Appendix F

User Manual

CellView™

System Engineering Manual

MIPAC

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Preface

Who Should Read this Guide

This guide is aimed at system engineers and administrators responsible for the installation and maintenance of a CellView environment. It provides a technical overview of the CellView architecture, as well as detailed installation and usage instructions.

Before Beginning

This guide assumes that the reader has experience in using:

- Microsoft Windows
- Microsoft Windows servers

It is also assumed that the reader has a working knowledge of:

- SQL database
- OPC

How this Guide is Structured

- *Chapter 1, Introduction to CellView*
- *Chapter 2, Mesh Network Planning*
- *Chapter 3, System Software Installation*
- *Chapter 4, Mesh Router Configuration*
- *Chapter 5, PDA Configuration*
- *Chapter 6, OPC Server Configuration*
- *Chapter 7, CellView Setup Application*
- *Chapter 8, Commissioning*
- *Chapter 9, Cell Monitor Installation*
- *Chapter 10, Mesh Router Installation*
- *Chapter 11, Specifications and Declarations*
- *Chapter 12, Server Hardware Requirements*

Conventions Used in this Guide

The following conventions are used in this guide:

File ⇨ Exit	Indicates that the File menu should be opened and the Exit option selected.
Ctrl+F4	In procedures, a key sequence indicates that the Ctrl key must be held down while another key is pressed. In this example, the Ctrl key must be held down while the function key F4 is pressed.

Use of a mouse in CellView GUI applications is identical to that in other Microsoft Windows applications. The following terminology is used in this guide to describe the mouse functions:

Select	Highlight one or more characters to perform an operation on those characters.
Click	Point to an object, then press and release the left mouse button.
Double-click	Point to an object, then press and release the left mouse button twice in quick succession.
Drag	Point to an object, hold down the left mouse button, reposition the mouse, and release the mouse button.

The terms select, click, double-click, and drag refer to the mouse cursor and the left-hand button on the mouse.

Definition of terms used in this guide

The following conventions are used in this guide:

Cell Monitor	The CellView voltage sensing element
Mesh Router	The CellView networking and routing device for the Cell Monitor. The access point radio (AP Radio) is a separate device to the Mesh Router but in this manual the devices may be referred to as a single device for ease of understanding.
OPC tags	Tag definitions in CellView's **O**LE for **P**rocess **C**ontrol compliant communications server. *These tags are the single point of communication between the CellView Cell Monitors and either a separate control system or a Human Machine Interface (HMI)*
CellView Channel	These are the channels which the Cell Monitors use for communication with the Mesh Router
IEEE 802.11	A set of standards defining wireless local area network (WLAN) computer communication in the 2.4, 3.6 and 5 GHz frequency bands
IP Address	Internet Protocol address, the address using the following form AAA.BBB.CCC.DDD where each letter represents a number. This is an address used by Ethernet network routing equipment to determine where IP packets need to go
IP Subnet	An IP Subnet is a reference to set of addresses which are accessible to devices without requiring routing. For example if a subnet is 192.168.1.0 and the subnet mask is 255.255.255.0 any device which has an address between 192.168.1.1 and 192.168.1.254 will be able to communicate with any other device which has an address between 192,168.1.1 to 192.168.1.254 . However it will not be able to communicate with a device on the 192.168.2.0 network unless a router is present.
IP Subnet mask	The IP Subnet mask is a number which represent what subnet ranges are available to an IP networking device without contacting a router. For example a 192.168.1.1 device with a subnet mask of 255.255.255.0 will be able to contact any device with an IP of 192.168.1.1 to 192.168.1.254 (254 possible addresses). However if the subnet mask was 255.255.0.0 then the device could contact any device from 192.168.1.1 to 192.168.254.254 (~64000 devices). *For further information refer to a more detailed reference*

Chapter 1

Introduction to CellView

The CellView® system provides a method of monitoring the operating conditions in the electrolytic cells used for metal electro-refining and electro-winning. The system consists of a wireless, battery-powered Cell Monitor connected to each individual electrolytic cell. The Cell Monitor communicates with one or more Mesh Routers which route the Cell Monitor messages to the server and provide the wireless data network. If communication between a Mesh Router and Cell Monitor is interrupted after some time the Cell Monitor will attempt to communicate with another Mesh Router. The Mesh Routers form a fault tolerant network which will automatically heal / organise and re-route communications if Mesh Router failures occur or communication pathways are interrupted. The Mesh Routers communicate with a central Server via Ethernet. The Server has an OPC interface to communicate with the end users control system.

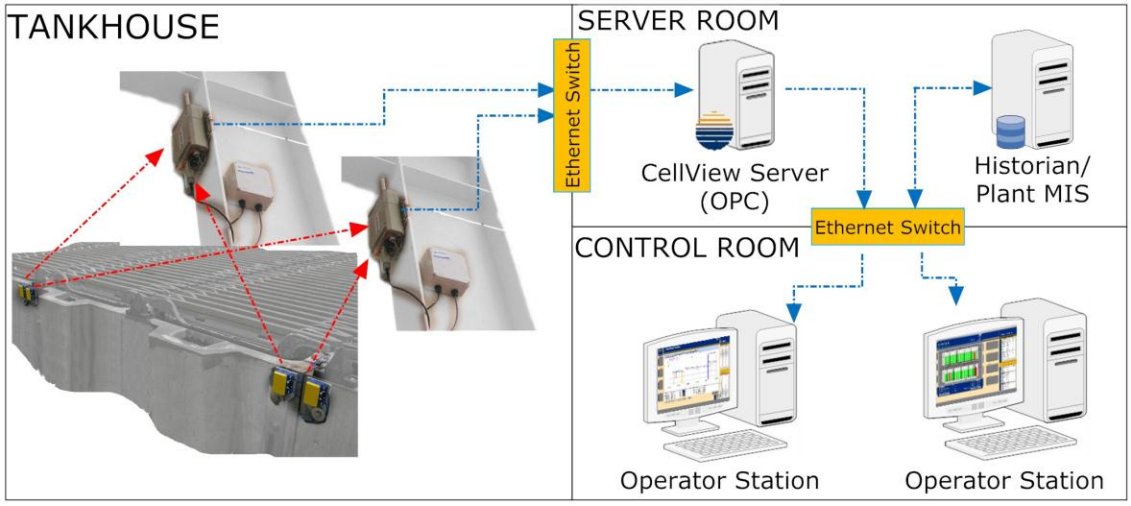


Figure 1 Typical CellView System

This manual contains instructions for all stages of engineering and implementation. Generally the end user engineer will use only those portions dealing with using and maintaining the system – Chapters 5, 6, 7 and 8.

Chapter 2

Network Planning

Introduction

The CellView wireless cell voltage monitoring system requires planning before the CellView server, Mesh Routers and Cell Monitors can be configured correctly to communicate with each other. This chapter covers the planning of the network and the following chapters cover the setup and configuration of the Mesh Routers and CellView server.

This manual assumes that the quantities of the following components are already known:

- Number of Cell Monitors
- Number of Mesh Routers

If these are not known a simple guideline is that the network ratio is roughly

- One Mesh Router to 50 Cell Monitors

This number can be higher however it is based on the scan rates of the Cell Monitors.

So in a typical 1000 cell refinery you would need at least 20 Mesh Routers.

Minimum network planning requirements to get the routers and server configured:

- Ethernet addresses for the Mesh Routers
- Mesh Router OPC tags

These items are the minimum requirements for router and server configuration. Further setup will be required using either the provisioning interface “CellView Setup” or the CellView OPC interface before the Cell Monitors may be powered on.

Network Setup

A typical CellView Ethernet network topology is depicted in Figure 2. Before addresses may be finalised the following questions should be considered;

- What Site network IP Address is required for the CellView server
- Which Mesh Routers will be physically connected to the CellView server
- Which Mesh Routers will be completely wireless
- What IP Subnet will the Ethernet Mesh Routers operate on
- What IP Subnet will the Wireless Mesh Routers operate on
- What IP Subnet will be used for clients connected to the Wireless Mesh Routers
- What other devices will use the CellView wireless or Ethernet network and what are their particular network requirements

As there are many possible options it is recommended that sequential IP Subnet numbering is used. For example;

192.168.1.0 for Ethernet Mesh Routers - *(where in* Figure 2*) 1 corresponds to A)*

192.168.2.0 for Wireless Mesh Routers - *(where in* Figure 2*) 2 corresponds to B)*

192.168.3.0 for Wireless Mesh Router clients - *(where in* Figure 2*) 3 corresponds to C)*

Site requirements may preclude this method. For example, on a site network where the 192.168.2.0 subnet was visible and accessible by the CellView server from the Site network port the CellView server would not be able to communicate with the Wireless Mesh Routers. The choice of subnets can not conflict with any existing site subnet, if the 192.168.3.0 subnet is used onsite you can not use that particular subnet for the CellView network.

To avoid subnet conflicts:

Ensure all subnets used on the CellView network do not exist on the site network *(to which the CellView server is connected)*

Default network setup

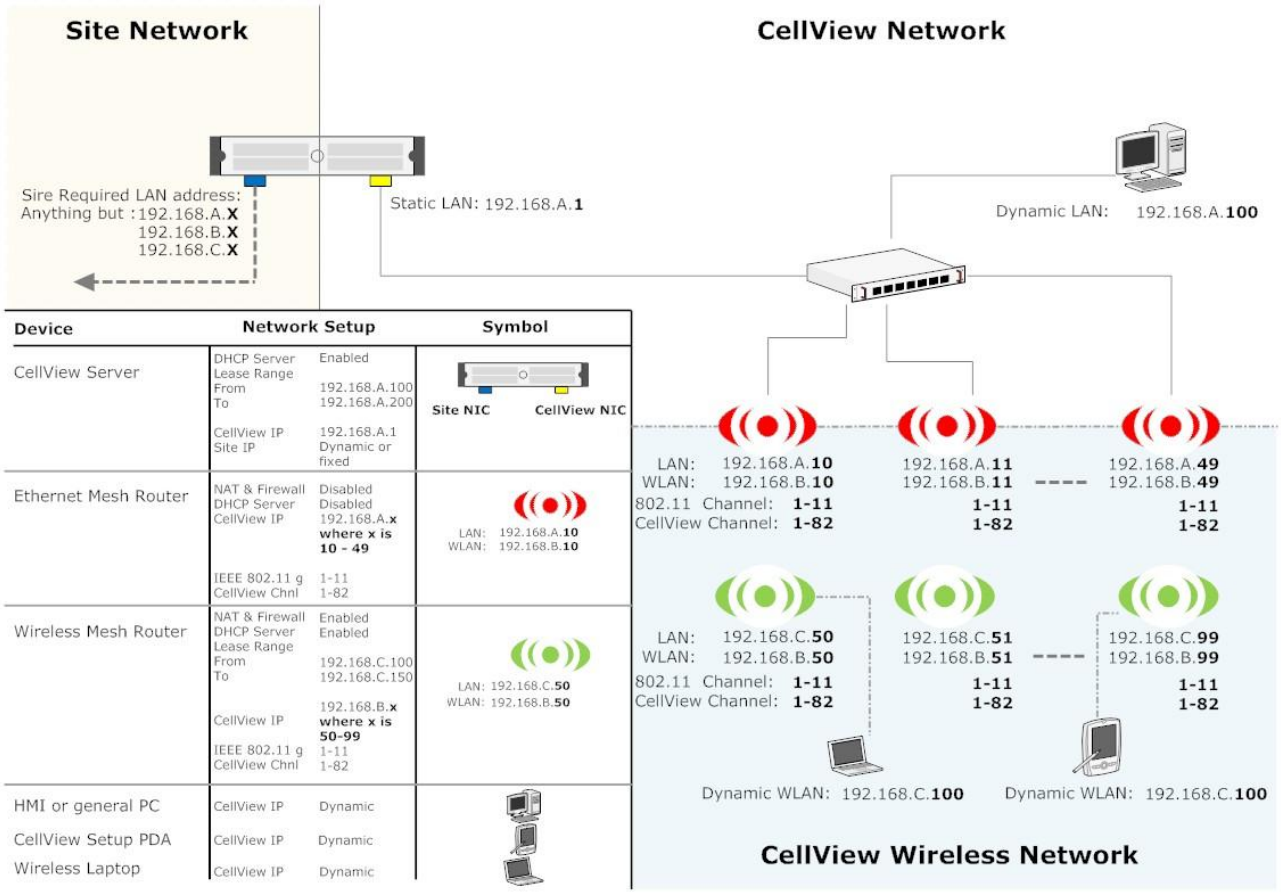


Figure 2 CellView Network

Figure 2 shows the default CellView network layout where A,B and C are the user selected subnets. Notice that Mesh Router IP addresses begin at **10** for Ethernet Mesh Routers and **50** for wireless Mesh Routers.

This reasons for this are:

- To enable some fixed IP addresses to be available on the Ethernet network
- To ensure that the maintenance engineer can quickly determine whether a fault has occurred with a wireless or Ethernet Mesh Router

Notes:

- Traffic on the site network will not be able to contact the CellView network.
- At least two Ethernet connected Mesh Routers must be used if a redundant communication pathway is to be provided for the CellView network.
- The Mesh Router uses the WIFI 802.11 standard for communication only with other Mesh Routers. It is connected to an Access Point radio (serial connection) which communicates with the Cell Monitors using a one MHz wide GFSK modulated signal. This channel is the 'CelView Channel'

Example Network Setup

Consider a small system consisting of four Mesh Routers and 60 sensors connected to a site network. The required site network IP address for the CellView server is as follows:

Site Network Card:

Site IP 192.168.45.16

Subnet 255.255.255.0

Default Gateway 192.168.45.254

There are no existing site subnets for 192.68.1.0, 192.168.2.0 and 192.168.3.0 networks.

The CellView network can therefore be setup as follows:

- Server Configuration:
    - Site Network Configuration
        - Site network IP 192.168.45.16
        - Subnet 255.255.255.0
        - Deafult Gateway 192.168.45.254
    - CellView Network Configuration
        - CellView network IP 192.168.1.1
        - Subnet 255.255.255.0
        - Deafult Gateway (Assigned by software)
- Ethernet Mesh Router configuration.
    - Ethernet Mesh Router 1
        - LAN IP : 192.168.1.10
        - WLAN IP: 192.168.2.10
    - Ethernet Mesh Router 2
        - LAN IP : 192.168.1.11
        - WLAN IP: 192.168.2.11

- Wireless Mesh Router configuration

  Note - Wireless Mesh Routers must have DHCP server components enabled

  - Wireless Mesh Router 3
    - LAN IP : 192.168.3.50
    - WLAN IP: 192.168.2.50
  - Wireless Mesh Router 4
    - LAN IP : 192.168.3.51
    - WLAN IP: 192.168.2.51

- The PDA has a dynamically allocated IP address.

After determining these settings a network diagram as shown in Figure 2 should be produced following which the setup and configuration of both Server and Mesh Routers may be completed.

Network Cautions

Do not encourage the use of the CellView wireless network to carry data unnecessarily unless it is carefully planned.

If the CellView wireless network does support additional devices it has an associated risk of adversely affecting the Cell Monitor communication.

Only select non standard IP addressing schemes if competent.

Planning the Mesh Router Wireless channels

The Wireless and Wired Mesh Routers communicate with each other using the IEEE 802.11 g wireless standard. The Mesh Routers make use of high power antennas and as a result if they overlap existing site wireless networks they may impact on the site wireless network performance. It is therefore important to avoid overlapping the Mesh Router wireless channels with site wireless channels. The table below indicates what channels are available given that some network channels are already used. The Tables below are not related to the CellView Channel for sensor communication and only relate to the Mesh Router 802.11b/g communication.

Channel Used	Channel Option 1	Channel Option 2
1	6	11
2	7	12*
3	8	13*
4	9	
5	10	
6	1	11
7	2	12*
8	3	13*
9	4	
10	5	
11	6	1

Table 1 IEEE 802.11 b and g Channel Options

Channel Number	Lower Frequency MHz	Centre Frequency MHz	Upper Frequency MHz
1	2401	2412	2423
2	2406	2417	2428
3	2411	2422	2433
4	2416	2427	2438
5	2421	2432	2443
6	2426	2437	2448
7	2431	2442	2453
8	2436	2447	2458
9	2441	2452	2463
10	2446	2457	2468
11	2451	2462	2473
*12	2456	2.467	2478
*13	2461	2.472	2483

Table 2 – IEEE 802.11 b and g bandwidth usage

**These channels are not available in North America (governed by FCC)*

Selecting the best channel for the Mesh Routers is by reference to **Table 1**. For example if channel 1 is used within the refinery, channel 6 or channel 11 should be used. Where more than one channel is used select a channel with the most separation from the used channels or close to a used channel having a weak signal strength. For example if channels 1 and 8 are used and channel 8 has a very weak signal, use channel 11.

The Mesh Routers also have the ability to detect other wireless networks. During installation it is important to check that other undocumented networks do not exist. To check for other visible access points open the mesh router web interface and then select the **wireless** tab and confirm that no undocumented networks exist.

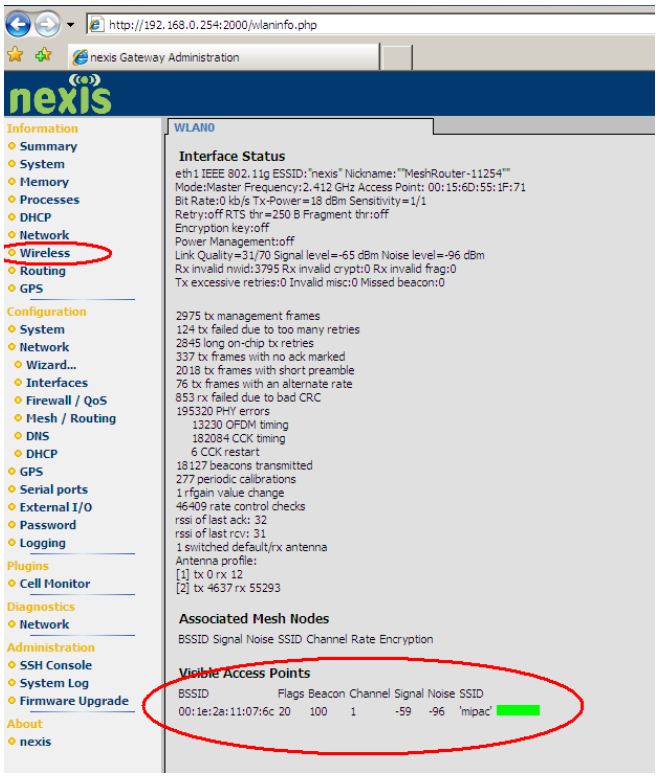


Figure 3 Detecting Wireless Networks

Planning CellView Channels

CellView channels are the communication channels that the Cell Monitors use to communicate to the Mesh Routers and in turn, the Mesh Routers to the Server. The Cell Monitors communicate wirelessly using GFSK modulation and the bandwidth of each channel is ~1 MHz.

As the system operates in the international 2.4GHz band the Cell Monitors can operate on any channel in the 2.401GHz to 2.482GHz range. Because the channel bandwidth is 1 MHz this leaves 82 available channels. In CellView terminology channel one corresponds to 2.401GHz and channel 82 corresponds with 2.482GHz.

Planning the CellView Channel(s)

It is very important to select appropriate channels for the CellView Cell Monitor network to operate on (CellView Channels). The selection of the CellView channel(s) requires a brief understanding of the 2.4GHz wireless spectrum and how different devices can adversely affect the available bandwidth. It also requires the use of a 2.4GHz spectrum analyser so that channels with the least noise are selected. The CellView channels are in the same spectrum as the Mesh Router 802.11 b/g communication so ensuring that the Mesh Routers do not overlap the CellView Channels is also important (see Mesh Router network planning above). The discussion below relates only to planning CellView Channels not 802.11b/g channels for Mes Router communication.

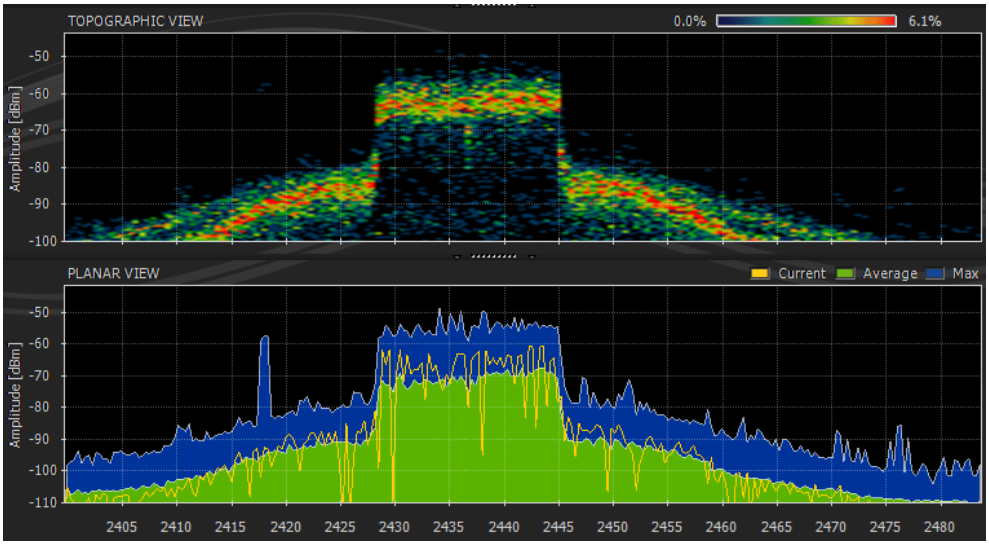


Figure 4 IEEE 802.11 g transmission on channel 6

Figure 4 shows an IEEE 802.11 g transmission on channel 6. Signal power is indicated on the Y axis (left hand side) and frequency indicated on the X axis (bottom). The image demonstrates that a considerable amount of the 2.401GHz to 2.483GHz spectrum is consumed by one single IEEE 802.11 network.

Note: *To take a similar survey a wireless spectrum analyser (eg: Wi-Spy) may be purchased online which will provide enough information to plan the CellView channels.*

IEEE 802.11 (b or g) wireless networks are the most common consumer of 2.4GHz bandwidth. For a general guide consider that all IEEE networks use 22MHz of bandwidth, therefore for IEEE 802 channels:

Comparing the plot in **Figure 4** to the data in Table 2 it can be assumed a wireless network is present in the refinery on channel 6 and that CellView channels 26 – 48 are not usable. While it is possible to use CellView channels immediately around the wireless network (25 and 49 in this example) it is not advisable. It is better to leave as many spare channels between the CellView network and the wireless network as possible so that optimum signal qualities can be achieved.

If **Figure 4** was the radio noise plot in a refinery the best channels to use would be above channel 65 or below channel 15.

When planning the CellView channels its also important not to forget that the Mesh Router network also uses part of the 2.4GHz spectrum. For example if the Mesh Router network used IEEE 802.11 g channel 6 then CellView channels 25 through 49 would not be recommended for use.

Important points:

- Avoid using areas of the spectrum used by other wireless networks
- Avoid using areas of the spectrum with excessive radio noise
- Do not use the same part of the 2.4GHz spectrum which the Mesh Routers use for their IEEE 802.11 g network
- In a situation where all available channels are used it may be easier to determine the appropriate wireless channels by surveying the implementation area first. Once the area is surveyed select the CellView channels by locating areas on the spectrum plots with the least radio noise.
- Try to keep the CellView channels together in a small group < 22 channels wide (unless more than 22 channels are required) so that the CellView network is as spectrum efficient as possible.
- The CellView channels which are selected should be included in the network plan and the particular region which they use should always be free of wireless networks. While the Cell Monitors are tolerant of wireless traffic it is best to record their channels so that other networks are not inadvertently placed over the CellView network.
- It is also good practice (though not necessary) to set the CellView channels lower in the frequency range rather than higher. For example if channel 1 and channel 82 were available use channel 1. The reason for this is in the way that the sensors scan the network for Mesh Routers, if the Cell Monitors are on channel 82 it will take longer and consume more power than if they’re set to channel 1.

Design Example for the CellView Network

Example 1)

A site requires 1000 Cell Monitors and currently has a wireless network operating on IEEE 802.11 b channel 7. The wireless survey from onsite indicates that network on IEEE 802.11 b channel 7 creates a low level of radio noise.

Setup would therefore be:

- Set the Mesh Router IEEE 802.11 g network to channel 11
- 20 CellView channels required (1000/50) use the lower channels 1 to 20
- MIPAC would request that the site does not setup another wireless network on channel 1 or else they may interfere with the CellView network

Example 2)

A site required 2000 Cell Monitors and they operate a wireless network on Channel 11. From a spectrum plot from the site it appears that there is noise in the lower region 2.401 to 2.410 GHz but apart from this there is little noise generated by the network on channel 11:

- Set the Mesh Router network set to channel 11 (2.451GHz to 2.473GHz) – *Confirm that this is ok and the network on channel 11 is not adversely affected*
- 40 CellView Channels are required (2000/50) use channels 11 to 51
- If the site is in the European Union then use channel 13 for the Mesh Routers

For this particular installation because of the very tight margins used for the CellView network is would be very important to closely monitor the system before and after installation ensuring that no sensors achieve less that 70 % RF qualities.

Example 30

A site has networks which exist on IEEE 802.11 g channels 1, 6 and 11. Because of this a site survey was requested and the following radio plot was obtained. The site requires 1000 Cell Monitors.

- Set the Mesh Router IEEE 802.11 g network to channel 6
- 20 CellView Channels required (1000/50) use channels 1 to 20

Chapter 3

System Software Installation

Operating System Installation

Install Windows Server 2003 Service Pack 2 on the CellView server as per hardware vendor and Microsoft instructions.

DHCP Server Setup

IMPORTANT: This section provides instructions for DHCP setup for the CellView server assuming it is not part of a domain. If the CellView server is part of a domain please ensure that, once joined, the domain controller has allowed the CellView server to serve DHCP leases (*contact the necessary IT administrator*), if this is not enabled correctly the CellView server will not be able to serve DHCP leases.

Setup Network Interfaces

Disconnect the server from any networks until this setup is complete.

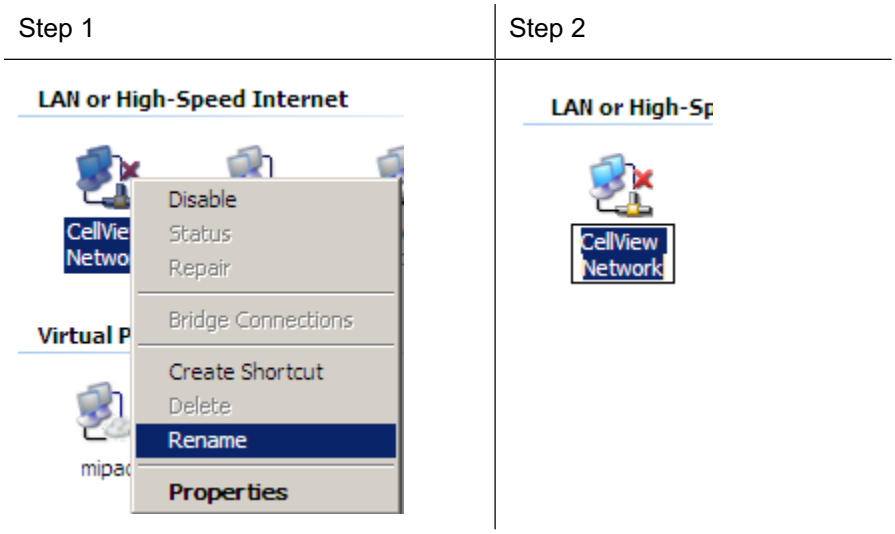
Ensure server has two distinct network cards that can operate independently.

Configure the network card which will connect to the CellView wireless network to have an IP which matches the CellView network IP address (i.e. 192.168.1.1)

Do not specify a default gateway for the CellView network card.

Set the name of the network card to ‘CellView Network’.

- Right click on the configured card in control panel ⇨ network connections and select rename and change the name to “CellView Network”. Ensure that the name matches this document exactly.

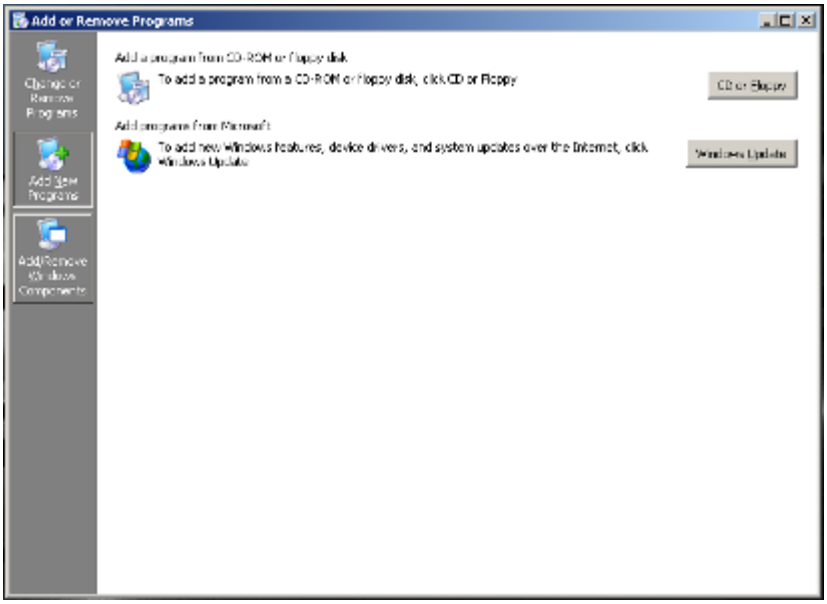


This will allow the CellView software to determine which network card is the CellView network.

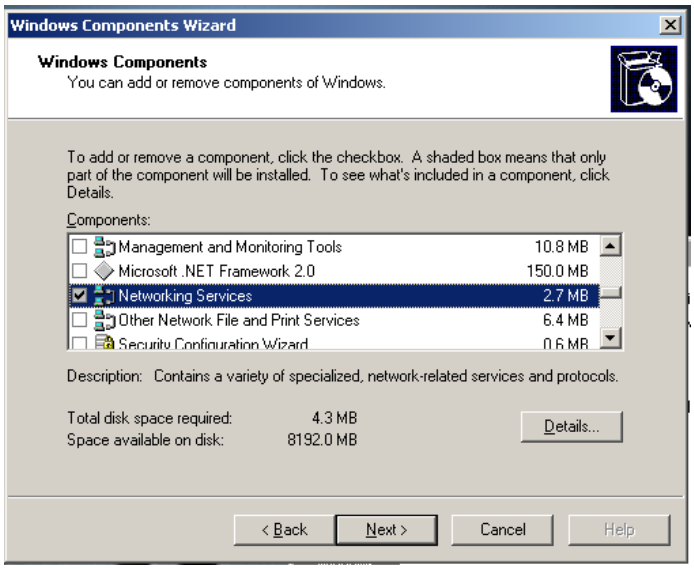
Do not set the second network card ‘Site Network Card’ to Obtain IP address automatically until the DHCP setup is complete. This is so the server is positively confirmed to be unbound from providing DHCP leases on that network interface.

Setup DHCP Service

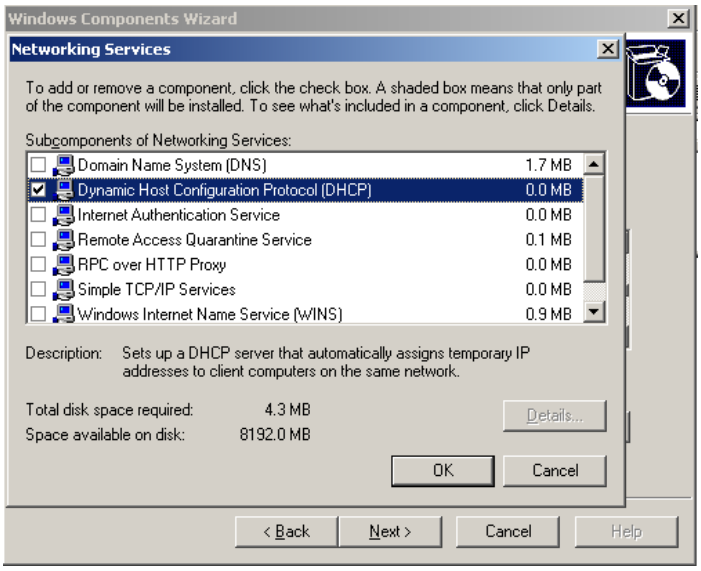
- Go to the windows add remove programs utility in the control panel
- Select Add/Remove Windows Components



- Double click the networking services item



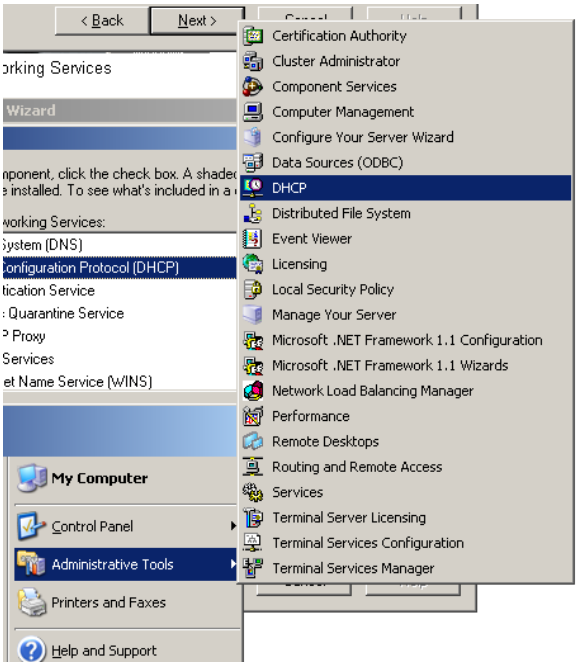
- Select the Dynamic Host Configuration Protocol (DHCP)



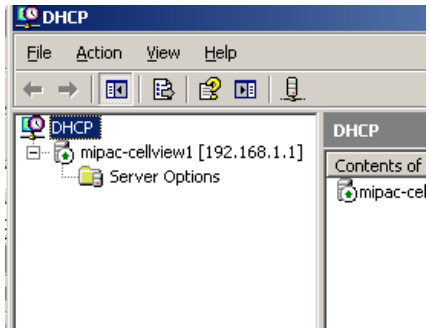
- Select OK
- Select Next and then complete the installation

DHCP is now installed

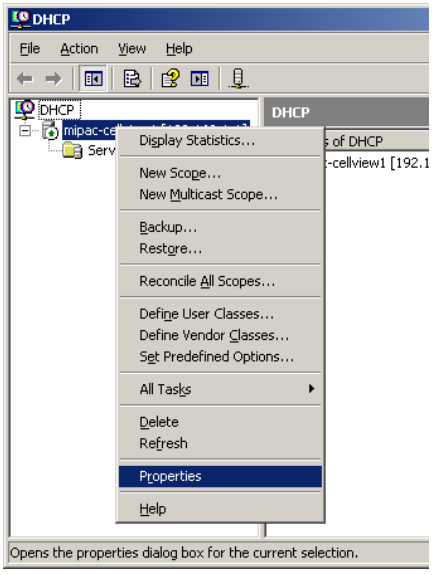
- Go to the DHCP server settings Start ⇨ Administrative Tools ⇨DHCP



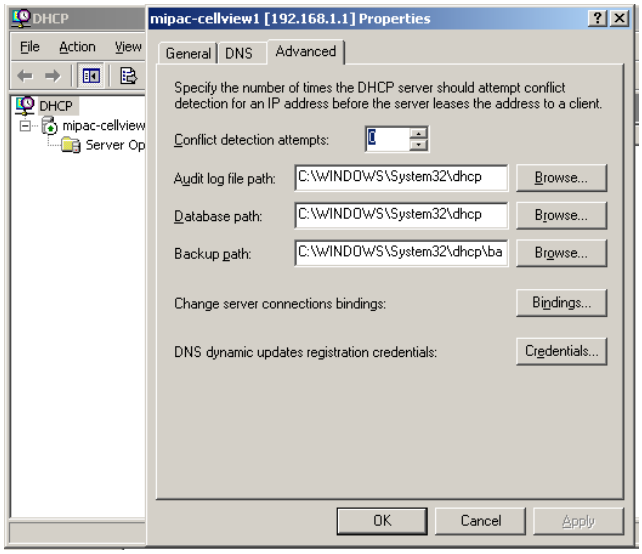
- Expand the CellView Server



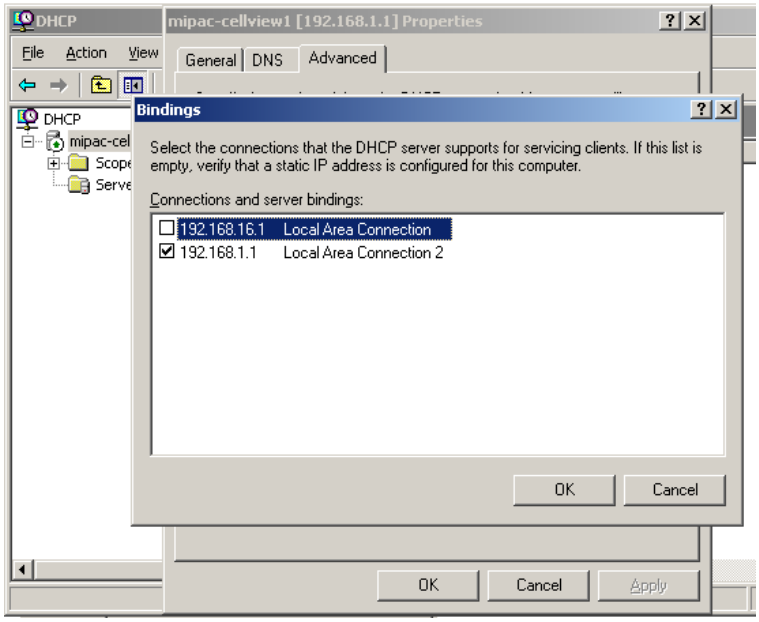
- Right click on the server once expanded and go to properties



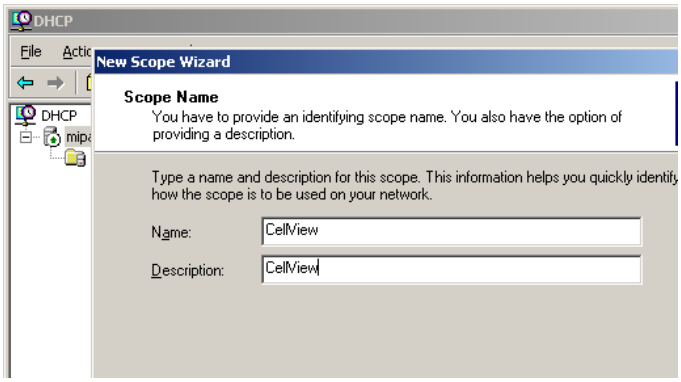
- Go to the advanced tab



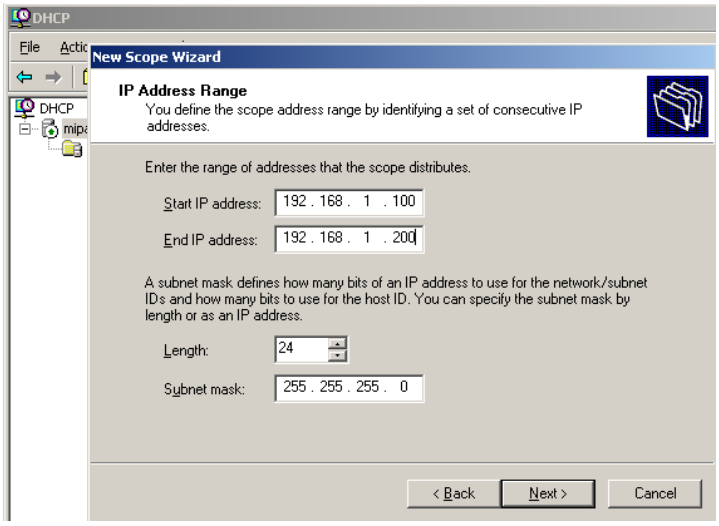
- Click on the 'Bindings' button.
- Bind only the CellView network interface



- Right click on the server and select 'New Scope'
- Select Next
- Set the Name and description to 'CellView'



- Select Next



- Set the range to 192.168.A.x

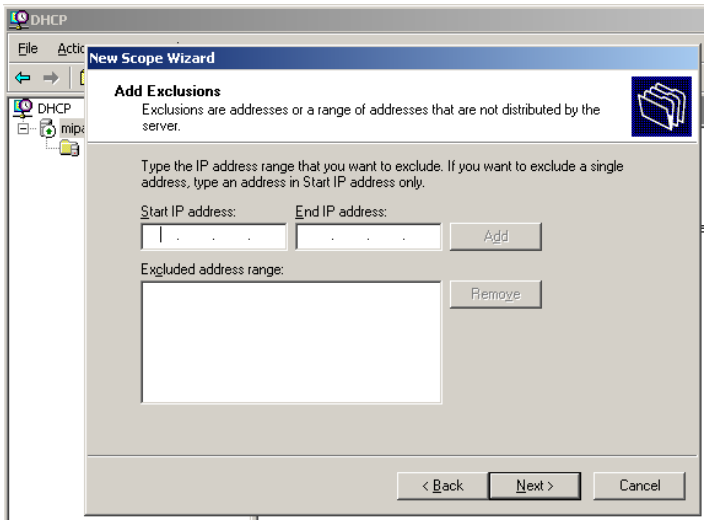
  Where A is your servers subnet by default it should be 1 i.e. 192.168.1.x or when a site has requested different IP ranges e.g. A = 16 would result in 192.168.16.x . *Refer to the network planning section and* Figure 2 *for details on the CellView network.*

  Where x is your client address pool, client addresses will start at 100 and end at 200 before they are either not allowed to connect or recycled.

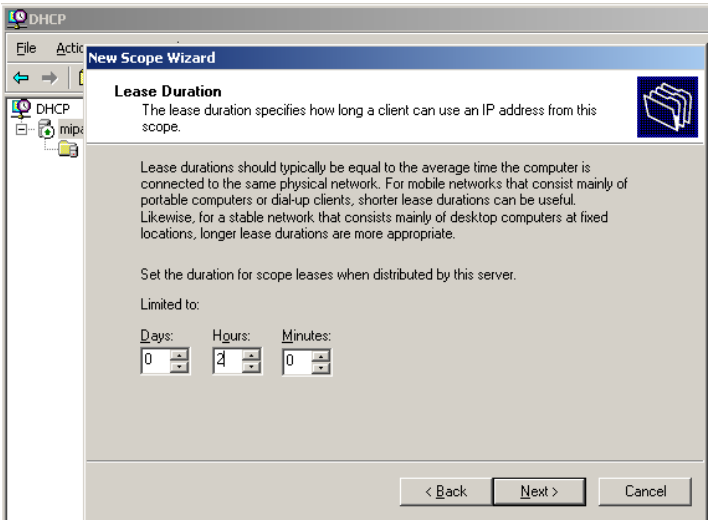
  Leave the subnet as shown unless specifically requested.

- Select Next

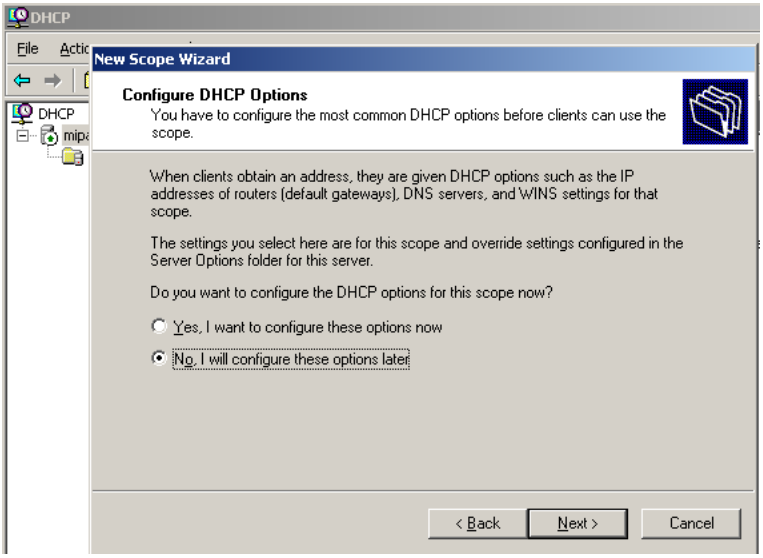
- There are no address exclusions



- Select Next
- Set the duration of the leases to two hours



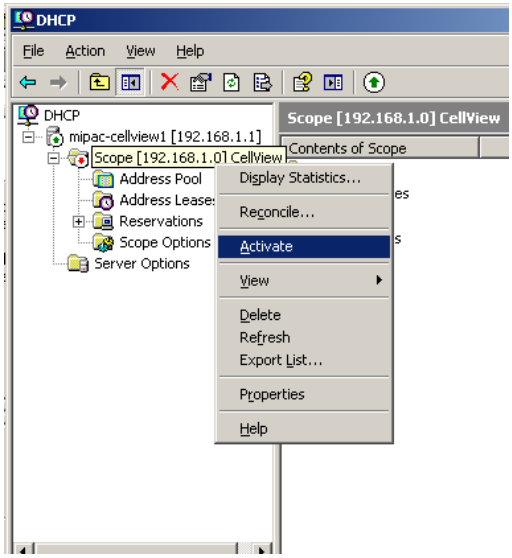
- Select Next



There are no routing requirements for CellView. *This may not be strictly true however this manual assumes that if this is not the case the person responsible is aware of any implications.*

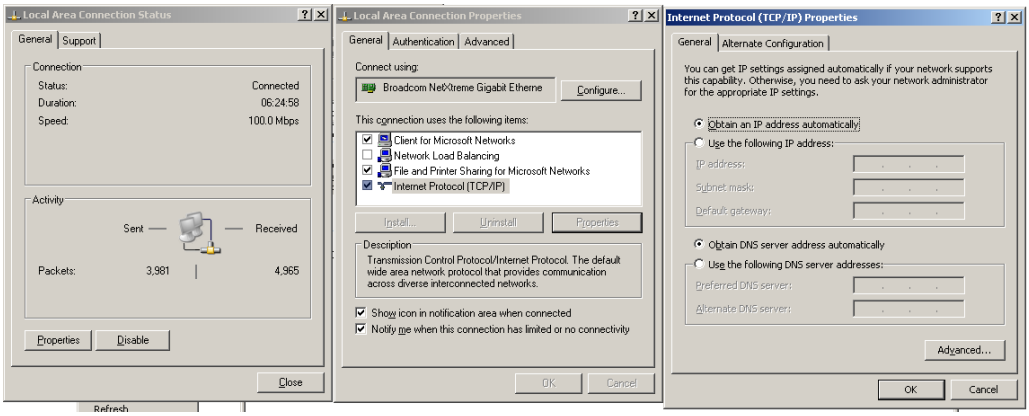
- Select Next
- Select Finish

- Highlight CellView under the DHCP tree ⇨ right click ⇨ select Activate



Now check the configuration to ensure the setup has been successful.

- Connect a switch to the CellView network point and to a laptop/pc. Ensure that the PC has DHCP turned on in its IP settings (see below) and that it receives a valid IP lease from the server



- Connect a switch to the Site Network port and to a laptop/PC. Ensure that you do not receive a lease.

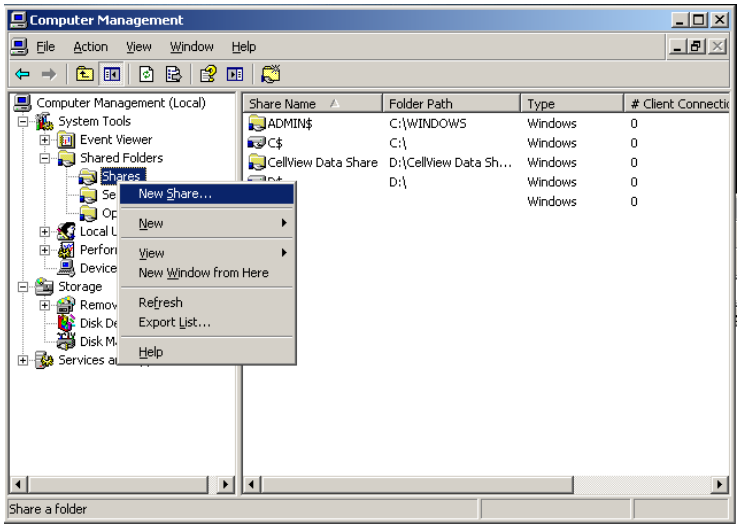
Finally to confirm that the Mesh Routers are working with the server set to DHCP

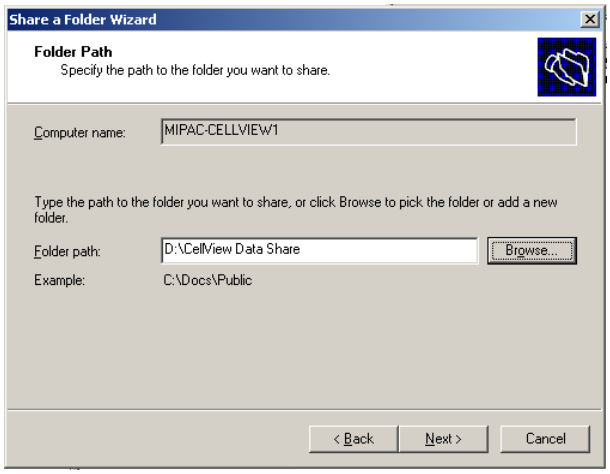
- Connect a switch to the CellView Network port and to a Mesh Router (which has been setup correctly, see the mesh router guide)
- Connect a Laptop/PC wirelessly to the Mesh Router's 'Nexis' network and ensure that the laptop/PC receives a DHCP lease.

Once you have confirmed all the above tests make sure the Site Network is set to the correct IP address or to DHCP (whatever is required).

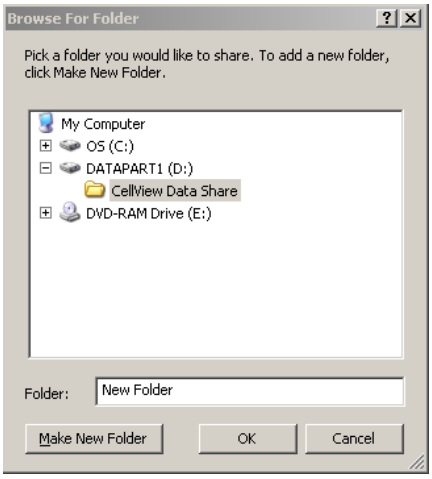
Create a Data Share on the CellView Server

- Go to Start ⇨ Control Panel ⇨ Computer Management
- Expand the 'Shared Folders'
- Right click on 'shared folders'
- Select 'new share'

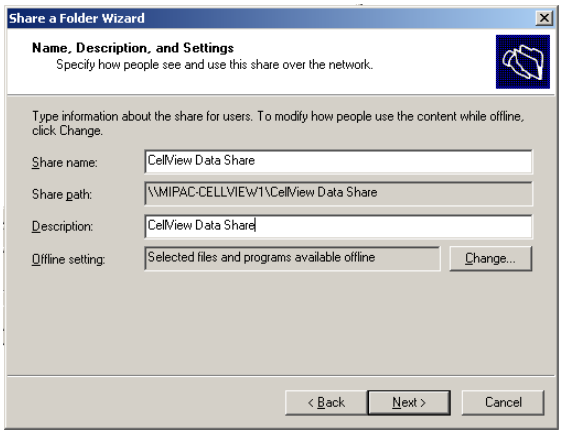




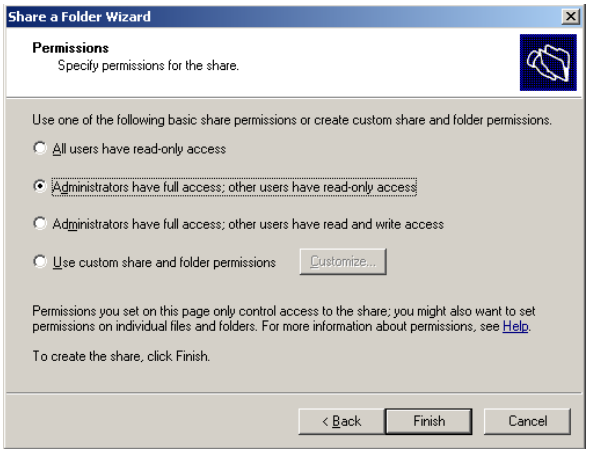
You may need to create a folder, make sure to put it on the secondary drive as the primary (C:) is for the Operating System.



- Once you have created or selected the folder select OK and then next
- Set the folder description to match the share name



- Setup the folder so that only administrators can modify files which are available

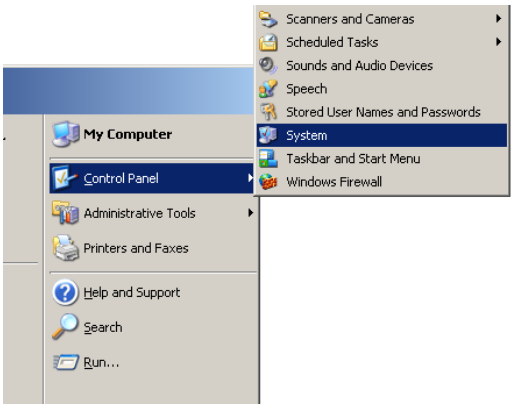


- Select Finish
- Select Close

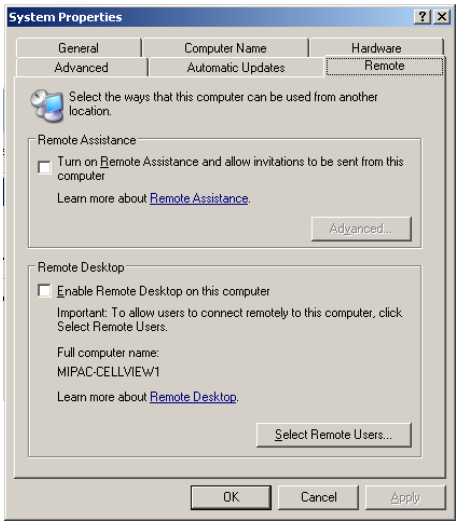
You should now have one share available to clients on the CellView network.

Enable Remote Desktop on CellView server (if necessary)

- Go to Start ⇨ Control Panel ⇨ System

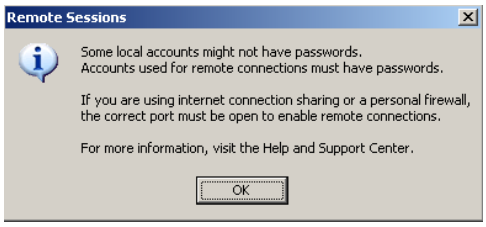


- Go to the remote tab



- Check the 'Enable Remote Desktop on this computer'

The following warning will display however the administrator user has been setup with a password and will be enabled for remote desktop sessions so this error can be ignored.



- Select OK ⇨ Apply ⇨ OK

Server Desktop Setup

Setup server background as follows:

- Right click on the desktop background
- Go to properties
- Select the desktop tab
- Browse to the CellView installation CD
- Select the Server Background R01.jpg file

Activesync Installation

Before installing the main CellView server application, install Microsoft Activesync 4.5 as follows:

- Insert the CellView installation CD
- Open the CD from its relevant drive and run the ‘ActiveSync45.msi’
- Accept the user license agreement
- Follow the prompts and complete the installation

Ensure that the Activesync icon appears in the task bar and it should be greyed out

Acrobat Reader Installation

Before installing the main CellView server applications it is recommended that Acrobat reader is installed so that any manuals or PDF documentation stored on the server can be accessed:

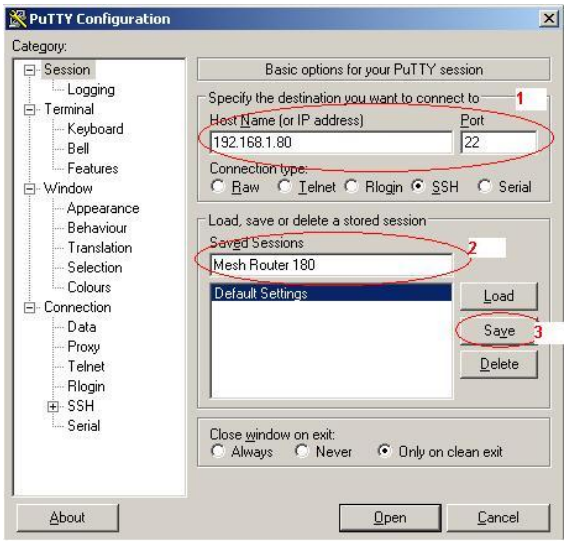
- Insert the CellView installation CD
- Open the CD from its relevant drive and run the ‘AdbeRdr70_enu_full.exe’
- Follow the installation prompts

Putty Installation and Setup

Note – network design must be completed prior to completing the following instructions

Before installing the main CellView server applications it is recommended that Putty.exe (SSH client) is installed so that in the unlikely event of abnormal system operation the Mesh Router serial communication with the Sensors and their communication with the CellView server can be interrogated.

- Insert the CellView installation CD
- Open the CD from its relevant drive and copy the Putty.exe file to the desktop.
- Run the putty application
- Individually type in the IP addresses for all Mesh Routers
- Match the name of the Mesh Router to the name used in the OPC Provisioning file
- Save the configuration



Complete these steps for each Mesh Router.

The SSH password to the Mesh Router is identical to the password used to access the web interface. The credentials are as follows:

User name: root

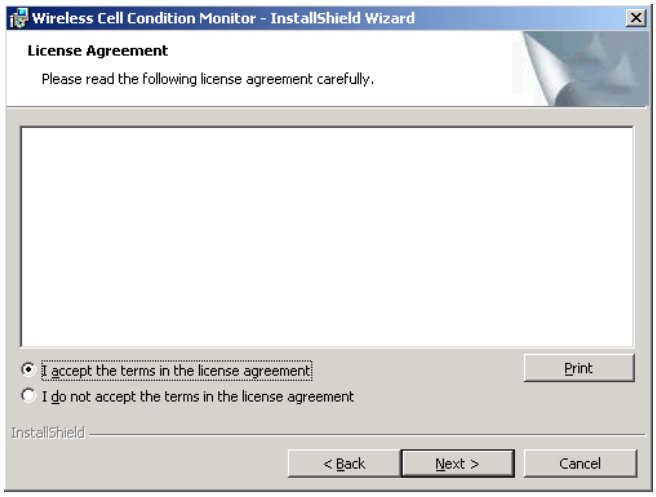
Password: neX1s!

OPC Server Installation

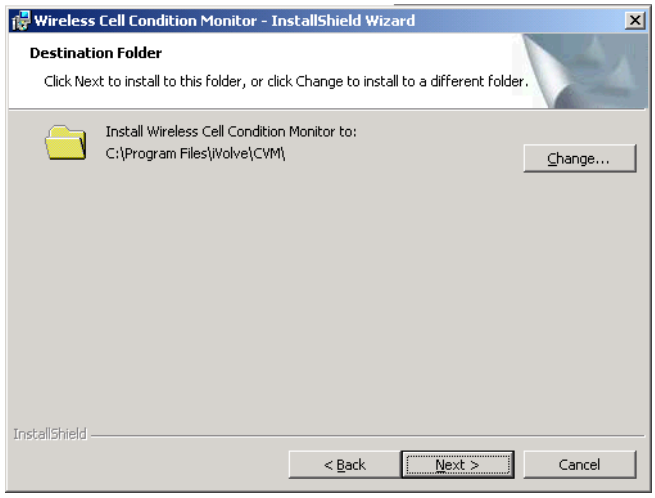
Server application and database:

Before beginning this setup, plug one PDA into the CellView server using the supplied mini-D USB connector.

- Insert the CellView installation CD
- Open the CD from its relevant drive and run the ‘Setup.exe’ file
- Accept the user agreements



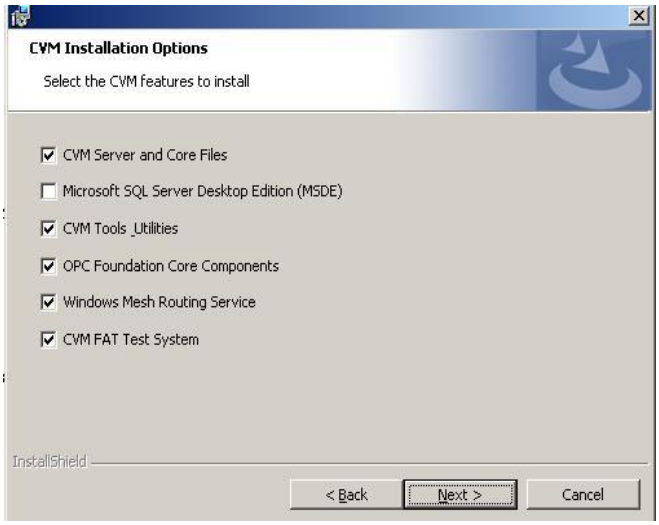
Install the CellView application to the default location or if a different location is required select change and select the directory. This will install only the main program files however there will be some files which will reside in the Windows\System32 directory.



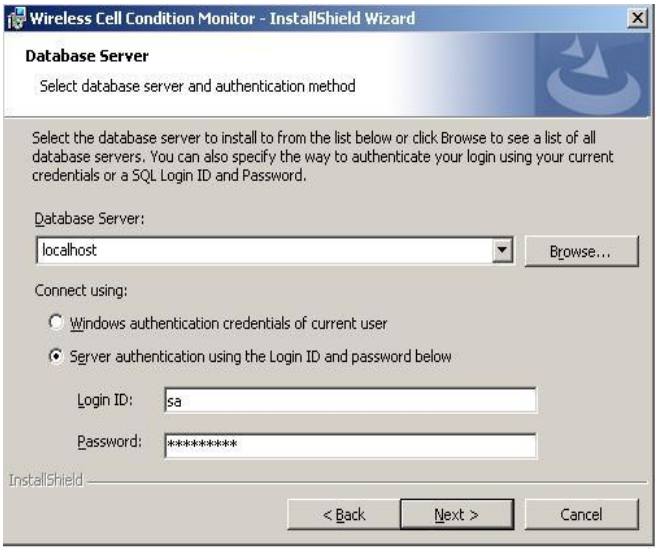
The CellView applications require access to an SQL database for configuration data storage. An existing SQL database may be used if accessible by the CellView Server.

If an existing SQL database is available then select items as shown below.

If an existing SQL database is NOT available then also select “Microsoft SQL Server Desktop Edition (MSDE).

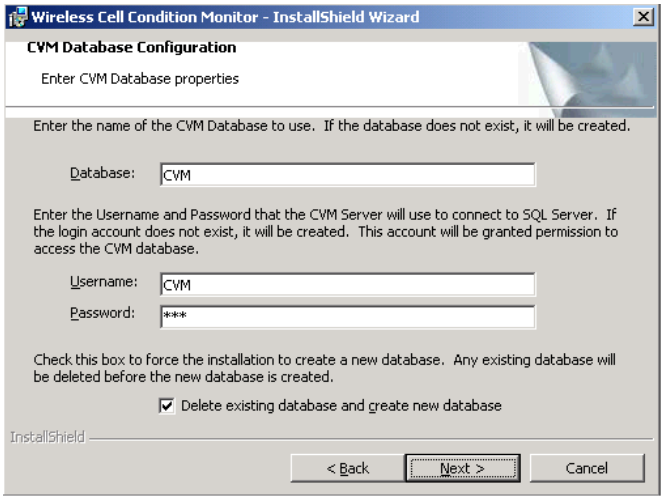


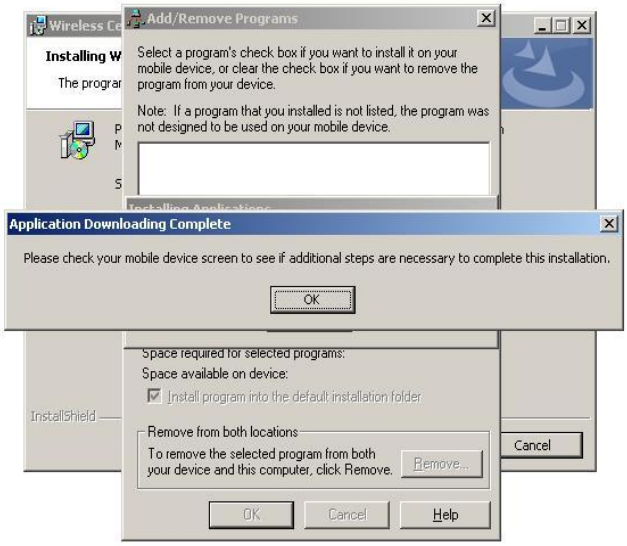
If using an existing SQL database (ie: NOT the Desktop Edition installed locally) then the following window will present:



Contact your local administrator to obtain the required server name and login details.

Use the default database setup unless there is a site specific requirement for usernames or passwords.

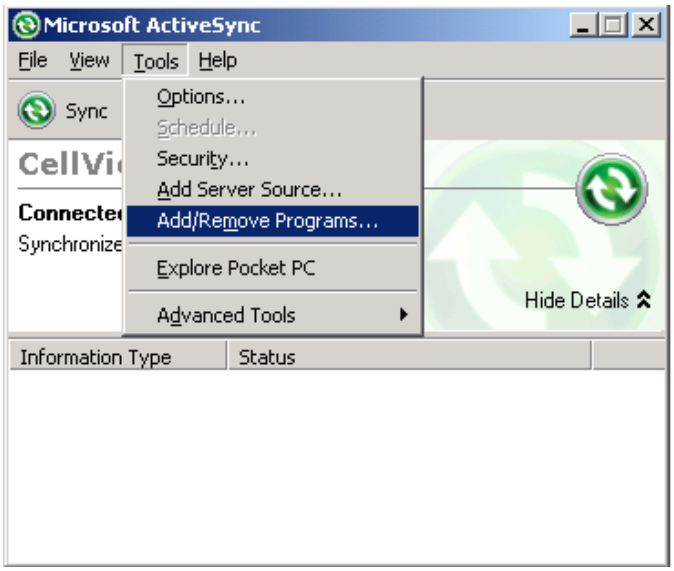




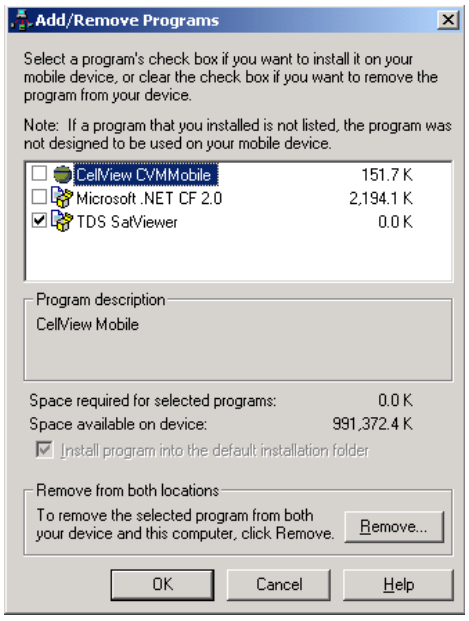
If you need to install another PDA, perform the following task.

Plug the CellViewPDA2 into the server via the mini-D USB connector and wait for activesync to initialise and appear onscreen.

Go to tools and the ‘Add/Remove Programs tab



- Select the CellView application
- Select OK



Follow the prompts and ensure that the application reports as successfully installed on the PDA.

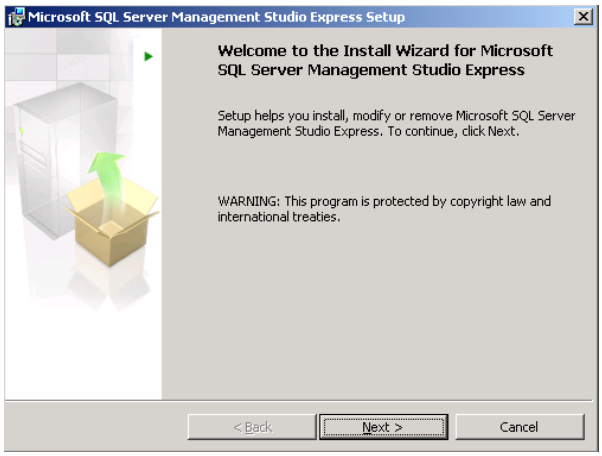
Installation of Mesh Router Manager Software

Copy the Nexis Manager.exe from the CellView installation cd to the CellView Server desktop.

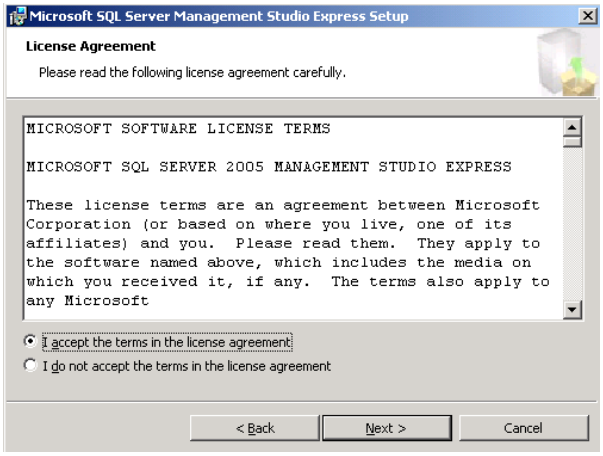
Microsoft SQL Server Manager Studio

Note - not required but recommended

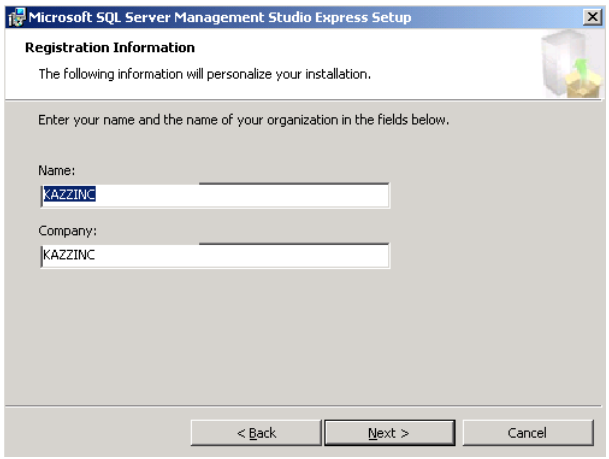
- Go to the CellView server install CD and run the SQLServer2005_SSMSEE.exe
- Select next



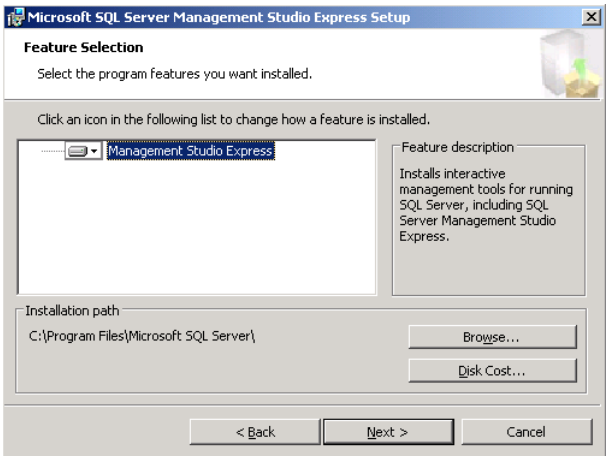
- Accept the user license agreement



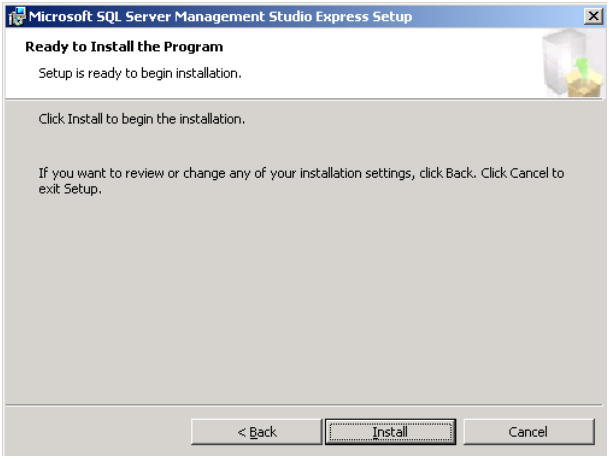
- Enter the name of the client site or a site specific set of names for the Microsoft SQL software



- Ensure that the management studio component is selected to be installed



- Install the software



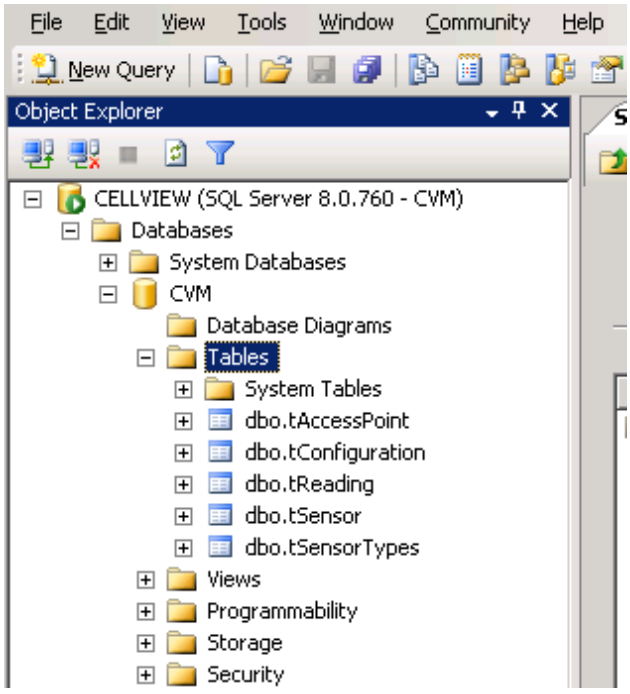
To test that the SQL software was correctly implemented:

- Open Microsoft SQL server management studio software (start run etc)
- Select the servers name (CELLVIEW)
- Select SQL Authentication
- Set the credentials as:

User name: sa

Password: !passw0rd

Use the tree navigation and open the CVM database and confirm that the following tables exist:



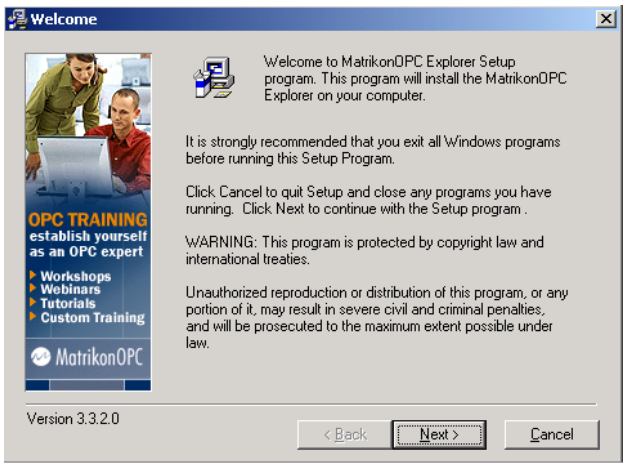
- Once verified exit the SQL Server Manager Studio

Installation of Matrikon OPC Explorer

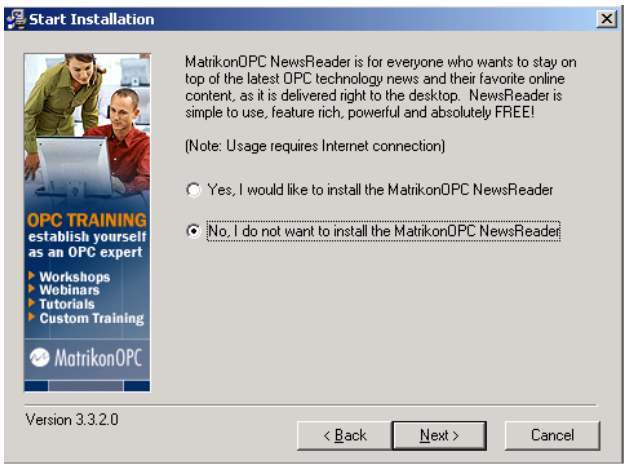
Note - not required but recommended

Install Matrikon OPC explorer by double clicking the MatrikonOPCExplorer executable from the CellView install CD

- Select Next

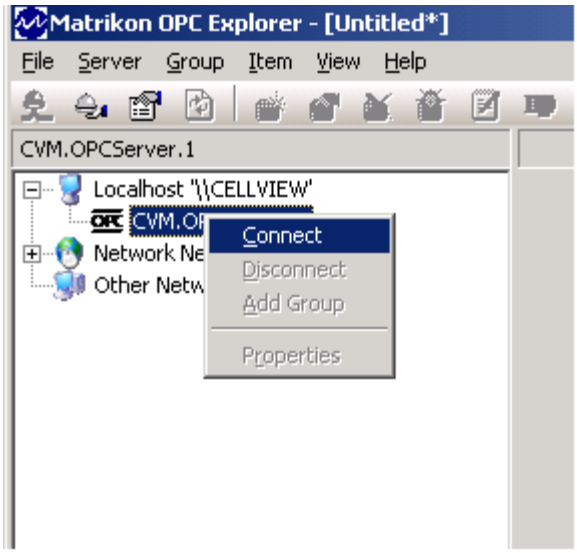


- Accept the user agreement
- Select No to the newsreader option

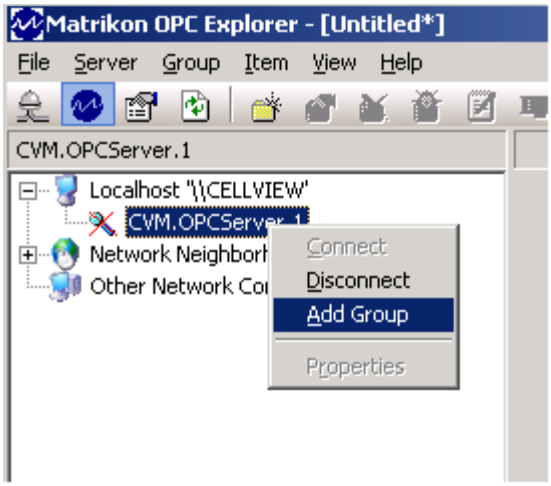


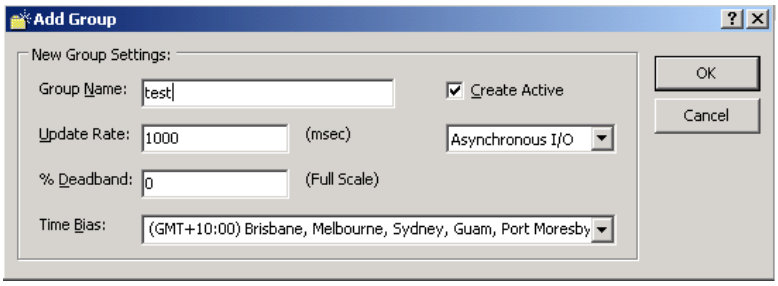
- Install Matrikon OPC
- Select finish

Once Matrikon has been installed, run Matrikon OPC Explorer and connect to the CVM.OPCServer.1

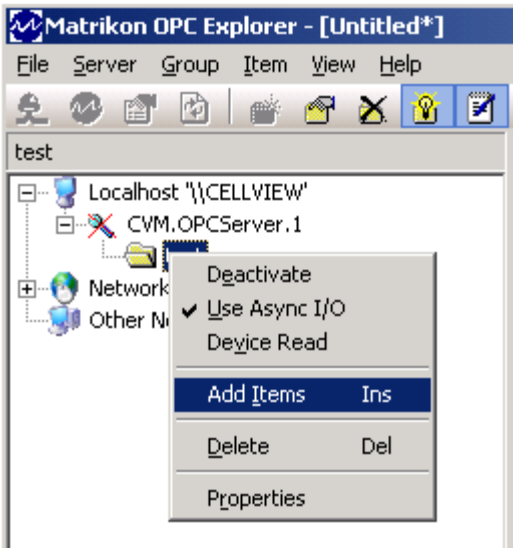


- Create a group called test

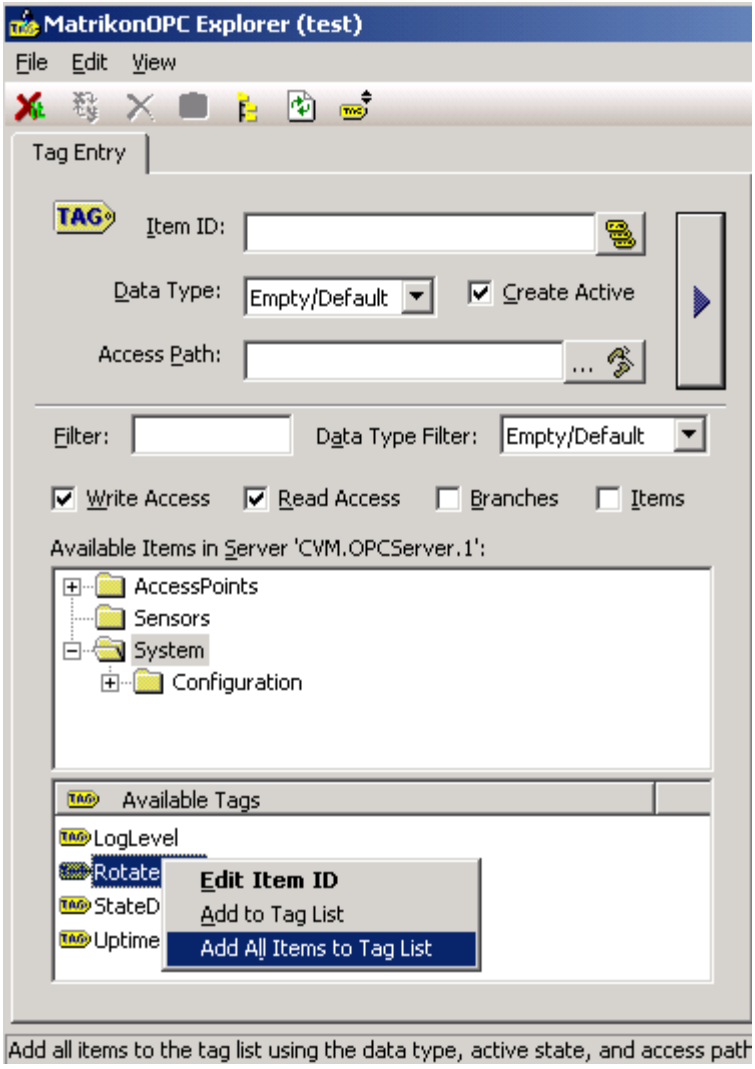




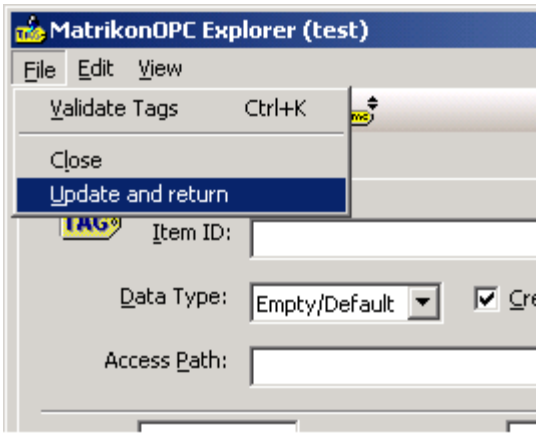
- Select and add items to the group



- Add all the items from the System tree (not the tags from the system.configuration tree)



- Update and return



Ensure that the System.Uptime is increasing every second.

Check the System.LogLevel and ensure its set at 80 or the otherwise specified level.

Chapter 4

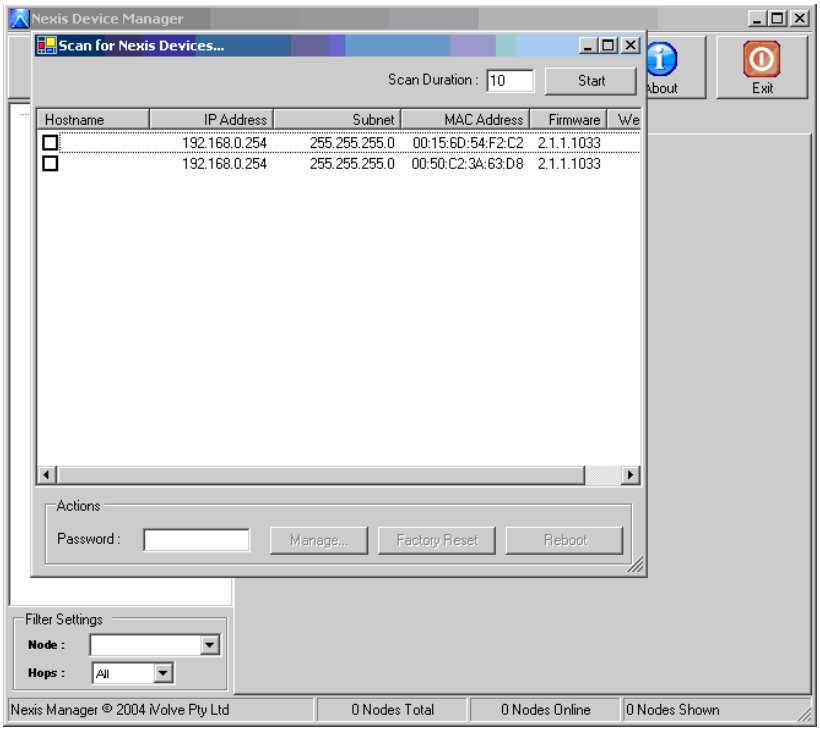
Mesh Router Configuration

Mesh Router Pre-Setup

Plug the Mesh router into the CellView server's Ethernet port

Start the Nexis Manager application

Select Scan'⇨ Start



A typical default configuration for a mesh router is a static IP address of 192.168.0.254.

Once you have established the IP address of the Mesh Router, set the PC or server's CellView network card to an IP address of 192.168.x.y

- where x is the subnet of the Mesh Router (this is 0 if the MR IP is 192.168.0.254)
- where y is not the last quad of the Mesh Router IP address (this should be anything BUT 254 if the MR IP address is 192.168.0.254)

To connect to the Nexis web interface set internet explorers address to:

http://<Nexis IP Address>:2000/

You will be prompted for a user name and password. The default Nexis access password is:

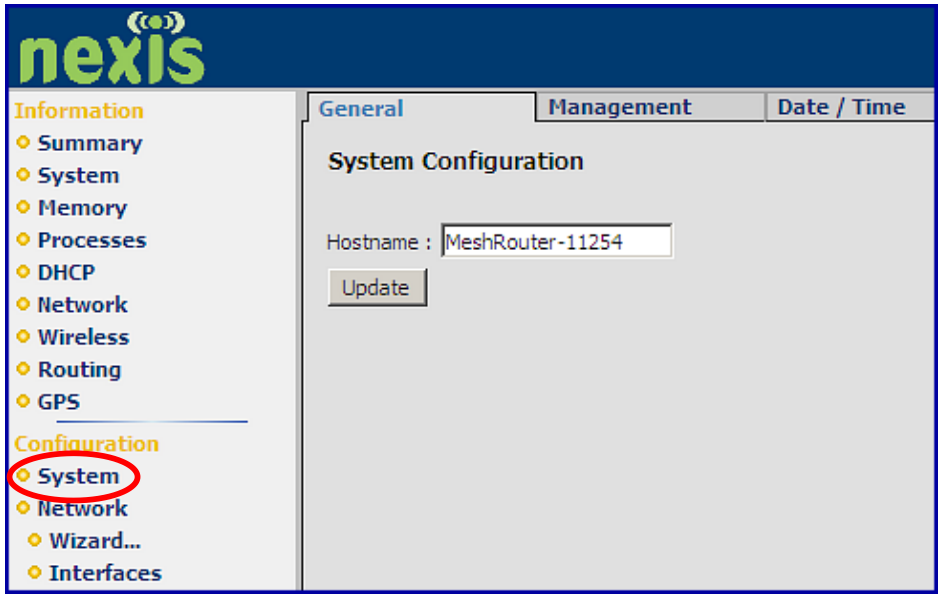
UserName : root

Password : neX1s!

The main Nexis web interface will then display.

Mesh Router Network Setup

- Click on System under Configuration in the Nexis web interface



- Select the General tab
- Enter Hostname

  Where the site does not have a tag name requirement for the Mesh Router set the Hostname to be MeshRouter-xxxxxx

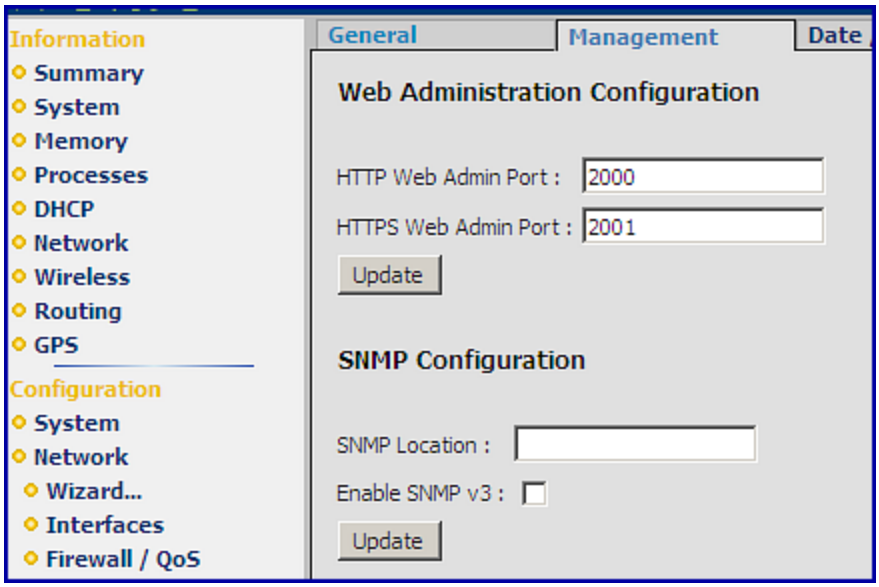
  where xxxxxx are the last two segments of the IP Address

  i.e. 192.168.**11.254** the segments shown in bold are the numbers to be used. In this example the hostname name would be MeshRouter-**11254**.

  Where the site does have a tag name requirement for the Mesh Router set the Mesh Routers host name to match the site tag name. eg: 70EY5822

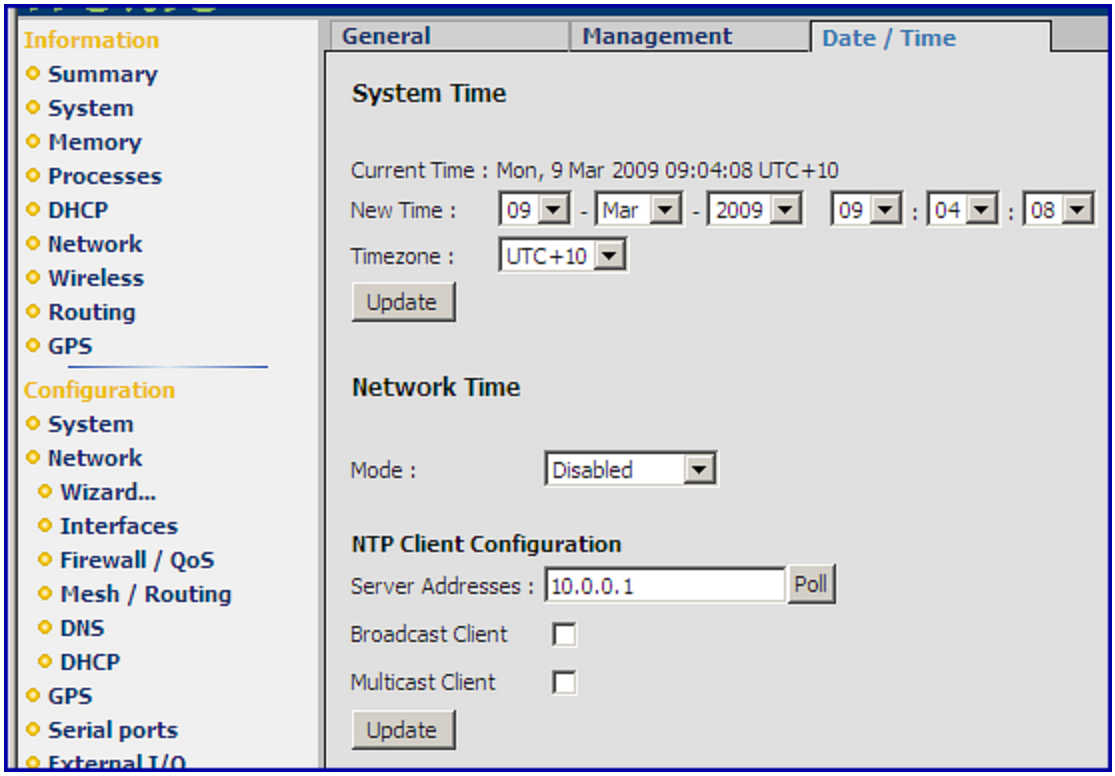
- Click on Update

- Select the Management tab



- Default settings shown are adequate
  Note: SNMP configuration not generally used

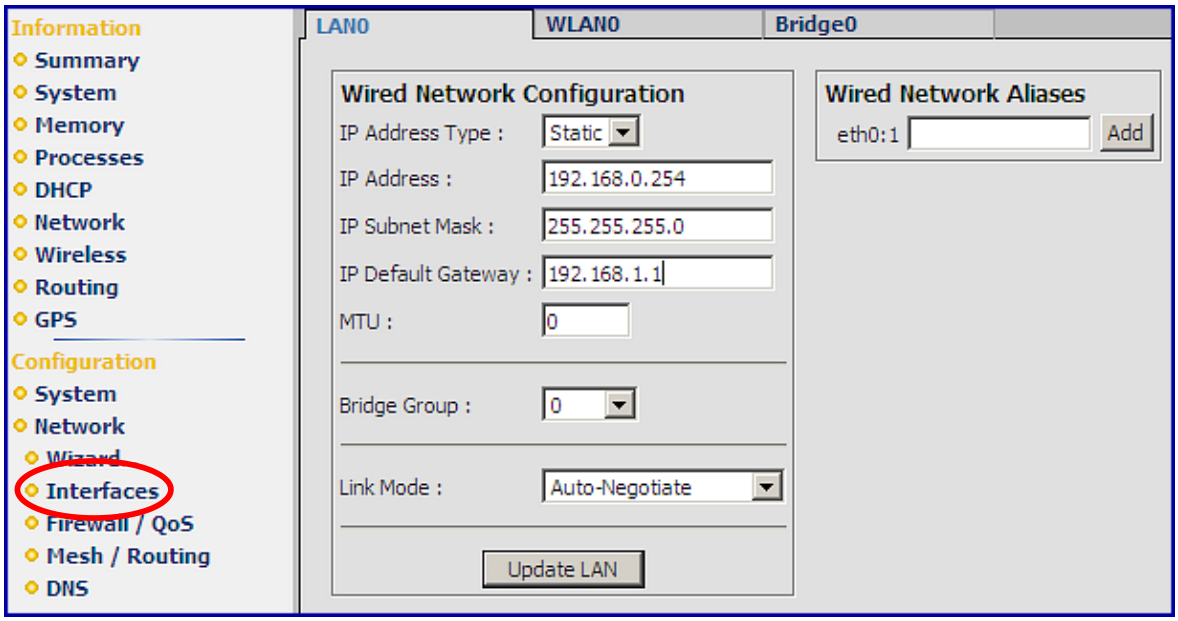
- Select the Date tab



- Default settings shown are adequate
  Note: NTP configuration not generally used

Mesh Router Interfaces Setup

- Click on Interfaces under Configuration in the Nexis web interface



- Setup the Static IP address

  Enter the static IP address as per the network setup requirements

  Always set the subnet mask to 255.255.255.0 unless otherwise indicated

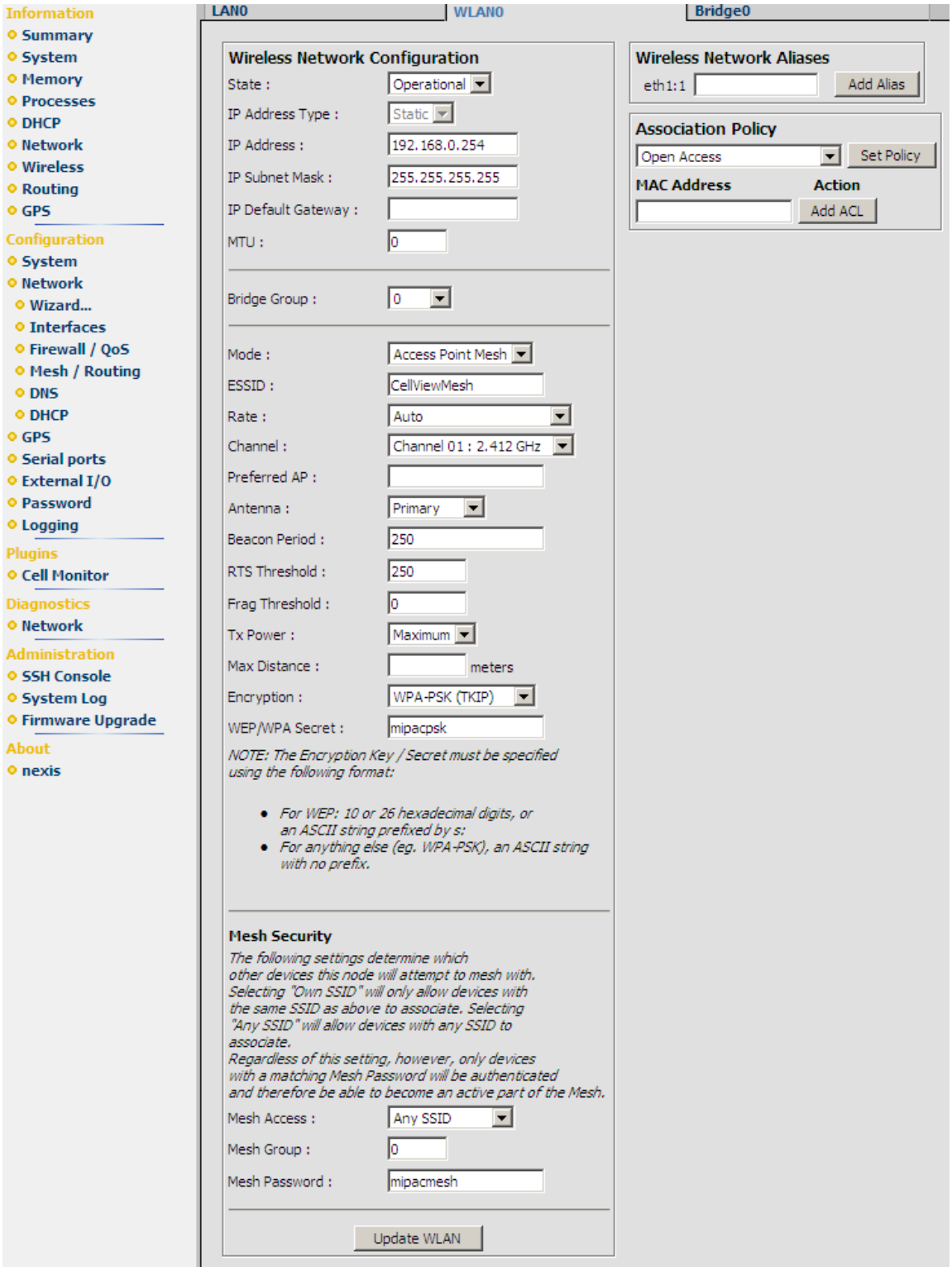
  For wired Mesh Routers setup the default gateway as the CellView server's IP address

  For wireless Mesh Routers leave the default gateway blank

- Click on Update LAN

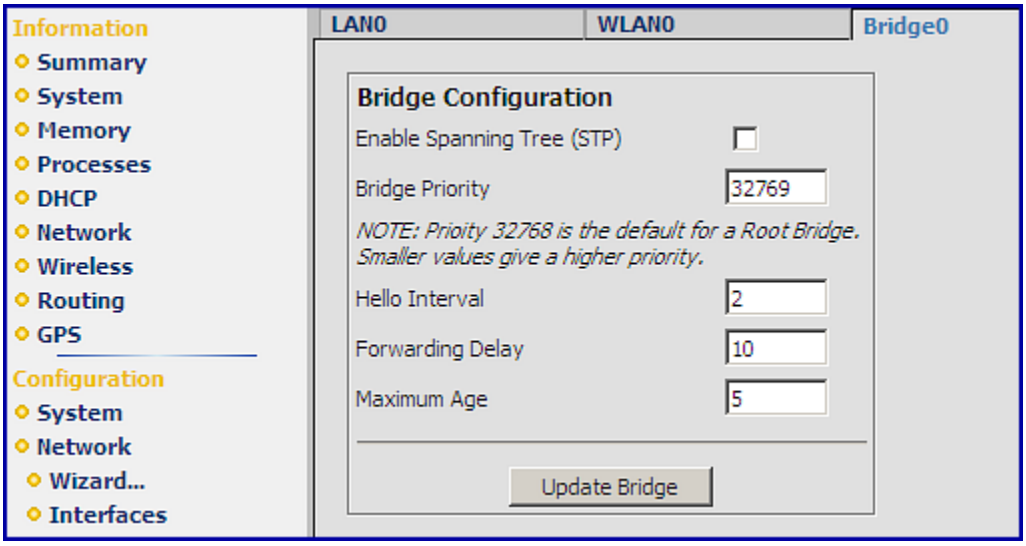
Note - If the IP address is changed the Mesh Router will no longer be accessible. Configure the CellView Server or PC network card to match the IP address subnet entered earlier ie: 192.168.a.b where b is anything not including the address specified for the Mesh Router.

- Select the WLAN0 tab



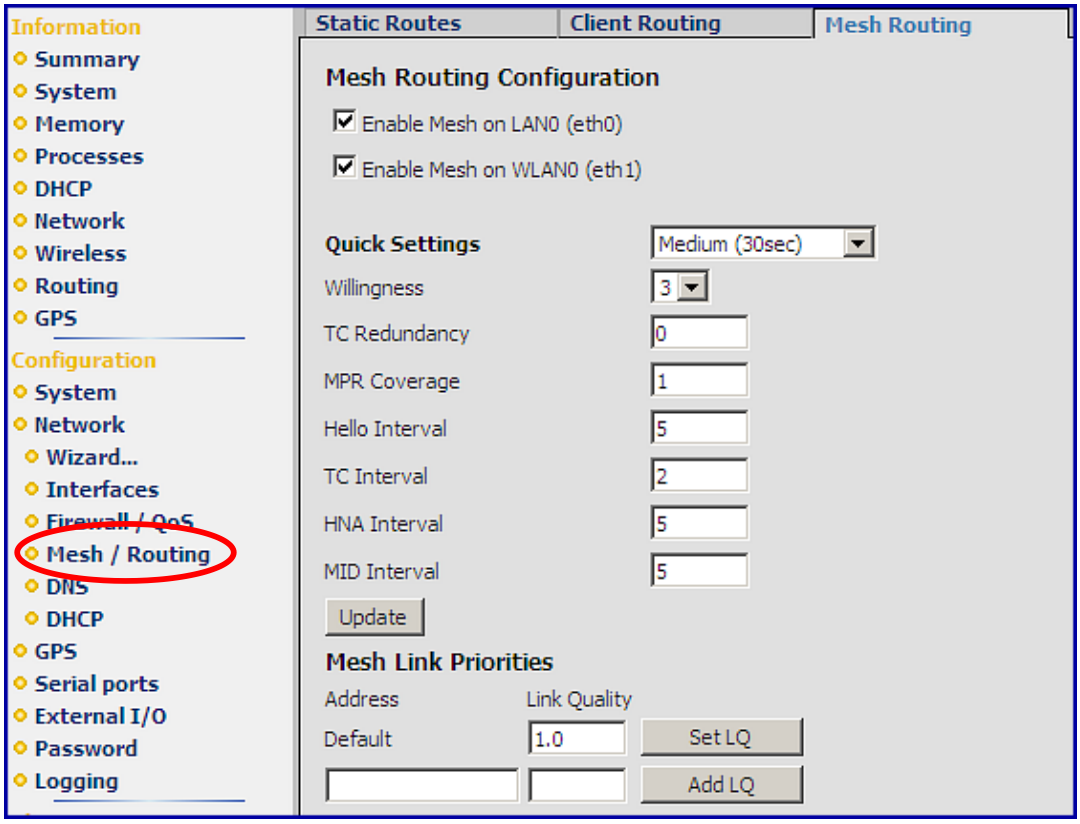
- Set Mode to AccessPointMesh

- Set ESSID:
    - CellViewMesh – for all routers except the Mesh Router which talks to the PDA
    - CellViewPDA – for the Ethernet connected Mesh Router which talks to the PDA
- Set Channel to the required channel for the site
- Set the encryption type to suit the network onsite
- Set the encryption password as required (in this example “mipacpsk”)
- Setup the mesh password as required (in this example “mipacmesh”)
  Note - this is only related to the Mesh network and will not affect how other wireless clients connect to the Mesh Router such as a PDA)
- Ensure other settings are as shown or as determined in network planning
- Click on Update WLAN
- Click the Bridge0 tab and ensure settings are as shown below



Mesh Router Mesh Routing Setup

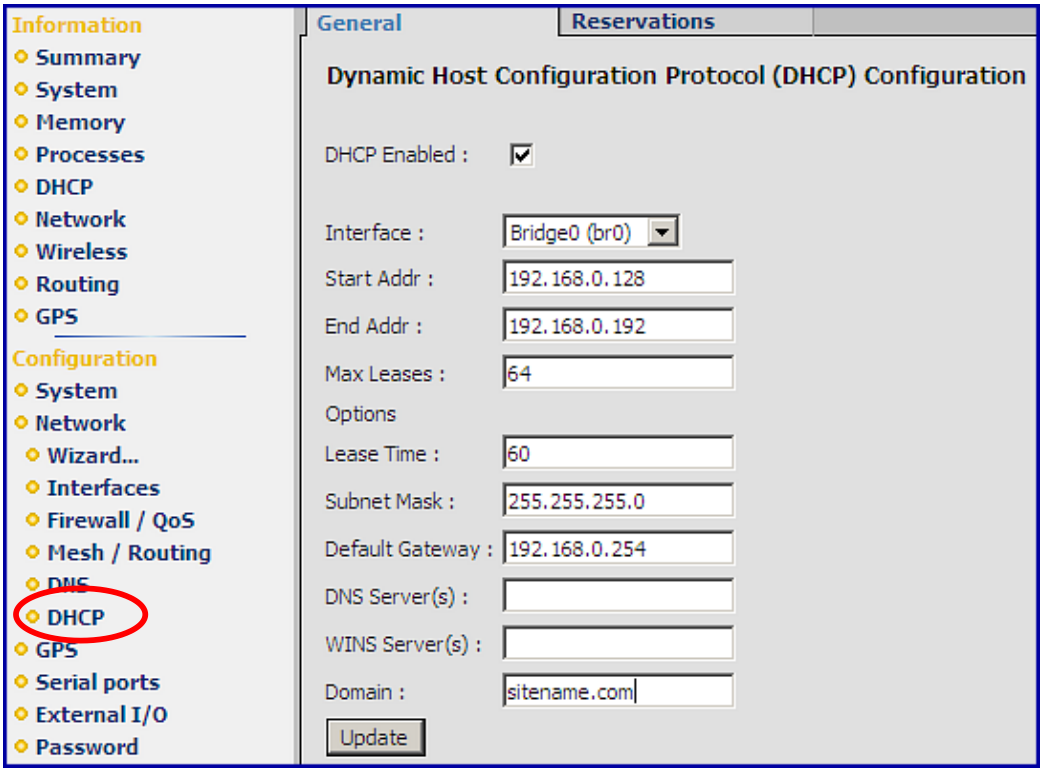
- Click on Mesh / Routing under Configuration in the Nexis web interface
- Select the Mesh Routing tab



- Check that Enable Mesh on LAN0 is selected
- Check that Enable Mesh on WLAN0 is selected
- Go to the quick settings combo box and select Medium.
- Click on Update

Wireless Only Mesh Router Setup

- Click on DHCP under Configuration in the Nexis web interface
- Select the General tab



- Check the DHCP Enabled checkbox
- Set the interface to Bridge0 (br0)
- Set the start address to match the following configuration:

  192.168.xx.100 where xx is the Mesh Router subnet setup
- Set the end address to 192.168.xx.150
- Set the default gateway to 192.168.xx.254
- Set the domain to be sitename.com (or as required for the site)
- Click on Update

Wired Mesh Router Setup

- Uncheck the DHCP Enabled checkbox.
- Click on Update

AP Radio ID Identification

Under normal circumstances the AP Radio ID should be listed on the front of the Mesh Router next to the serial number. If there is a situation where this ID number has been destroyed, unreadable, unknown or the router positioned remotely you can use the following procedures to deduce the AP Radio ID number.

Mesh Router not configured and can be connected locally but AP Radio ID not determinable

- Connect to the Mesh Router using Putty
    - Double click Putty icon on desktop
    - Connect to the Mesh Router by entering the Mesh Router IP address in the dialogue box (this should then connect to the Mesh Routers service console)
    - Enter the username : root
    - Enter the password : neX1s!
    - Paste the entire following line into the console
        - `/flash/usr/sbin/cvmd -c /flash/etc/cvmd/cvmd.conf & nc localhost 22222 & /flash/etc/init.d/cvmd restart | grep IN`
    - There will be a line with the following text, the number underlined and highlighted is the AP Radio ID of the Mesh Router
        - `1241498939 IN : {204 -2 1 0 176 600 990 1000 1 5 1500 0 0 3 21 0 1 0 12700 1 *}`
    - After completing this step reboot the router

Mesh Router configured, AP Radio ID lost and needed already part of the CellView network

- If the Mesh Router ip address or name is known then you can recover the AP Radio ID which is communicates with by simply following the steps below
    - Set the OPC parameter ‘system.StateDump’ to 1
    - Go to “C:\windows\system32\cvmState.txt” and find the Mesh Router in question
    - Under the AP Radio field there will be an ID number indicated. This is the AP Radio ID installed in the Mesh Router

Chapter 5

PDA Configuration

The CellView PDA is used for commissioning the CellView Cell Monitors (see the commissioning section). Before this is possible the PDA must be properly setup to connect to the CellView wireless network.

Preparation Required before Setup

Ensure that a Mesh Router is on and correctly configured with an access point name of CellViewPDA.

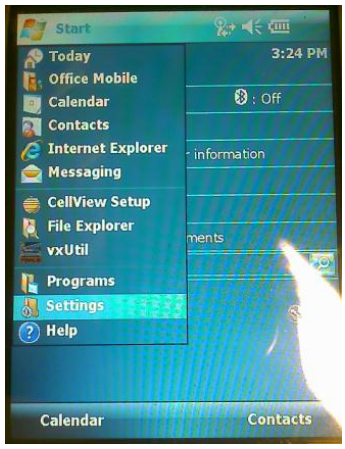
Ensure that the wireless network key for the CellViewPDA access point is ‘mipacpsk’. Follow the Mesh Router setup guide for more information.

Ensure that the PDA is fully charged and is within wireless communication range of the Mesh Router.

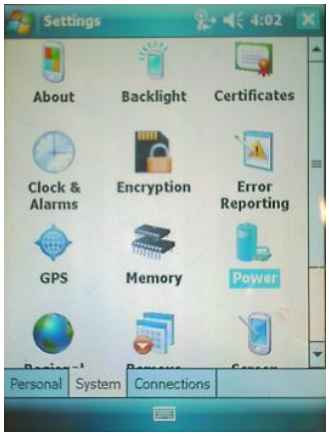
Follow the steps below to disable the automatic power off for the PDA.

This will mean that unless intentionally turned off the PDA will not power down, in the interests of conserving battery life and ensuring longevity the settings below should be restored after commissioning is complete.

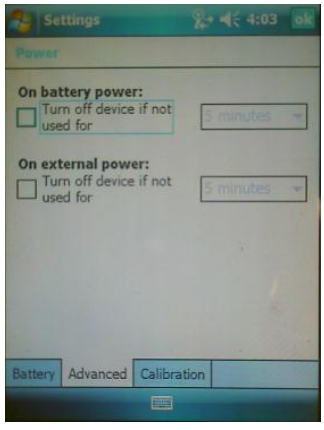
Step 1: Select settings



Step 2: Select the ‘System’ tab, then select power



Step 3: Deselect the on battery power and on external power check boxes

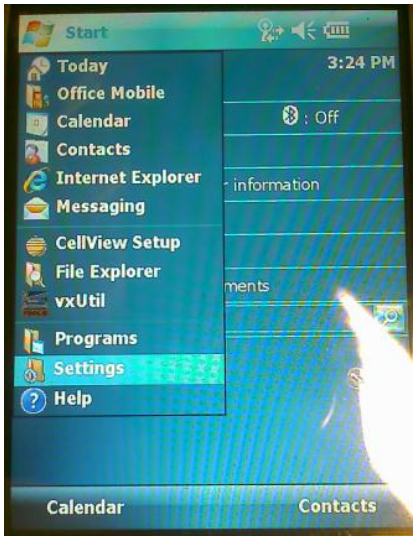


CellView Network Settings for PDA

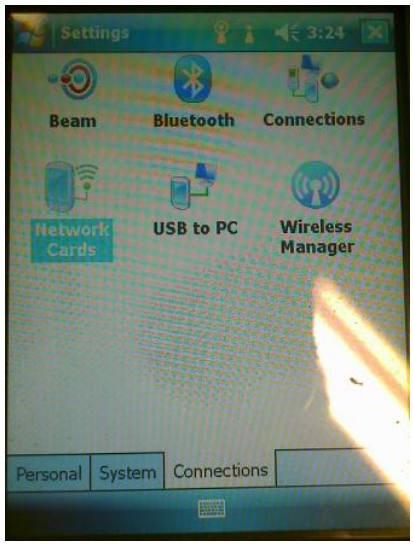
Power the PDA on, If it has been off for a substantial duration or the battery is flat you may be prompted to calibrate the PDA. Follow the steps as directed onscreen

To setup the wireless connection follow the steps shown below:

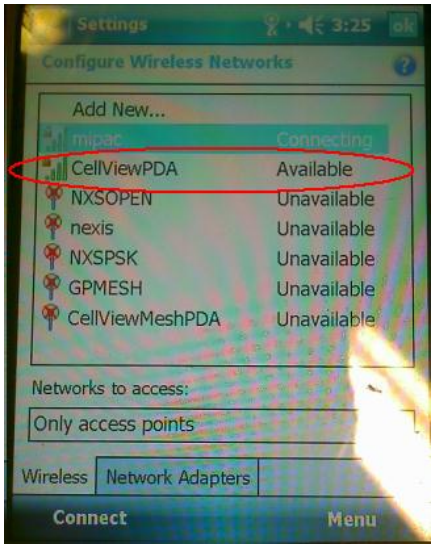
Step 1: Select settings



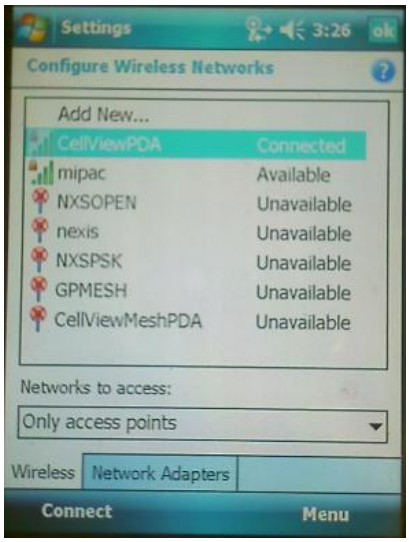
Step 2: Select the connections tab in the settings window and then select 'network cards'



Step 3: Select the CellViewPDA access point name



Step 4: Select next

Step 5: Set Authentication to “WPA-PSK” Set Encryption to “TKIP” Enter the Network key “mipacpsk” 	**Step 6:** Select the CellViewPDA network and select ‘connect’ 

Trouble Shooting the CellView PDA

If the CellViewPDA refuses to connect to the wireless network:

- Check for a Configuration Error
  - Complete the above process again and then reconnect
  - Check in the Mesh Router wireless interface that the encryption settings are correct and match the PDA wireless settings
- Check PDA has not connected to a non preferred network
  - Follow steps 1 – 3 above and select ‘connect’ for the CellViewPDA network
- Check for a miscellaneous PDA error – *sometimes the PDA can be configured correctly but due to its operating system it refuses to connect*
  - Hold the PDA power button for 3 seconds and release
  - Select ‘Reset’

Chapter 6

OPC Server Configuration

Introduction

This chapter will describe how to setup the following elements of the provisioning file:

- The Cell Monitor tag names in the OPC server
- The transmission speed of the network
- The default RF timing values
- The default online/ offline timing values
- The sensor groups (if required)

In order to minimise commissioning time the CellView provisioning system allows the engineer to predefine many parameters. Once provisioned the engineer may then proceed to allocate Cell Monitors to their respective OPC tags.

To do this the engineer must first consider the following items:

- Customer tag name requirements
- Customer network requirements
- CellView server network setup
- Wired Mesh Router setup
- Wireless Mesh Router setup

Provisioning the Network

To provision the CellView network the engineer must build a CSV (comma separated value) file containing the appropriate information about the system, this includes:

Provisioning File Setup Objects:

- Mesh Router IP Addresses and settings including CellView network channel
- AP radio ID and settings (each AP radio has to be setup for each Mesh Router)
- Group configuration
- Cell Monitor names
- Application settings

Examples of typical CSV file requirements:

Example 1)

Small system, temporary installation, tag names determined onsite and setup anticipated to be completed through PDA:

- Mesh Router IP Addresses and settings
- AP Radio settings specifically CellView Monitor network channel

Example 2)

Large system, where commissioning time is important, tag names known:

- Mesh Router IP Addresses and settings
- AP Radio settings specifically CellView Monitor network channel
- Cell Monitor names

Example 3)

Large system, where commissioning time is important, sections of the plant run at different sample rates, the CellView server is on a site network and the default application port is blocked:

- Mesh Router IP Addresses and settings
- AP Radio settings specifically CellView Monitor network channel
- Group configuration
- Cell Monitor names
- Application settings

Provisioning File Settings and Considerations

It is important to realise that the provisioning file also contains important parameters which control the wireless communication information flow. Avoid changing the parameters as the defaults will work in most typical settings. There are some scenarios listed below that, if they occur, will indicate that the settings need to be changed.

Before the installation commences a site radio survey is required which will indicate the amount of RF 'noise' present in the environment. Once installed the CellView system will be set in a Site Acceptance Test (SAT) mode for a short period of time, the SAT software should highlight any problems generic to the system or specific to certain sensors.

The following situations flag possible problems with the default system settings:

- A wireless survey indicated that the CellView network could not be placed in a section of the wireless spectrum which was relatively free of noise
- The site survey did not indicate high traffic but the site operates several wireless networks across the entire 2.4GHz spectrum and as a result the CellView network must operate in the same frequency bands as the site networks
- During site SAT the SAT software reports that all the sensors deviated from an RF Quality minimum set point of 80 more than 10 times during the commissioning period
- During a site SAT the SAT software reports that a large number of the sensors performed more than 4 associations
- Some areas of sensors suffer from low RF quality.

If any of these scenarios occur it is possible that the radio performance of CellView wireless system could be improved by modifying some of the transmission properties. However before modifying the default communication parameters confirm that the poor communication is unrelated to the placement of the Mesh Routers or the channels that particular routers are using.

If the network performance is still not acceptable follow the procedures below before modifying the default communication parameters:

- Contact MIPAC and describe the problem
- Request MIPAC review possible parameter changes to ensure there is no impact on Cell Monitor battery life

If parameter changes do not work successfully revert to defaults, this should automatically update the Cell Monitors when they next communicate.

If parameter changes prohibit the Cell Monitors from communicating with the Mesh Routers:

- Change parameters back to defaults
- Wait 24 hours for Cell Monitors to reset to defaults and reconnect with the Mesh Routers
- If a faster approach is required removal and reinsertion of the Cell Monitor batteries will force an automatic reset to defaults and connection with the Mesh Routers

Modifying System Settings for an Existing System

Certain setting changes may require a system restart in some situations.

Backup the system before changing configuration settings.

All settings except for Mesh Router IP addresses may be modified via the OPC interface. If modification of Mesh Router IP addresses is required they will need to be deleted and then re-provisioned.

Provisioning Mesh Routers

Before provisioning the Mesh Routers in the CellView system the Engineer must:

- Setup the Mesh Routers correctly following the instructions in the chapters on Network Planning and Mesh Router Configuration.
- Determine the Mesh Routers AP Radio ID, either from the delivery information for each Mesh Router or from on the front decal of the Mesh router. Alternatively, if this information is not accessible follow the AP Radio identification information in the Mesh Router manual.
- Build the provisioning file string
- Run the CellView application and upload the provisioning information. This can be completed in one pass rather than provisioning each individual router.

The following parameters must be defined in the provisioning file for error free provisioning:

AP Radio Fields	Defaults	As seen in csv file	OPC Paramater
First field (denominator)	apRadio	apRadio	~
Access Point Radio ID	~	512	~
Radio Power 0 = -20 dBm 1 = -10 dBm 2 = -5 dBm 3 = 0 dBm	3	3	AccessPoints.<Mesh Router OPC Name>.Configuration.RadioPower
Beacon Interval (milliseconds)	600	600	AccessPoints.<Mesh Router OPC Name>.Configuration.BeaconInterval
Radio Channel	Make unique to each AP Radio	1	AccessPoints.<Mesh Router OPC Name>.Configuration.RadioChannel
Mesh Router Fields			
First Field (denominator)	AccessPoint	AccessPoint	
Mesh Router IP	~	192.168.1.80	AccessPoints.<Mesh Router OPC Name>.Address
Connect (set 1 always)	1	1	~
Mesh Router OPC Name	~	MeshRouter-180	~
Sensore Ack Response timeout before resend (milliseconds)	1800mS	1800	AccessPoints.<Mesh Router OPC Name>.Configuration.SensorTimeoutMilliSecs
Max Command Attempts	2 retries	2	AccessPoints.<Mesh Router OPC Name>.Configuration.MaxCommndAttempts
Max Sensors that AP can handle	100 sensors	100	AccessPoints.<Mesh Router OPC Name>.Configuration.MaxAssociations
Mesh Router Update interval	5 seconds	5	AccessPoints.<Mesh Router OPC Name>.Configuration.StatsUpdateInterval
Hello period (Heart beat to server)	10 seconds	10	AccessPoints.<Mesh Router OPC Name>.Configuration.HelloPeriod
RF Quality limit (retry ratio, ignored = 100)	100 % (Received/sent)	100	AccessPoints.<Mesh Router OPC Name>.Configuration.RetryRatioPercent
Sensor Timeout Seconds (4 times sleep period)	600 seconds until offline	600	AccessPoints.<Mesh Router OPC Name>.Configuration.SensorReceiveTimeoutSecs
Server Port	44444	44444	~

Example provisioning file CSV lines:

AP Radio

```
apRadio,512,3,600,1
```

MeshRouter

```
AccessPoint,192.168.1.80,1,MeshRouter-180,1800,2,100,5,10,100,600,44444
```

Provisioning Considerations

Particular attention should be paid to the following fields as they can not be modified in OPC or the CellView setup application once the Mesh Router and its associated Access Point radio have been provisioned.

Access Point Radio ID

Mesh Router IP Address

The following fields may be modified in the CellView Setup application after the Mesh Router and Access Point radio have been provisioned

Mesh Router OPC Name

OPC Parameter List for Mesh Routers

List of Mesh Router OPC parameters and their read/write properties:

OPC Paramater	Definition	Properties
AccessPoints.<Mesh Router OPC Name>.Address	Mesh Router IP	Read Only
AccessPoints.<Mesh Router OPC Name>.Id	ID, used internally by server software	Read Only
AccessPoints.<Mesh Router OPC Name>.Name	Mesh Router OPC Name	Read Only
AccessPoints.<Mesh Router OPC Name>.Online	1 = Online 0 = Offline	Read Only
AccessPoints.<Mesh Router OPC Name>.SensorCount	Number of Cell Monitors associated with Mesh Router	Read Only
AccessPoints.<Mesh Router OPC Name>.Uptime	Number of seconds Mesh Router has been online	Read Only
AccessPoints.<Mesh Router OPC Name>.Configuration.BeaconInterval	Beacon Interval (milliseconds)	Read/ Write
AccessPoints.<Mesh Router OPC Name>.Configuration.HelloPeriod	Hello period (Heart beat to server)	Read/ Write
AccessPoints.<Mesh Router OPC Name>.Configuration.MaxAssociations	Max Sensors that AP can handle	Read/ Write
AccessPoints.<Mesh Router OPC Name>.Configuration.MaxCommndAttempts	Max Command Attempts	Read/ Write
AccessPoints.<Mesh Router OPC Name>.Configuration.RadioChannel	Radio Channel	Read/ Write
AccessPoints.<Mesh Router OPC Name>.Configuration.RadioPower	Radio Power 0 = -20 dBm 1 = -10 dBm 2 = -5 dBm 3 = 0 dBm	Read/ Write
AccessPoints.<Mesh Router OPC Name>.Configuration.RetryRatioPercent	RF Quality limit (retry ratio, ignored = 100)	Read/ Write
AccessPoints.<Mesh Router OPC Name>.Configuration.SensorReceiveTimeoutSecs	Sensor Timeout Seconds (4 times sleep period)	Read/ Write
AccessPoints.<Mesh Router OPC Name>.Configuration.SensorTimeoutMilliSecs	Sensore Ack Response timeout before resend (milliseconds)	Read/ Write
AccessPoints.<Mesh Router OPC Name>.Configuration.StatsUpdateInterval	Mesh Router Update interval	Read/ Write

Provisioning Cell Monitors and Cell Monitor Groups

Before provisioning the Cell Monitors ensure that:

- Cell Monitor tag names are known
- Cell Monitor transmission intervals (sleep times) are known
- Cell Monitor groups (if more than one) settings are known

The provisioning file requires the following parameters to be defined:

Cell Monitor Fields	Defaults	As seen in csv file	OPC Paramater
First Field (denominator)	Sensor	Sensor	
Group Allocation	1	1	Sensors.<Sensor Tag Name>.ConfigGroup
Sensor ID	NULL		
Sensor Type	0	0	
Sensor Tag Name	~	633VG01N01	
Cell Monitor Group Fields			
First Field (denominator)	sensorGroup	sensorGroup	
Group ID	1	1	
Maximum number of retry attempts before Cell Monitor will sleep and then retry again	5	5	System.Configuration.Group<Group ID>.MaxRetryAttempts
Access Point acknowledge response timeout (milliseconds)	400	400	System.Configuration.Group<Group ID>.AckResponseTimeout
Radio Power 0 = -20 dBm 1 = -10 dBm 2 = -5 dBm 3 = 0 dBm	3	3	System.Configuration.Group<Group ID>.RadioPower
Sensor Sleep Time (Seconds)	180	180	System.Configuration.Group<Group ID>.SleepTime
Access Point Scan Time (milliseconds)	1500	1500	System.Configuration.Group<Group ID>.APScanTime
Maximum number of retry and sleep attempts before a Cell Monitor will search for a new Mesh Router	5	5	System.Configuration.Group<Group ID>.MaxUnackedReadings
Cell Voltage ADC Range 0=Auto, 1=Force Positive Low range, 2=Force Positive High range, 3=Force Negative Low range, 4=Force Negative High range	0	0	System.Configuration.Group<Group ID>.CellVoltageADCRange
Extended Sleep (Seconds)	12700	12700	System.Configuration.Group<Group ID>.ExtendedApScanInterval

The parameters in the previous table should be left as their defaults (other than those marked “~”)unless advised otherwise.

If further detail is required about any parameters contact MIPAC.

Example provisioning file CSV lines:

For the Cell Monitor

```
sensor,1,NULL,0,633VG01N01
```

For the Cell Monitor group (sensor group)

```
sensorGroup,1,5,400,3,180,1500,3,0,12700
```

Provisioning Considerations

Cell Monitor Groups 1 to 5 are set up by default by the software and do not require entries in the provisioning file. If more than 5 groups are required then they must be set up in the provisioning file using the format specified.

If Cell Monitors are provisioned but a Cell Monitor group is not provisioned then all sensors will be allocated to the default Cell Monitor group with default configuration values.

The following fields can be modified in the CellView Setup application after the Mesh Router and Access Point radio have been provisioned

Cell Monitor OPC Name

Cell Monitor ID

OPC Parameter List for Mesh Routers

List of Mesh Router OPC parameters and their read/write properties:

OPC Parameters	Definition	Properties
Sensor Fields		
Sensors.<Sensor Tag Name>.AccessPoint	ID number of the associated Mesh Router	Read Only
Sensors.<Sensor Tag Name>.AccessPointAddress	IP Address of the associated Mesh Router	Read Only
Sensors.<Sensor Tag Name>.AccessPointName	OPC Tagname of the associated Mesh Router	Read Only
Sensors.<Sensor Tag Name>.AssocRetries	Number of times packets in the associate sequence were retried	Read Only
Sensors.<Sensor Tag Name>.AssocRxPackets	Number of packets received from the associated Mesh Router	Read Only
Sensors.<Sensor Tag Name>.AssocTxPackets	Number of packets transmitted to the associated Mesh Router	Read Only
Sensors.<Sensor Tag Name>.BatteryVoltage	Cell Monitor battery voltage (mV)	Read Only
Sensors.<Sensor Tag Name>.CellVoltage	Voltage measured at the Cell Monitors A terminals (mV)	Read Only
Sensors.<Sensor Tag Name>.ConfigGroup	Configuration group allocated to Cell Monitor	Read/ Write
Sensors.<Sensor Tag Name>.ExternalTemperature	Measured temperature from externally conntected PT100 temperature probe (°C)	Read Only
Sensors.<Sensor Tag Name>.HWVersion	Cell Monitor hardware version	Read Only
Sensors.<Sensor Tag Name>.Id	Cell Monitor hardware identification number	Read Only
Sensors.<Sensor Tag Name>.InternalTemperature	Cell Monitor internal temperature (°C)	Read Only
Sensors.<Sensor Tag Name>.Online	Cell Monitor status Online = 1 Offline = 0	Read Only
Sensors.<Sensor Tag Name>.RFQuality	Cell Monitor radio transmission quality (1-100%) <70% undesirable	Read Only
Sensors.<Sensor Tag Name>.SWVersion	Cell Monitor software version	Read Only
Sensors.<Sensor Tag Name>.Temperature	Cell Monitor selected temperature (see temperature source)	Read Only
Sensors.<Sensor Tag Name>.TemepratureSource	Selected source for the temperature OPC parameter 0 = Auto 1 = internal 2 = external	Read/Write
Sensors.<Sensor Tag Name>.TotalRetries	Total number of packets resent during the association sequences	Read Only
Sensors.<Sensor Tag Name>.TotalRxPackets	Total number of Received packets	Read Only
Sensors.<Sensor Tag Name>.TotalTxPackets	Total number of transmitted packets	Read Only
Sensors.<Sensor Tag Name>.Uptime	Total number of seconds sensor has been online	Read Only
Sensor Group Fields		
System.Configuration.Group<Group ID>.AckResponseTimeout	Access Point acknowledge response timeout (milliseconds)	Read/Write
System.Configuration.Group<Group ID>.APScanTime	Access Point Scan Time (milliseconds)	Read/Write
System.Configuration.Group<Group ID>.CellVoltageADCRange	Cell Voltage ADC Range 0=Auto, 1=Force Positive Low range, 2=Force Positive High range, 3=Force Negative Low range, 4=Force Negative High range	Read/Write
System.Configuration.Group<Group ID>.ExtendedApScanInterval	Extended Sleep (Seconds)	Read/Write
System.Configuration.Group<Group ID>.MaxRetryAttempts	Maximum number of retry attempts before Cell Monitor will sleep and then retry again	Read/Write
System.Configuration.Group<Group ID>.MaxUnackedReadings	Maximum number of retry and sleep attempts before a Cell Monitor will search for a new Mesh Router	Read/Write
System.Configuration.Group<Group ID>.RadioPower	Radio Power 0 = -20 dBm 1 = -10 dBm 2 = -5 dBm 3 = 0 dBm	Read/Write
System.Configuration.Group<Group ID>.SleepTime	Sensor Sleep Time (Seconds)	Read/Write

OPC Parameter Change Considerations

When making any change to the Cell Monitor group fields be aware that this change will be downloaded to all Cell Monitors when they next communicate with the Mesh Routers.

If it is necessary to change the parameters for an individual Cell Monitor allocate it to a separate group and set the new group parameters to the desired values

If Cell Monitors are allocated to the default Cell Monitor group and configuration changes are required find the OPC parameters under ***System.Configuration***

Additional Provisioning File Lines

The provisioning file can also define the application ports for communication with the Mesh Routers. This line is not required but can be defined if necessary.

Parameter definition:

app,<LoggerLevel>,<ServerPort>

Example provisioning file CSV lines:

```
app,1,44444
```

Example Provisioning File

File in CSV format. Note that the # symbol indicates a comment and will be ignored by the software.

```
#Cell Monitors
sensor,1,NULL,0,633VG01_N01
sensor,1,NULL,0,633VG01_N02
sensor,1,NULL,0,633VG01_N03
sensor,1,NULL,0,633VG01_N04
sensor,1,NULL,0,633VG01_N05
sensor,1,NULL,0,633VG01_N06
sensor,1,NULL,0,633VG01_N07
sensor,1,NULL,0,633VG01_N08
sensor,1,NULL,0,633VG01_N09
sensor,1,NULL,0,633VG01_N10

#Cell Monitor Groups
sensorGroup,1,5,400,3,180,1500,3,0,12700

#Mesh Routers
AccessPoint,192.168.2.10,1,MeshRouter-210,2000,3,100,5,10,100,1500,44444
apRadio,201,3,400,20
AccessPoint,192.168.2.11,1,MeshRouter-211,2000,3,100,5,10,100,1500,44444
apRadio,216,3,400,25

#Application configuration
app,1,44444
```

Chapter 7

CellView Setup Application

Apart from the OPC client interface, it is possible to interact with the CVM server using an application called CellView Setup. This application runs under Windows XP and on Windows CE PDA devices. The PDA configuration chapter made reference to this application. There are functionality differences between the CellView setup application for the CellView server and the CellView PDA.

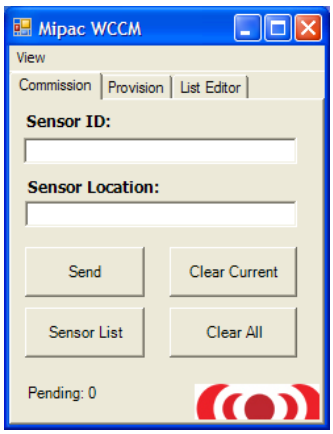
Common

The application requires a number of configuration parameters. These are supplied by a configuration file called “cvm.conf”, found in the same directory as the application. This configuration file does not need to be manually edited as all configuration settings can be applied via the application.

When the application starts, it attempts to connect to the CVM server. The details for doing this are contained in the configuration file. If the configuration file does not contain the necessary information for accessing the server, the user will be prompted to enter them. This is done via the “Settings” screen (see below for details).

CellView Setup Main screen

The image below shows the main screen for the CellView setup application.



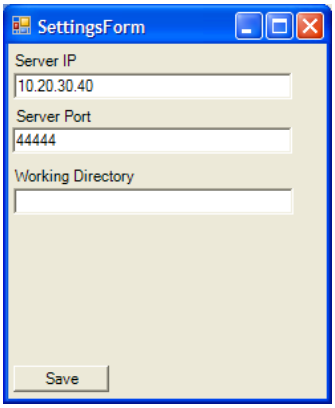
The main screen has the following features:

- **Connection status icon**. The icon at the bottom right toggles between red (not connected) and green (connected) to indicate the current status of the connection to the CVM server.
- **Cell Monitor ID text field**. This contains the Cell Monitor ID (unique serial number). It can be manually entered or will be automatically entered when the RFID wand is used to read a Cell Monitor’s ID. The contents can be cleared with the “clear” button.

- **Cell Monitor Location text field**. This is the “tag” for the Cell Monitor and must be unique for each Cell Monitor. It will typically be a location string for the Cell Monitor. The contents can be cleared with the “clear” button.
- **Send button**. Pressing this button will send Cell Monitor ID and location information to the server. If the application is not currently connected to the server, the data will be stored for later transmission (see “Pending tags” below). Pressing “Send” without either the Cell Monitor ID or Cell Monitor location fields completed will attempt to send any outstanding ID/location pairs. The number of ID/location pairs currently queued for sending is shown in the bottom left corner (the “Pending:” label).
- **Clear Current button**. This button clears the contents of the current active field (either Cell Monitor ID or Cell Monitor Location).
- **Clear All button**. This button clears the contents of both the Cell Monitor ID and the Cell Monitor Location fields.
- **Cell Monitor List button**. This button provides a shortcut to access the Cell Monitor List page (which is also accessible via the “View” menu).
- **View menu**. This menu allows other screens to be accessed. These include:
  - **Settings**: This is used to configure the application.
  - **Pending Cell Monitor Tags**: Used to view Cell Monitor ID/location pairs that have not yet been sent to the server.
  - **Cell Monitor List**: Opens a list of Cell Monitor ID/location pairs downloaded from the database.
  - **Access Points**: Provides a list of network access points downloaded from the server.
- **Commission Tab**. This makes the screen shown above accessible.
- **Provision Tab**. This is used to access the system provisioning screen.
- **List Editor Tab**. This is used to access a page for editing Cell Monitor and access point details.

Settings Screen

The Settings screen allows the application to be configured.



The following settings can be configured:

- **Server IP**. The IP address of the CellView server. Note that only IP addresses (not hostnames) can be entered here.
- **Server Port**. The port number on which the CellView server is listening for connections.
- **Working Directory**. The path used for writing certain files (pending tags file, Cell Monitor list file). This field can be safely left blank, in which case the working directory will be the current directory of the executing application.

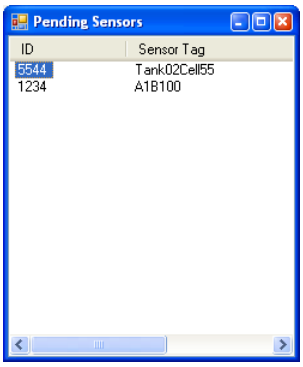
Press the “Save” button to save the settings. Press the ‘x’ button to exit this screen without saving the settings.

Pending Tags Screen

This screen displays the list of Cell Monitor ID/location tags that have not yet been uploaded to the server. ID/location pairs are not deleted from the pending Cell Monitor list until they’ve been acknowledged by the server. Users can manually delete entries from this list be clicking on the ID of the entry to be deleted.

If this screen displays no ID/tag pairs, then there are none to be uploaded to the server.

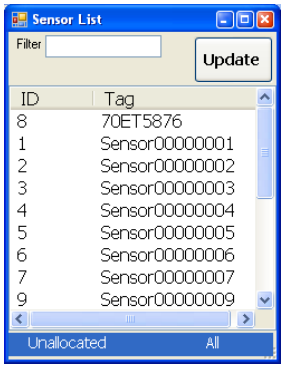
Pending Cell Monitors screen



Cell Monitor List Screen

This Cell Monitor list screen provides a convenient way for installers to assign Cell Monitor IDs to Cell Monitors at known locations (specified by the Cell Monitor tag). A list of Cell Monitor ID/tag pairs is stored locally (either on the Windows XP file system or on the PDA). The “Update” button will attempt to refresh the list from the server. Obviously, this will only work if the connection to the CVM server is active.

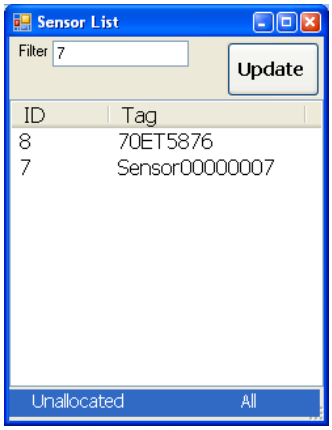
Cell Monitor List screen



There are two display options available: “Unallocated” and “All”. Selecting “Unallocated” will display only Cell Monitors for which the ID is not currently assigned. Selecting “All” will display all Cell Monitors.

The Cell Monitor locations can be filtered based on substrings. Typing into the “Filter” text box will update the Cell Monitor list, displaying only those with a partial tag containing the entry in the Filter box. The displayed order of the IDs and tags can be selected by pressing the column header of either column. Repeatedly pressing the header will toggle between ascending and descending order for the selected column.

Cell Monitor Screen with active filter



Allocating a Cell Monitor to a tag

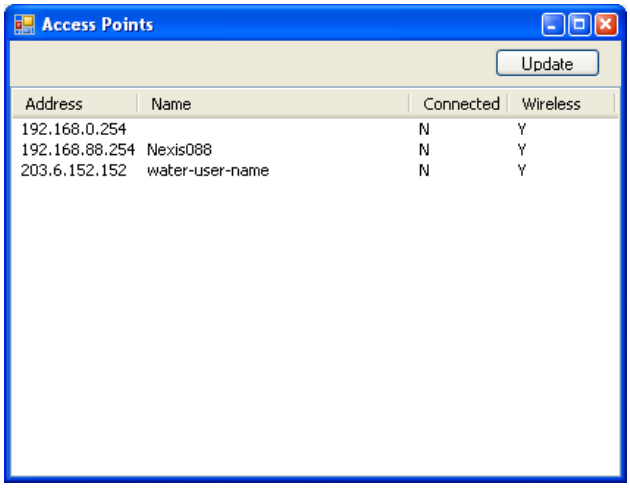
Clicking on a Cell Monitor ID will return the user to the main screen, and fill in the Cell Monitor ID and Cell Monitor Location fields with the details of the selected tag. This allows a user to easily select a Cell Monitor (typically one with a NULL Cell Monitor ID) prior to swiping the Cell Monitor with the RFID wand to read its ID and allocate the Cell Monitor to the desired tag.

Access Points Screen

This screen lists all the access points that have been configured in the database. It displays:

- **IP address** of the Mesh Router
- **Mesh Router OPC Name** – the 'tag' given to the access point via the OPC interface
- **Connection status**. This indicates whether the access point is currently connected to the CellView server.
- **Wireless Only Connection**. This indicates whether the access point is "wired" to the CellView server or whether it connects wirelessly to the server.

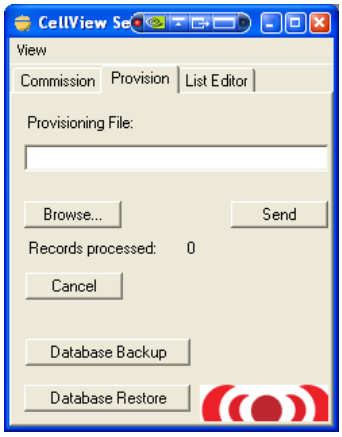
Access Points screen



Log

This option is available via the "View" menu. It initiates a WordPad session with the server's log file open.

Provision Tab



The Provisioning tab allows a “provisioning” file to be uploaded to populate a database. Typically, this would be used to populate a fresh database prior to installation, but it can be used at any time to modify or add new database entries.

Provisioning the database is done by uploading a CSV file to the application. The file is chosen via the “Browse…” button, and executed using the “Send” button. There is no interaction with the CVM Server during this process, so it does not need to be running or accessible.

During upload, the process can be halted using the “Cancel” button.

The “Records sent” counter provides feedback of progress during the upload process. It indicates how many records have been inserted or modified in the database; it does not include commented lines in the provisioning file or records that have failed to be inserted or modified.

Database Restore and Backup

The Provisioning tab also contains a “Database Backup” and a “Database Restore” button. These will trigger the server to backup or restore the database to its file system. The location of the backup files is fixed and is set to the same directory that the server executable is running from. Doing a “Database Restore” will first clean out the database before restoring the contents to the backup version.

A backup can be restored to a newly installed CellView system in the event of a software or hardware failure which results in the loss of the system configuration:

- Perform the CellView software installation in its entirety as covered earlier
- Open the CellView setup application, select restore
- Acknowledge that the service may stop
- When the CellView symbol becomes green confirm that the sensors are configured by making use of the list editor functionality (see below)

Considerations

The restore process will also cause a restart of the CellView services, this will cause all OPC clients to disconnect

If you wish to maintain the backup files separate from the server copy the following files

```
cvm-accesspoint.backup
cvm-configuration.backup
cvm-sensor.backup
```

from:

```
C:\program files\cellview
```

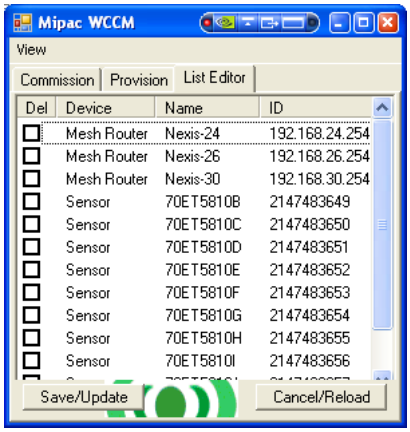
In the event that a restore is required from files which are not on the CellView server, copy the files above to the directory above and then perform the restore procedure.

File Format

Described elsewhere in this manual.

List Editor Tab

The List Editor tab provides a view of all the Mesh Routers (access points) and Cell Monitors currently known by the server.



Users can either delete or modify entries in the List Editor tab.

If possible (ie: if there is a connection to the server), the List Editor will auto-populate when the application is started. The list can be manually populated by pressing the **Save/Update** button.

Entries can be deleted by selecting the check box in the left-hand column (the “Del” column).

Entries can be modified by left-clicking within the body of a line (ie in either the “Device”, “Name” or “ID” columns). Selecting an entry for editing will open another window in which the changes can be made. Users cannot modify the IP address of a mesh router via this mechanism.

Note that deletions and modifications are not actually sent to the server until the “Save/Update” button is pressed. If there are any deletions/modifications pending, then the text in the “Save/Update” button changes to ***bold italics***.

If there are any deletions and/or modifications pending, these can be cancelled by pressing the “Cancel/Reload” button. This will discard pending changes and reload the list from the server.

It is not possible to modify the ID of a Cell Monitor to one that already exists. If the user attempts to do this, they will be prompted whether to continue or not. If they choose to continue, the Cell Monitor with the conflicting ID will have its ID changed to an “unallocated” Cell Monitor and the Cell Monitor being modified by the user will receive the new ID. This operation requires an immediate (and automatic) update with the server.

In order to select multiple contiguous items for deletion, please follow the following procedure:

- Left-click in the checkbox of the first item to be deleted
- Hold down the shift key
- Left-click in any other column (not the checkbox) of the last item to be selected
- Release the shift key
- If the checkbox of the very last item has not been checked, then do so manually for that item.

Chapter 8

Commissioning

Commissioning the CellView system is the process whereby Cell Monitors are allocated to the correct control system tags.

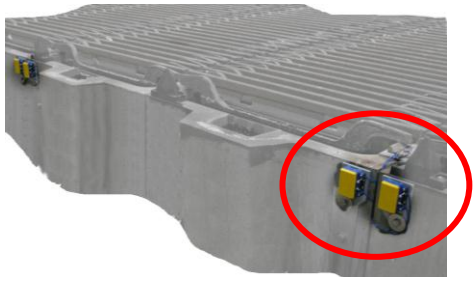
Commissioning check list

Before beginning commissioning ensure that the following steps have been completed:

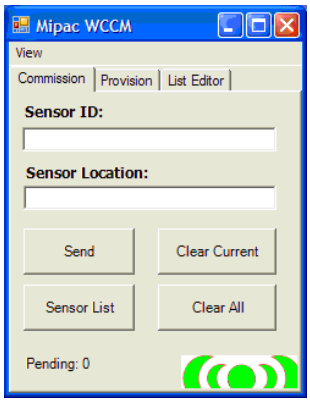
1. Server is correctly setup and has both Cell Monitors and Mesh Routers provisioned correctly for the final setup
2. Server is connected to Mesh Routers
3. Ensure that all Mesh Routers are online and connected to the server
4. Ensure that the Mesh Router with the CellView PDA access point name is online
5. Ensure that batteries have been installed in all Cell Monitors
6. PDA is connected to network
7. PDA connection symbol is green
8. Check that a refresh of the sensor list screen on the PDA updates the list and all tags are available

Commissioning process

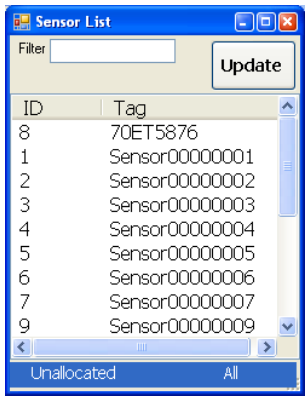
Physically locate the Cell Monitor which is to be allocated in the refinery to the CellView network.



Open the CellView application on the PDA, check that the symbol is green

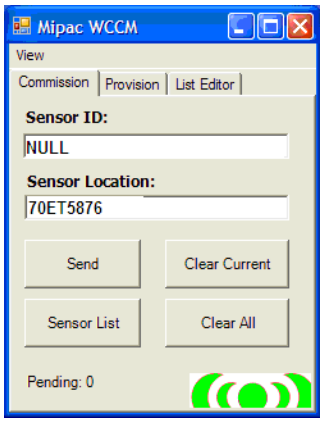


Press the Sensor List button



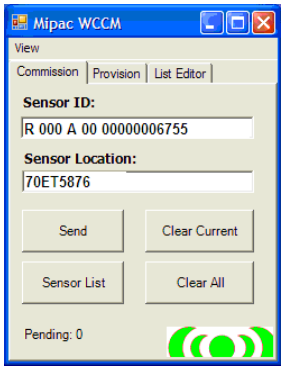
Select the Unallocated or All buttons as necessary and use the filter box to narrow the selection down if necessary. When the appropriate tag has been found press the tag twice and you will be returned to the commission tab.

The screen should appear as shown below:



Move the RFID wand close to the target sensor and press the scan button on the wand

If the sensor has been scanned successfully the sensor ID will appear on the CellView setup ‘sensor ID’ input box.



Press the send button. This will allocate the sensor with an ID of 6755 to the tag 70ET5876.

At this point all clients connected to the CellView OPC server will immediately begin to be served data which is available from the Cell Monitor.

Proceed to the next Cell Monitor to be commissioned and execute the identical steps as outlined above.

Complete this procedure for all Cell Monitors.

System Backup

When commissioning is complete back the Cell View server up (following the directions outlined earlier) and keep a copy of the backup files.

In the event that the server is damaged and rendered irreparable the backup can be restored and the CellView network will immediately begin running again.

Chapter 9

Cell Monitor Installation

DISCLAIMER

CellView is a product which is under continual development and, as such, the product and all documentation referring to the product is subject to change without notice.

The mounting method described in this document has been based on mounting to typical vinyl ester resin based polymer concrete cells.

Notwithstanding the information provided in this document MIPAC does not accept any responsibility

Selecting Cell Monitor Locations

The Cell Monitors have been robustly designed and built to withstand chemical and mechanical damage however, in the interests of maximising their working life and minimising maintenance issues, Cell Monitors should be positioned to meet the following requirements:

- to achieve 'line of site' contact with Mesh Routers.
- to avoid high traffic areas
- to avoid clashing with plant equipment such as the crane bale
- to ensure that the battery lid is accessible and battery can be removed
- to ensure that CellLink connection leads can be installed and removed without difficulty

Mounting Procedures

The Cell Monitor Base Plate must be securely mounted on the cell in the chosen location. This can be achieved by using bolts or adhesives. In either case do not install the Cell Monitor in its Base Plate until the Base Plate is securely fitted to the cell.

Adhesive Mounting

Where adhesive mounting is chosen the 'bonding surfaces' referred to below are:

- The Cell Monitor Base Plate - flat underside
- The Designated Cell Monitor mounting area on polymer concrete cell

Do not install Cell Monitor on its Base Plate until adhesives are fully cured in accordance with local conditions and materials used.

- Lightly sand bonding surfaces with 100 grit sand paper to remove any wax, dirt or glossy surface that would make adhesion difficult
- Paint a thin layer of chemical resistant grade PVC cleaner on both bonding surfaces. Allow PVC cleaner to evaporate.

- Apply a thin but complete layer of adhesive to both bonding surfaces and press together.
- Support Cell Monitor Base Plate with tape for at least 30 minutes ensuring that the arrangement does not allow the Base Plate to shift during the adhesive curing time.
- Leave for 24 hours before assembling Cell Monitor

Bolt Mounting

Where bolt mounting is the chosen method of securing the Cell Monitor Base Plate to the cell the following requirements must be met:

- Procure suitable 316SS self-tapping non-counter sunk mounting screws with a head not larger than a standard metric M5 bolt
- Procure polypropylene rawl plugs which suit both masonry drill size and intended hole depth

  Note - It is advisable to test the mounting setup before installation to ensure that screw heads do not come into contact with the underside of the Cell Monitor in such a way that may prevent the Monitor from properly locating in the Base Plate.
- Mark the position using the most suitable four screw holes in the Cell Monitor Base Plate. Keep all mounting holes a minimum of 50mm from any edge of the polymer concrete cell.
- Use a 5mm masonry drill bit to drill the holes to a maximum depth of 20mm.
- After holes are drilled and cleaned of grit, prepare a small quantity of Gel Coat and apply to the drilled holes, ensuring that the entire exposed internal surface is thoroughly coated.
- Immediately install a polypropylene rawl plugs to suit 5mm masonry drill into mounting holes.
- Immediately bolt the Base Plate into position by screwing the 4 self-tapping screws into the rawl plugs
- Leave for 24 hours before mounting the Cell Monitor in the Base plate

Material Considerations

Both the Adhesive and the Coating Resin technologies have been designed to bond the Cell Monitor Base Plate cPVC material to the vinyl ester resin-based polymer concrete cells .

Similarly the mounting techniques covered in this document are suitable for an electrolyte solution having the following chemical makeup:

Typical Electrolyte Composition, conc (g/L)

Cu	42 to 52
H2SO4	160 to 200
Cl-	0.035 to 0.045
Ni	12
As	12
Fe	2
Sb	0.2
Bi	0.2

If the chemical makeup of the electrolyte differs from the above or the process involves exposure to other chemicals the mounting methods covered in this document may not be suitable.

Where the Cell Monitor and its Base Plate may be exposed to chemicals other than as listed above it is the responsibility of the installation contractor to determine whether the mounting method described within this document is suitable.

Adhesive

The adhesive for bonding the Cell Monitor Base Plate to the Cells is a three-part mixture:

Component	Chemical / Brand	Quantities
Laminating Resin	Hetron 922 or equivalent	19%
Thixotropic Agent	Fumed Silica	79%
Catalyst	Methylethylketoneperoxide (MEKP)	2%

To create the adhesive:

- Mix thoroughly one part Laminating Resin to four parts Thixotropic Agent to make a putty.
- Mix thoroughly one part Catalyst to fifty parts Putty to make the adhesive.

Putty can be made several days prior to application and kept sealed in a cool area ~25°C.

Once putty is mixed with catalyst to make the adhesive it must be applied to bonding surfaces within 10 minutes.

It is recommended that small wax coated drinking cups are used to mix small quantities of the putty and catalyst.

Gel Coat

The Gel Coat is used as an additional protective coating on the polymer concrete cells. The polymer concrete cell is made of a mix of silica and vinyl ester resin which is resistant to sulphuric acid chemical attack. The gel coat layer creates a non porous sealing barrier and stops the electrolyte from weakening the cell structure over time.

The specific components of the Gell Coat are as follows:

Component	Chemical/ Brand	Quantities
Laminating Resin	Hetron 922 or equivalent	98%
Catalyst	Methylethylketoneperoxide (MEKP)	2%

To mix the gel coat:

- Mix thouroughly one part catalyst to fifty parts laminating resin.

Gel Coat must be applied to rawl plugs and surfaces within 10 minutes.

cPVC Cleaner

Prior to application of adhesive to the cPVC Cell Monitor base plate it must be cleaned with a suitable cPVC (PVC) cleaner (priming or etching agent). The cleaner cleans the cPVC surface of any impurities and leaves it in an optimal state to bond with the adhesive.

Purchasing Considerations

Laminating Resin, Catalyst and PVC Cleaner are classed as ‘Flammable Goods” and it is recommended that these be purchased locally from a Fibre Reinforced Polymer supplier.

The Thixotropic Agent can be bought directly from CTI-Unicell.

The shelf life for all components is less 3 months.

It is the responsibility of the persons responsible for the installation to ensure that all components are identical to those shown in the tables above. If alternatives are used the persons responsible should ensure that they meet all chemical requirements.

Chapter 10

Mesh Router Installation

General

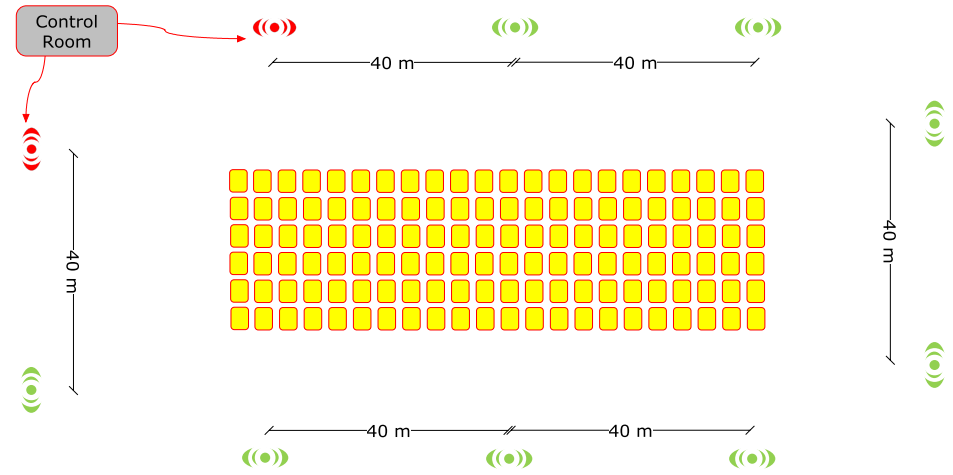
The Mesh Routers are devices which communicate between the Cell Monitors in the refinery and the CellView Server and the operator interface in the control room.

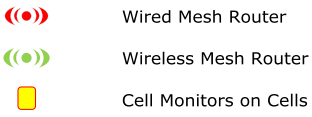
For further information see the Nexis documentation.

Mesh Router Installation requirements

Ensure that Mesh Router installation locations provide good wireless coverage of the refinery. Also ensure that the locations are evenly spaced and Cell Monitors have two Mesh Routers within 50 meters of their location.

Refinery Mesh Router Layout





The Mesh Routers are typically mounted upright so that the power and Ethernet leads trail vertically, however horizontal or other mounting angles are acceptable. Try to avoid obstructing the antennas as this may reduce the range of the Mesh Routers. For optimal operation it is best to have clear line of site between the Mesh Router and the Cell Monitors.

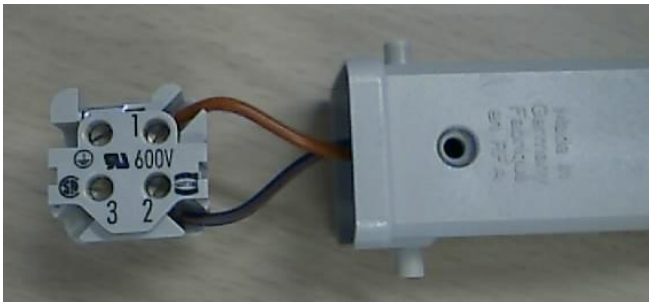
Mesh Router Power Cable Installation

The Mesh Router requires a single 24VDC power connection that is capable of supplying 6 watts. Ensure that the cables are shielded and that the cable runs are not excessively long.

It is best to install an inline 1 Amp fuse and circuit breaker to protect the Mesh Router. The circuit breaker will also enable the power-down of routers for maintenance if required.

Terminate the 24 V DC power cables to the Mesh Routers using the supplied Harting power Plugs observing the correct polarity – Positive to terminal 1 and Negative to terminal 2

Harting connector showing correct installation



Red cable is Positive
Black cable is Negative

Mesh Router Network Cable Installation

Install a shielded Cat 5e data cable from the CellView switch to a Mesh Router setup as an Ethernet router.

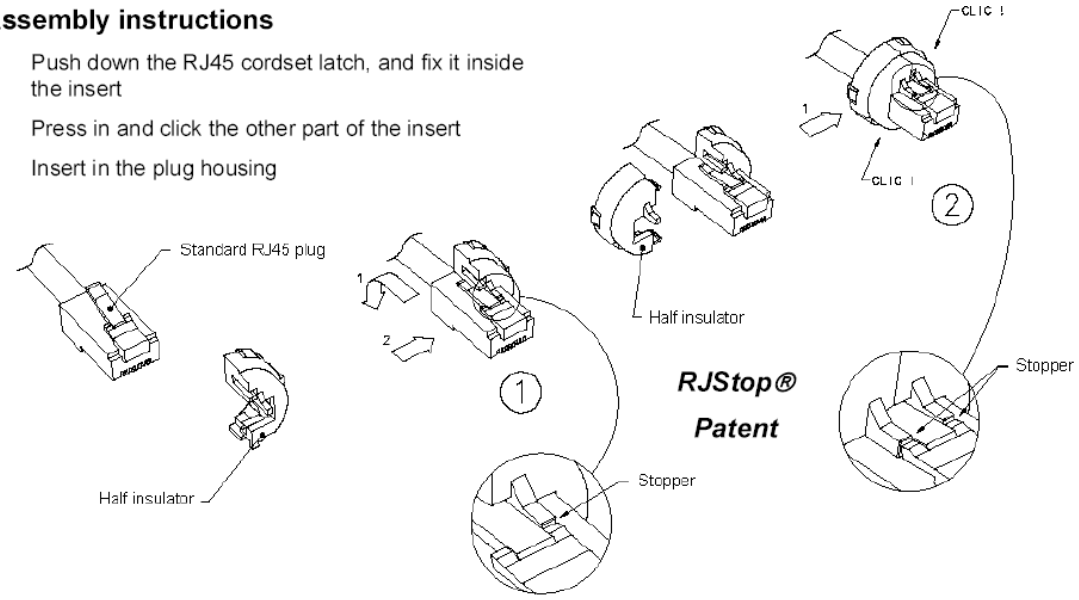
Ensure that the Cat 5e data cable shield is only terminated at one end of the cable.

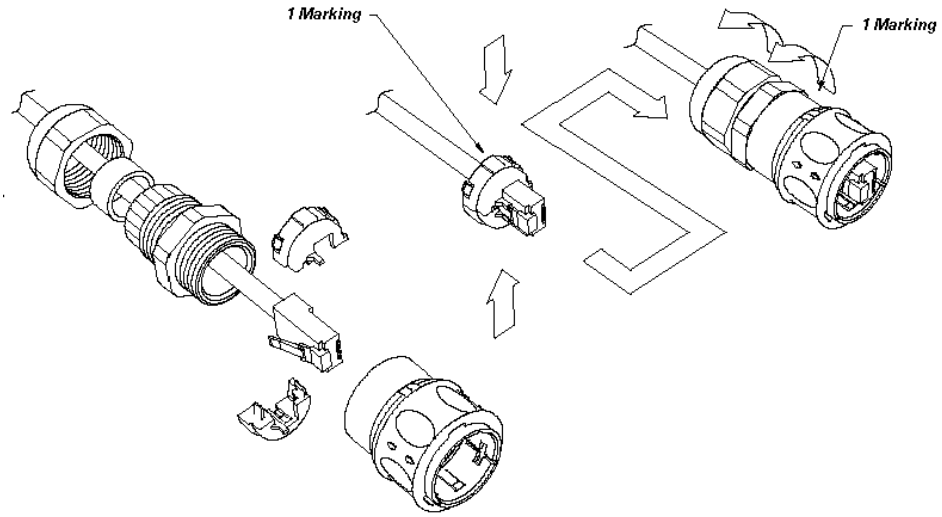
Follow the instructions overleaf to properly assemble the RJ field connector to ensure that the router is sufficiently protected from the environment.

When mating the RJ field connector to the male connector on the Mesh Router ensure that the collar positively clicks into place and that the connector is secure.

Assembly instructions

1. Push down the RJ45 cordset latch, and fix it inside the insert
2. Press in and click the other part of the insert
3. Insert in the plug housing





Powering the Mesh Router on for the First Time

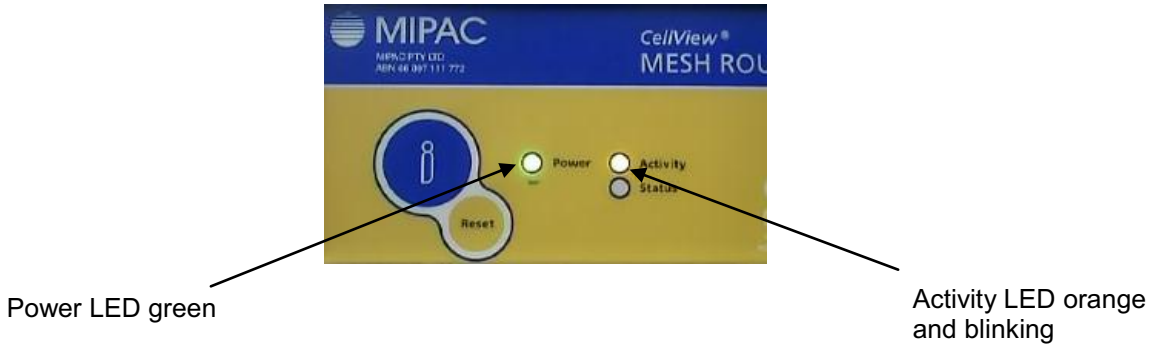
Ensure the polarity of the Harting power connector is correct.

Ensure that there is 24 VDC on the Harting power connector terminals.

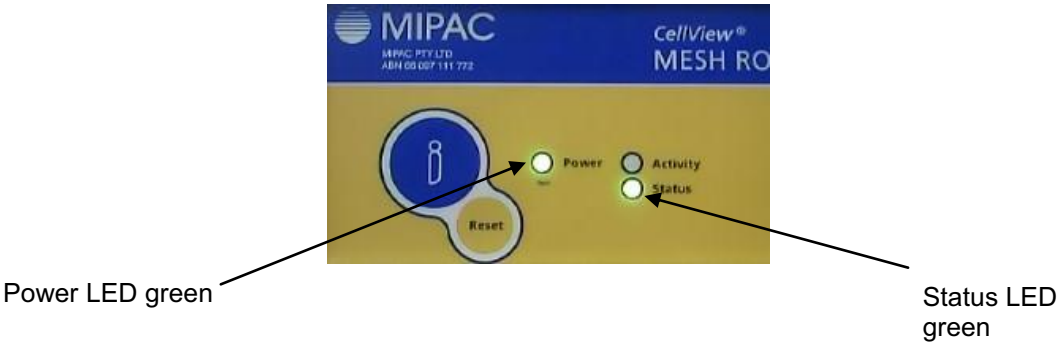
Plug the Harting power connector into the Mesh Router.

The Mesh Router has three LEDs on the front face which indicate the status of the Mesh Router. Ensure that the Power light is on and that the Activity light flashes for roughly 20 seconds, then it will become solid for roughly 20 seconds. The activity light will then turn off and the Status light will become solid.

Mesh Router Front Face – Initial Power On



Mesh Router Front Face – Normal Operation On



Mesh Router Trouble Shooting

Power related problems – Power LED will not be on

Electronic problems – Power LED will be on but Status light will not be on

Software errors – Power LED will be on and Activity LED will be on and / or Status LED

Chapter 11

Compliance Information

Cell Monitor

Model: MIPAC CellView Cell Monitor

FCC

FCC ID: ZT7-CVM-CSLV

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada

IC ID: 9802A-CVMCSLV

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.

Antenna

The Cell Monitor component of the CellView is not operated with an external antenna.

EUROPEAN DECLARATION OF CONFORMITY

We, MIPAC, 6/43 Sandgate Rd Albion Brisbane Australia, 36248852, 32628196 declare under our sole responsibility that the product:

CellView Cell Monitor, model CVM-CSLV-R06

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

Standard	Description
• EN60950	Information technology equipment — safety — Part 1: General requirements
• EN 50371	Generic standard to demonstrate the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz - 300 GHz) — general public
• EN301489-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
• EN301489-3	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz
• EN300440-2	EN 300 440-2 V1.1.2 Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 2:

following the provisions of Radio and Telecommunications Terminal Equipment Directive (R&TTE Directive)

The Technical Construction File is maintained at: MIPAC's Brisbane Office

Date of issue: 30-11-08

Place of issue: MIPAC Brisbane

(Signature of authorized person)

(Typed name of authorized person)

AP Radio

Model: MIPAC CellView AP Radio

FCC

FCC ID: ZT7-CVM-AP

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada

IC ID: 9802A-CVMAP

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.

Antenna

The AP Radio component of the CellView system may have been provided with an external antenna and cable assembly. If this is the case then under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter IC ID: 9802A-CVMAP has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna Manufacturer:	TBA
Antenna Model:	TBA
Antenna Gain:	TBA
Antenna Connector/Cable:	TBA

Mesh Router

EUROPEAN DECLARATION OF CONFORMITY

We, MIPAC, 6/43 Sandgate Rd Albion Brisbane Australia, 36248852, 32628196 declare under our sole responsibility that the product:

CellView Cell Monitor, model CVM-MR-SA01-R02

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

Standard	Description
• EN 60950	Information technology equipment — safety — Part 1: General requirements
• EN 50371	Generic standard to demonstrate the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz - 300 GHz) — general public
• EN 301 489-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
• EN 301 489-3	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz
• EN 301 489-17	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific conditions for 2,4 GHz wideband transmission systems, 5 GHz high performance RLAN equipment and 5,8 GHz Broadband Data Transmitting Systems
• EN 300 328	Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive
• EN 55022	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement (CISPR 22:2005 (MOD))
• EN 300 440-2	EN 300 440-2 V1.1.2 Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 2:

following the provisions of Radio and Telecommunications Terminal Equipment Directive (R&TTE Directive)

The Technical Construction File is maintained at: MIPAC's Brisbane Office

Date of issue: 30-11-08

Place of issue: MIPAC Brisbane

(Signature of authorized person)

(Typed name of authorized person)

Chapter 12

Server Hardware Requirements

Typically most hardware available from 2008 onward in the Dell server line will meet or exceed the requirements in this specification. However it is up to the engineer to make a decision based on the reliability and performance of the server.

Baseline Requirements for CellView Server

CellView server selection may be regulated by end-user specification however the minimum requirements are:

- Dual Core Pentium 4
- Two Hard disks in RAID 1 with capacity of greater than 32GB
- 2 GB of Ram
- Dual Network cards (independent)
- Dual Redundant power supply