eye by using SSH

ssh root@<Eye IP address>

Step 3: Install certificate from certificate package

7config conn encryption install /tmp/mycerts-7signal-all.tar.gz

14 REMOVING OLD MEASUREMENT DATA

Sometimes it is necessary to remove old measurement data by using command line tool. This is necessary, for example, if large amounts of data needs to be removed. Performance of command line tool is much better than GUI tool, as data removal approach is different (database export/load vs. SQL delete statements).

Step 1: Resolve Eye ID

ID of one Eye in the network topology is needed. Login to Analyzer and check topology tree on the left side of the browser window. Click “(i)” button next to Eye name in the topology tree. Popup window opens. Locate line “Eye id” in the table and write down the Eye ID number.

Step 2: Login to Carat server host as root

Step 3: Change to DBMS directory

For example:

```
# cd /opt/7signal/dbms
```

Step 4: Create work directory writable by database user

For example:

```
# su – db7sign
$ mkdir /home/db7sign/purge_work_dir
$ exit
```

Step 5: Resolve group ID.

Resolve ID of the group that owns the data to be removed. For this, we are using the Eye ID resolved in step 1.

```
# su – db7sign
$ db2 connect to mgmt7 > /dev/null&& db2 select gid from carat7.eye where eye_id = <Eye ID>
```

Example output could be:

```
GID

-----------

        4
```

Exit the db7sign shell

```
$ exit
```

Step 6: Check data removal options

Execute data removal tool without options:

```
# ./purge_measurement_db.sh

Usage: purge_measurement_db.sh <date in YYYY-MM-DD format> <Carat group ID that owns the Eyes>

Options: -c              Use explicit table column names when exporting data.
         -d              Use DEL export instead of IXF
         -w <directory>  Use work directory <directory>
         -n              Use non-recoverable loading mode
```

Preferred options are –td for DB2 version 9.5. –w is mandatory

Step 7: Execute data removal tool:

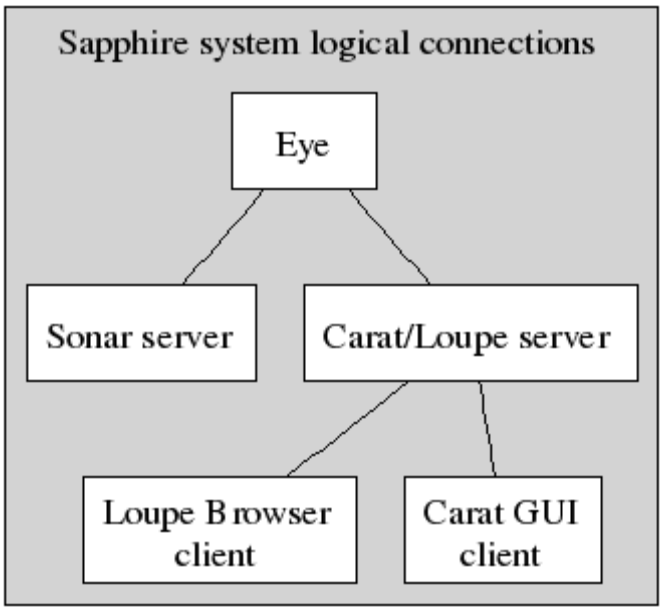
For example, if data older than 2013-10-12 should be removed from the measurement DB and group ID is 4, command would be:

```
# ./purge_measurement_data –w /home/db7sign/purge_work_dir 2013-10-12 4
```

Wait until command finishes. Notice that with large databases, data removal may take several ours, even days.

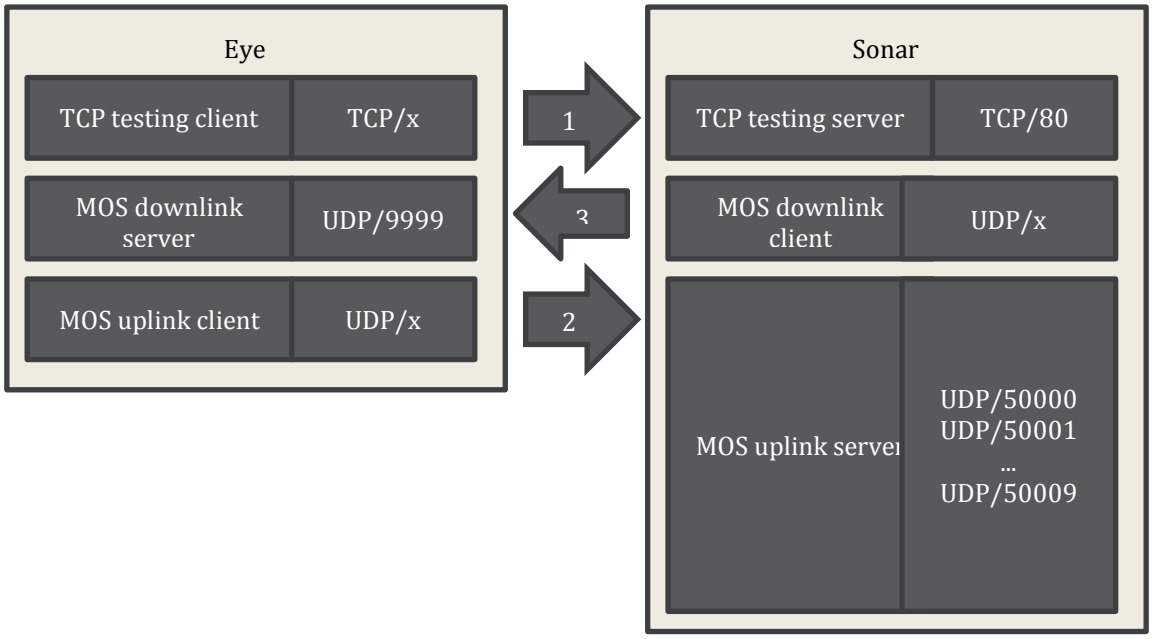
APPENDIX A. LOGICAL CONNECTIONS

Sapphire elements and their logical connections are in the picture below:



- **Eye** – a WLAN probe with both WLAN interface (WLAN client and analysis functions) and Ethernet interface (management functions).
- **Sonar** – Server software emulating various business services for testing purposes. Deployment method is two-fold as follows: 7signal Solution: the application is running in hosts chosen by the customer. 7signal Site Miner: a dedicated mini-laptop is running the application.
- **Carat** – centralized management software, a stand-alone application. Deployment method is two-fold as follows: 7signal Solution: the application running in a host chosen by the customer. 7signal Site Miner: a dedicated normal laptop running the application.
- **Analyzer** – A web-application for measurement visualization that is deployed in conjunction of the Carat server software.
- **Internet browsers** – Thin-clients for Analyzer server. Not provided by 7signal.

Eye – Sonar connection



Conn ID	Description	Data content	Listening port(s)	Remarks
1	Test management and typical test connection	Test control message and pseudo-data	TCP/80 Configurable during Sonar deployment	Traffic is properly encapsulated HTTP. Uses Eye WLAN interface.
2	MOS test, uplink direction	MOS test specific data	udp/50000 – 50009 Configurable during Sonar installer	Optional. Uses Eye WLAN interface. The number of port varies between 0 and 20. The port numbers are consecutive. By default 10 ports are opened.
3	MOS test, downlink direction	MOS test specific data	udp/9999 Configurable during Eye deployment	Optional. Uses Eye WLAN interface.

Main purpose: Eye connects through WLAN interface to the remote server that simulates or emulates business applications.

Important notice: The Sonar servers may be numerous and the network topology between Eye and Sonar may vary radically and could contain numerous firewalls. 7signal has no control over the network topology and cannot influence arbitrary devices and network elements between the endpoints. To ensure fluent deployment, the user/configurator has to have thorough understanding of the network between the endpoints and possibility to affect all the elements necessary.

To test and use the wireless connection the following variables must be known:

- ESSID – test parameter to connect to a particular wireless network.
- WLAN encryption

Network keys – pre-shared keys, certificates or similar - are stored in Eye file system by Carat application.

To be observerd: the target wireless network may be configured to have MAC address preventions so the MAC address of WLAN interface of the Eye unit must be white-listed as a network client. Eye does not act as an access point of the wireless network.

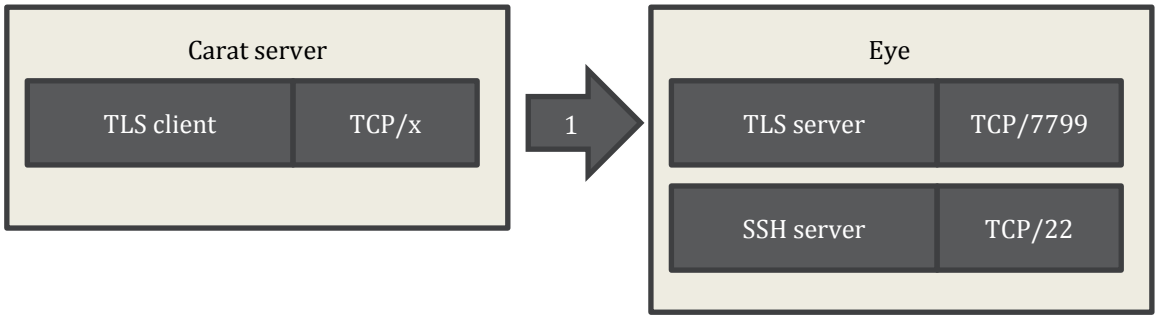
MOS test connections

MOS test is a license-controlled feature and not used in every environment. MOS test requires additional ports to be used. MOS traffic is special-purpose traffic with identical fingerprint than any VoWLAN call would have.

Sonar may serve numerous Eyes concurrently and therefore it is able to listen numerous UDP ports for incoming VoIP calls. Ports are listened in per-need basis. One UDP port may serve one Eye at a time so the number of concurrent MOS tests in single Sonar is dictated by the number of available ports that is configured during Sonar deployment phase.

Eye has one open UDP port for VoIP calls as it communicates with single Sonar only at a time.

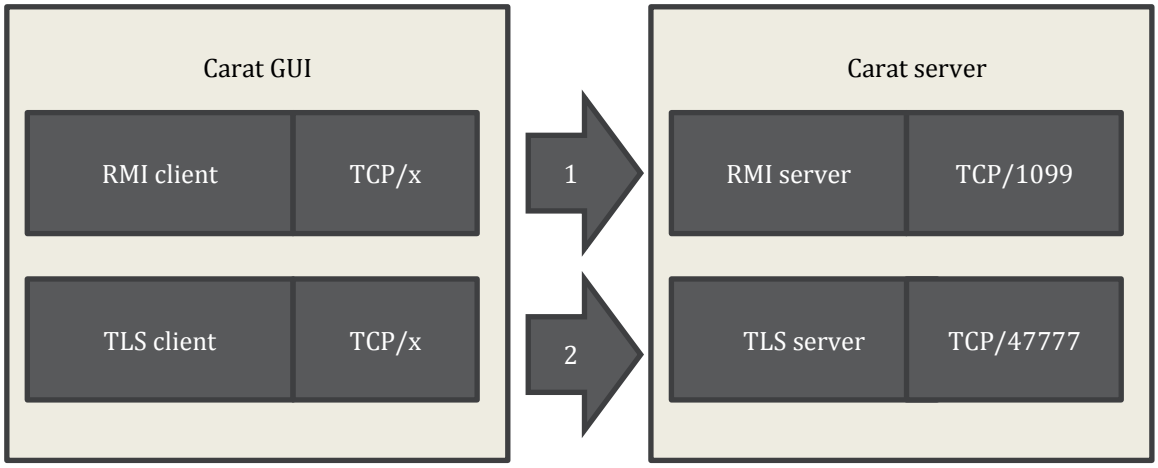
Eye – Carat connection



Conn ID	Description	Data content	Listening port(s)	Remarks
1	Eye server	TLS encrypted binary protocol for management and testing.	TCP/7799 Configurable in Eye deployment	Uses Eye ethernet interface.

In this case the Eye acts as a server and Carat software is a client. Carat does not make any SSH connections, SSH is optional connection for operators.

Carat server – Carat GUI connection

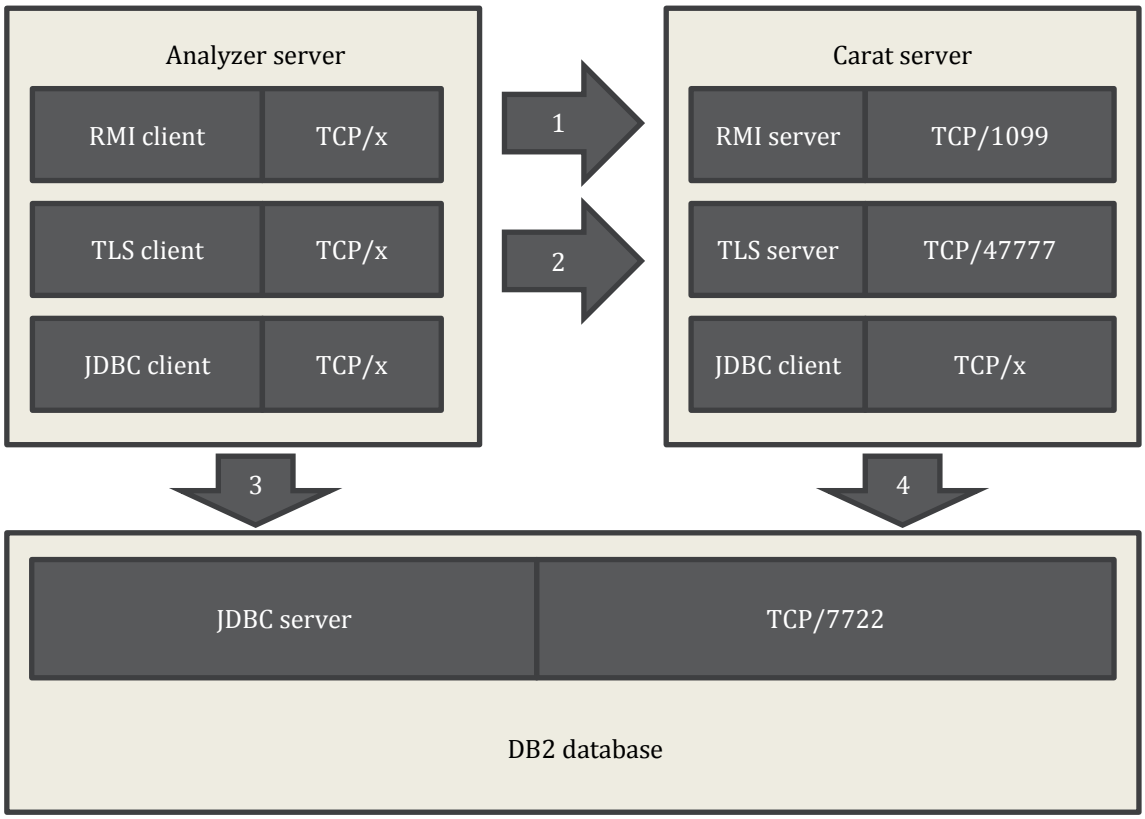


Conn ID	Description	Data content	Listening port(s)	Remarks
1	RMI service	RMI service protocol	TCP/1099 Typically not changed.	Discovery service for conn #2.
2	TLS encrypted connection from GUI to a Carat server	RMI calls	TCP/47777 Configurable in Carat GUI deployment	

The Carat graphical user-interface is a stand-alone Java SE application that is a client to Carat server. It is for managerial actions and interactive WLAN network testing for operators.

Internal connections in Carat server

Note: as the following connections occur inside one host machine only, this part may be skipped regarding the firewall settings and other networking.

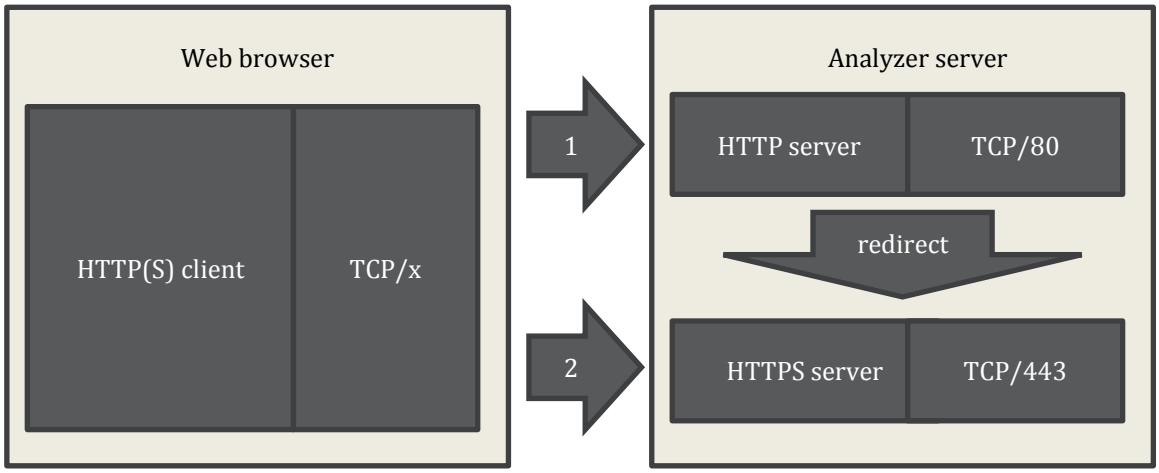


Conn ID	Description	Data content	Listening port(s)	Remarks
1	RMI service.	RMI service protocol	TCP/1099 Typically not changed.	Discovery service for conn #2.
2	Analyzer web-app connecting as a client to a Carat server.	RMI calls	TCP/47777 Configurable during Carat GUI deployment	
3	IBM DB2 database service for Analyzer.	JDBC traffic.	TCP/7722 Configurable during DBMS deployment	
4	IBM DB2 database service for Carat.	JDBC traffic.	TCP/7722 Configurable during DBMS deployment	

Analyzer is a web-application that visualizes the measurements and it has a dual-role in the sense of connectivity: Analyzer acts as a client to both the Carat server and DB2 and as a server to the browser clients. Currently, Carat, Analyzer and IBM DB2 applications are inseparable as they run in the same host in all supported setups. The connection between Carat GUI and DB2 is secured by medium-level encryption implemented by IBM.

7signal installers contain the installation medium for DB2 and the setup of DB2 is automated by 7signal DBMS installer. It is possible to change the defaults during installation time.

Analyzer – internet browser connection



Conn ID	Description	Data content	Listening port(s)	Remarks
1	Standard HTTP connection.	Standard HTTP traffic for creating a HTTPS connection.	TCP/80 Configurable during Analyzer deployment.	Redirects to HTTPS port of Analyzer.
2	Standard HTTPS connection for measurement requests and responses.	Secure HTTP. Report and chart requests and responses.	TCP/443 Configurable during Analyzer deployment.	Business connection for Analyzer.

APPENDIX B. BANDWIDTH REQUIREMENTS

NOTE: the volume estimates are estimates and vary based on the configuration.

14.1.1 Eye – Sonar

From	To	Medium	Traffic motivator	Volume estimate	Major factor
Eye	Sonar	WLAN	Automated test engine and interactive testing by users.	Low, each request is a few hundred bytes. Eye acts as one WLAN end-user would do, one operation per minute.	The test profile that the Eye is running. In case of MOS test VoFi traffic is transmitted as long as requested in the test parameters, constant traffic at the rate of 100 kBs/s.
Sonar	Eye	WLAN	Responses to client.	Typically pseudo-data that varies based on the test parameters.	MOS test most probably contain significant amount of data.

For example, the FTP download test transfers by default 2 megabytes of data that does not take long. The amount of data is exceptionally high for data transfer in a logistics environment but on the other hand in office environment transfer of this size is relatively low. The test parameter should be adjusted, either to simulate typical transfer or to save the bandwidth while keeping the transfer size high enough to give measurements out of the network.

14.1.2 Eye – Carat

From	To	Medium	Traffic motivator	Volume estimate	Major factor
Carat	Eye	Ethernet	Automated test engine and interactive testing by users.	1 kB/minute. The binary protocol for requests is volume-efficient.	The chosen test profile and individual test parameters dictate whether the Eye keeps testing a long time or is there frequent test management traffic. Duration of one test varies from a few seconds to almost minutes per request depending on the test type.
Eye	Carat	Ethernet	Responses to client.	100 kB /minute.	Spectrum Analysis and MOS test most probably contain significant amount of data.

The data transferred in only test parameters and in most cases results of analysis, sometimes raw measurements.

Naturally the number of Eyes is directionally proportional the traffic load as each Eye connection are independent and concurrent. One single Eye typically executes a test in one minute in the average. However, there are tests that finish in 10 seconds (practical minimum) and few tests run few minutes.

The communication protocol is both minimal and binary so the traffic from Carat to Eye is very economic. The measurement result minimum is around 100 bytes in one message and the top range is the spectrum measurement (not available in all configurations) that returns approximately 300 times a 50 byte result unit.

In data communications sense the traffic for single Eye is minimal.

Test type and test distribution depend on the test profile used in the Carat server. The test profile content and test parameters (incl. test duration and size of file transfers) are freely modifiable by Carat system administrator.

14.1.3 Carat server – Carat GUI

From	To	Medium	Traffic motivator	Volume estimate	Major factor
Carat	GUI	Ethernet	User	Very low.	User activity, expected low.
GUI	Carat	Ethernet	Responses to client.	300 kB/minute	Spectrum Analysis and MOS test results may contain significant amount of data.

There is no continuous interaction, all activities are initiated by the user. The amount of traffic depends completely on user-decisions. Typically the traffic is binary communication.

In 7signal Solution the IP cloud between the client and the server may be complex and contain VPNs, wireless links etc. that affect the communications.

14.1.4 Analyzer server – Analyzer client (browser)

From	To	Medium	Traffic motivator	Volume estimate	Major factor
Analyzer host	Clients in WWW	Ethernet, general networking	User actions	Volatile. Like one HTTP client.	User activity. Per any request the amount of requested KPIs is the driving factor.

There is no continuous machine-to-machine interaction, all activities are initiated by the user. The amount of traffic depends completely on user-decisions. Server output typically contains graphics. Medium duty cycle.

14.1.5 DB2 and Analyzer server, DB2 and Carat server

In current implementation all three processes are running in the same host so there is no network burden whatsoever outside the host.

From	To	Medium	Traffic motivator	Volume estimate	Major factor
localhost	localhost	IP stack	Interoperable server processes.	N/A	The amount of Eyes in the network. Data is transferred in the core memory of the host.