Module 1 Lesson 2 Hardware Definition

Objectives

The objectives for this lesson are for you to understand the analogy of the IP500V2, get to know the physical components that incorporate the system, and allow you to connect devices, such as endpoints and trunks, and the different hardware configurations when deploying the IP Office as Server Edition. Also, learn which adjuncts are supported with the IP500V2, and finally see which telephone sets are supported with the IP Office system.

Overview

In this lesson, we are learning about the IP Office hardware and its components. Starting with the Control Unit, where I'll be detailing Ethernet Interfaces, Base Module slots, among other components and learn how we can connect phones and lines right into the the IP Office Control Unit through the Base Expansion Cards.

We are also covering the different types of Expansion Modules and the differences between the Standard and Virtual Servers.

Music On Hold, Loud-Speaker Page, Night Bells, are some of the Adjuncts that I will be covering in the Adjuncts section. And finally, we are visiting the different types of Endpoints.

Analogy of the IP500V2

In this portion of the course, lets take a look a the IP500V2 Control unit. The IP500V2 Consists of 4 slots where you can insert base cards to connect phones, lines, and vcm resources to expand the system capacity.

I recommend that you install the base-cards starting from the left side of the IP Office Control unit, moving to the right of the control unit, without skipping any open spaces. As you insert the daughter cards into the IP500V2 Control Unit, it is important to keep each type of base-cards in order. Having the extension and line cards grouped together helps the system configuration numbering sequence to be in order.

Let's take a look at the back of the chassis

Power Source
The power source is the first connector, which allows you to power the system.
It is important to mention that there is no power on or off switch installed with the control unit.

SD Card Slots (Primary and Optional)
The SD-Card slots are available for licensing and storage. The Primary SD Card slot gets the Avaya SD-Card or license dongle and the Optional slot can be used for extra storage.

> The Avaya SD Card comes in four types= MuLaw, A-Law, Partner and Norstar which provides file server functionality and helps the IP Office components run the same software version across the board.

Ext O/P Port
The External Operation Port is normally used as a door relay, allowing the end-user to open a magnetic door via a shortcode.

Audio Port

The Audio port allows you connect an external Music On Hold source, letting the caller hear music whenever they are on-hold.

DTE Port

The Console or DTE port allows the system administrator to perform maintenance to the control unit, if unable to communicate via an Ethernet TCP/IP Connection.

Administrator password resets are one of the reasons why you need to use the DTE Port

LAN and WAN Ports

These two IP Interfaces connect to two different networks if needed. These are Layer 3 ports providing VoIP services. The LAN port normally connects to the customer's network, as the WAN can be part of the DMZ.

Reset button

If for some weird reason the system locks up, and stops communicating with the maintenance computer, you can reset the system by pressing the Reset Button.

If you decide to use the Reset Button, it is important to follow the procedures listed in this chart.

Press Duration (seconds)	CPU LED	Action
0 to 5.	Off	None
5 to 10.	Orange	Reboot When Free
10 to 30.	Flashing orange	Erase Configuration
30 to 40.	Red	Erase All.
Over 40.	Flashing green	None

Auxiliary button

The Auxiliary button allows the system to bypass the Primary Folder located in the SD Card File System, while the Control Unit is booting up. To do this, press the Aux button once. Another function of the Aux button, it is to shutdown the control unit for 10 minutes while the system is up and running.

IP500V2 Expansion ports

The expansion ports are utilized to connect up to 8 expansion modules.

Grounding screw

The Grounding Screw helps protect the system from lighting and other electric shocks.

Daughter Cards

The daughter cards allow the system to interconnect Digital Phones Analog handsets, H.323, and SIP Phones via the VCM Module in conjunction with a network switch with PoE.

Things you need to know
The base-cards can also handle different trunk types such as SIP Digital Trunks, like ISDN, BRI, T1 and E1, and finally Analog trunks such as Loop Start trunks. In the case of implementing Ground Start Trunks an expansion module is required.

Daughter Cards and they functionalities

COMBO Cards
In order to keep their hardware to a minimum for those small businesses occupying less than 20 people, Avaya released the Combo card to allow digital phones, analog devices, analog trunks and Voice Compression Channels.

Six digital station ports where you can connect any of the digital endpoints except the 4400 series phone. Ports 7 and 8 are dedicated to connecting analog devices. Port 8 is used as a Power Failure port in conjunction with analog trunks connected to ports 9 through 12.

The Power Failure port is activated whenever the system loses power, and this function only works with POTS lines not digital or SIP trunks.

The Combo card is also equipped with the capacity for 10 Voice Compression Channels for VoIP conversion. Licenses are needed to maximize the 10 VCM channels. It is important to mention that there is a maximum of 3 combo cards per IP Office system

The UC Module

The card comes with a HDMI port to connect an external display for initial configuration. Using a kickstart USB Jump Drive to startup the installation and connecting it to one of the USB ports available.

The installation package comes with Voicemail Pro, One-X Server, which provides services to soft-phone applications, among other PC Based widgets. It also comes with Web-Manager as the management application.

The 4 Port Expansion Card

If by any chance you run out of expansion ports in the IP500V2 Control unit, a base card was created to allow up to 12 expansion units connected to a single system, from its original capacity of 8 expansions, and it is only supported in the 4th slot of the Control unit.

Phone 2 and Phone 8

Besides the cards already mentioned, there are some others that you might come across, such as the Phone 2 and Phone 8 which allows you to connect analog devices.

The Digital 8 Station Card

The Digital 8 Daughter cards let you connect a total of 8 Digital stations. Keep in mind that the legacy 4400 series phones are not supported with these cards due to the big power requirements to light the LEDs.

The IP Office Expansion Modules

They get connected to the 8 ports available in the back of the control unit. It is important to connect them in order. Starting with Port 1, all the way to port 8.
Please note that if a port is skipped, the system will auto-configure new Logic ID ports, Extensions, and Users.

Digital station 16 and Digital Station 30 Expansion Modules
These modules are used to connect digital phones supported by the IP Office system.

Phone 30
The Phone Station 30 is designed to provide services to analog devices such as fax machines, paging systems, etc.

Analog 16
The Analog Trunk Module allows you to connect 16 Central Office Trunks, or CO Trunks, directly from the Demarcation point to the IP Office system. If you look in the back of the module, you will notice two ports labeled PF1 and PF2.
These ports become active if the entire system loses power, activating lines 1 and 2, connected in the front of the unit.

I personally run two cables from these two ports out to the reception area so that the operator can make calls with an analog phone until the power is restored, and the IP Office comes back online.
When using the PF ports no inbound calls will be routed through those ports, only outbound calls are allowed, designed for emergency purposes only.

The Digital Station 16A and Digital Station 30A
The DS30A and DS16A provide power to the Nortel phones. Not all of the Nortel phones are supported by these modules. Please refer to the IP Office Matrix for more details.

The Digital station 16B and Digital Station 30B

These Digital Expansion Modules support two modes of operation. The DS or BST Modes to allow Avaya or Nortel Digital phones.

Depending on which phone types either Avaya DS or Nortel BST, you have to change the mode by going through the Manager / Control Unit / Operating Mode. In the manager application, then select the mode from the dropped-down menu.

The DS Mode supports the 1400, 2400, 3800, 9500, 5400 and 4400 series phones. The BST Mode supports the M and T Series phones. A mix of DS and BST telephone types are not supported in the same module.

Brief Summary

You have learned that the IP Office IP500V2 Control Unit comes with 8 ports with a maximum of 12 ports to connect a total of 12 Expansion Modules.

The Digital Station 16 and 30 support the Avaya IP Office digital telephone sets.

To connect analog devices such as analog handsets, fax machines, mail machines, door phones, night bells, paging system, a Phone 16 or Phone 30 is required.

The Analog 16 supports up to 16 Analog trunks.
The Digital Station 16 A and 30 A Support the BST Digital Phones only and the Digital Station 16B and Digital Station 30B support either Modes BST or DS supporting Avaya or Nortel phones.

And that brings us up to the end of this section.

Part II

Server Edition Deployment

overview

- Under the Server Types section, you see which servers are supported with the IP Office Server Edition.
- The elements needed to have your server optimize for a Server installation are covered
- under the Server Requirements section.
- In the Deployment Modes section we are visiting the Basic and Complex deployments, including the Non-select and IP Office Select Modes.
- The difference between the Physical vs the Virtual Deployment Types

Server Types

The two Major server Brands recommended by Avaya are the Dell and HP Servers. Avaya replaced the Dell R210 and DL120G7 with the Dell R220 Server. Which can handle up to 750 users on the Primary server.

The R620 and R630 servers are very similar in capacity. They can run up to 2000 users with the Non-Select IP Office Mode. The HPDL360G7 Server has the capacity of handling up to 1500 users with the Non- IP Office Select, or IP Office Select editions.

Server Requirements

It is recommended to use the Xeon 2.3 and 2.4 Gigahertz Intel Processor with the server already mentioned previously, with 12 to 32 Gigs of RAM (*depending the server type and the amount of users or configuration size.*).

The Servers come with multiple Hard Drive configurations with a minimum requirement of 250 gigs of hdd space, up to 600 gigs. The servers can be configured with 4, 1 GIG Network Interface Cards, in the Server Edition.

Deployment Modes

The IP Office system can be deployed through the conventional IP500V2 chassis, or you can load the IP Office into a Server to run it as a physical, or virtual application. In the chart listed here, I am breaking down the three types of IP Office configuration, types of modes that you can configure, which platforms are supported on each mode, the voicemail that can be implemented per system, how to administer the IP Office system depending on which mode has been implemented, and how many locations.

	Basic	Simplex	Complex
Mode	Basic/ Essential/ Preferred	Server Edition	IP Office Select
Platform	IP500V2	Dell 220	Dell620/630 DL360G7
Messaging Options	Embedde VM Voicemail Pro	Voicemail Pro	Voicemail Pro
Administrator	Single Point SNC – Centralized	Full Centralized	Full Centralized
Locations	32	32	150

As shown in the chart, the IP Office can be deployed as Basic, Essential, Preferred, Server Edition, and finally IP Office Select.

Deployment Modes - Basic Edition

When implementing an IP Office where a Basic configuration with TDM, IP, and SIP are needed, the Preferred edition meets the best solution for those small to medium businesses. This mode allows you to administer a single system at a time, unless you have Small Community Networking (SCN) configured.

Deployment Modes - Simplex

This mode is mainly use when deploying H.323 and SIP endpoints. This mode provides a central administration console through the IP Office Web-Manager.

Deployment Modes - Complex

This mode is very similar to the Simplex deployment, but allows you to setup Resiliency between the Core and Distributed Server. The Web-Manager helps the administrator administer all of the nodes from one single interface.

Voicemail Modes for Basic, Simplex, and Complex.

The embedded voicemail is available with the Basic Mode through the IP500V2 control unit, and the Voicemail Pro is deploy with the Basic, Simplex, and Complex modes.

Deployment Types

In this section of this lesson we are continuing reviewing the IP Office Server Hardware compatibility, moving on with the “Deployment Types”. The following chart displays 4 different categories explaining which platform supports the deployment of the IP Office Core Operating System. Starting with the server environment, where you can deploy an IP500V2 Control Unit, a physical server, or a virtual machine.

Environments	IP500V2	Physical Server	Virtual Server
Configuration	Single Site SCN Centralized	Single Site Distributed	Single Site Distributed
Operating System	IP Office Proprietary	Linux OS .iso	Linux OS OVA
Initial configuration	Preconfigured Minimal Config	USB Kickstart Server Ignition	EXSi vSphere Console

Once you have chosen which system to deploy, it is time for you select which IP Office licensing that is going to meet the customer's needs.

The following are some tips that you should be aware=

- For those using the IP Office Linux version, it is important to follow the server's minimum requirements.
- For a regular Server Edition installation a kickstart jump-drive kicks-starts the IP Office installation.
- For a Virtual Server Edition implementation, Avaya has an OVA available that creates the virtual machine, and launches the initial installation process.

Before moving on to the next section of this lesson, lets take a look at
Some of the benefits of the IP Office Server Edition include the following

- **Central Management Capability -** allowing you to update remote nodes including users, hunt-groups etc., from a single Web interface.

- **License distribution** - this feature of the Server edition allows the IP Endpoints licenses to be shared between nodes.

- **VCM Resources** - No need of the VCM32 and VCM64 Modules when deploying the IP Office as a Server Edition, as the server has them already built-in.

- **Resiliency & Redundancy** - With the IP Office Select Edition you have the ability of having full server, voicemail, and IP Phone redundancy from a Primary to Secondary and Distributed systems.

- **vSphere Server snapshot** - allows you to duplicate the server as backup templates. It is useful to replicate the system when needed without interrupting the production system. The only consideration is how much is the server doing, like any computer, this process might slow the server down.

Adjuncts

Adjuncts are series of applications, devices available to increase and facilitate the IP Office telephony services. Avaya has a series of supported applications already tested and available for us to use.

Some of these applications are=

- Call Center Applications providing Call Center statistics
- Call Accounting or Reporting tools
- Property Management Systems
- CRM - The IP Office system also integrates with a Customer Relationship Management or CRM system, which combines the business operations with the IP Office.
- The IVR systems are used to allow callers make phone transactions by pressing or prompting the IVR system which queries to produce. It integrates with IP Office normally via SIP, H.323 or T1 circuits.

Other Adjuncts

Paging Systems are normally used in warehouses or big factories to make announcement through a loud-speaker in order to amplify the voice signals in loud areas. And for Office spaces there are Ceiling speakers.

Paging Modules interface between the Paging Amplifier and the IP Office system.

Paging Relays - Are used to open and close the paging port in the Amplifier. The Universal Paging Access Module or UPAM is the most common relay used, but the TAMB2 made by Bogen has become very popular in the US, performing the same tasks as the UPAM.

The Viking PA-2A - similar to the UPAM and TAMB2 acts as relay in conjunction with an Amplifier.

Zone Controllers - These are connected to an existing paging amplifier to allow the end-user to make announcements to designated areas, and it give them to choice to chose which areas to do the announcements

Contact Closure - These Access Control units are another adjunct used by the IP Office system to grant access to customers by pressing a shortcode via their phones. The Viking C-1000B is used in conjunction with the Alarm System to open magnetic locked doors.
As a best practice the Alarm company should set the door latch to always open for security reasons. The Door Entry Controller will keep the door locked at all times, except if the electric power is lost, and it interfaces with the IP Office system via a trunk or analog station port.

Door Phones - These are e analog devices that connect to the IP Office via a Trunk or Analog Station to let the visitors to announce themselves before entering the customer's premises. The Receptionist, or phone user has the ability to press a code preprogrammed in the door-entry controller box to open the door.

MOH - Music On Hold is another another adjunct that connects to the IP Office Audio Port, and lets the end-user configure their own announcements and promotions, to play them while the caller in on hold.

Night Bells - are used mainly in loud warehouses, and offices to cover the front desk after-hours. It allows the customer to use a pickup button or feature to answer the incoming call.

Endpoints

When it comes to telephones the IP Office is the best in the market when offering a combination of handsets from Digital, Analog, H.323, SIP, and IP-DECT technology.

Digital Phones - Under the digital telephone family the two big players are the 1400 family and the 9500 family of digital phones. The big difference between these two are that the 9500 uses soft-keys versus 1400 which uses dedicated buttons.

Some of the legacy phones that you might find out there in the field are the 4400 series phones that came out with the Merlin Magix, and the 5400s and 2400s Digital sets

IP Phones - For IP Phones the most popular model is the 9600s Series phones.

The second digit of the model number will determine weather the phone is digital or IP. The IP Phones normally have a six after the leading digit, whereas digital phones a number 4 or number 5 is presented after the leading digit.

SIP Endpoints - IP Office supports the 1100 and 1200 series of SIP Endpoints. Avaya released two conference phones very similar. The only difference, is that one connects to an analog port, and the other connects the customer network using a SIP Extension and license.

Wireless IP-DECT Technology - Avaya supports various wireless technology handsets. The D100 is the most popular of the three currently sold. These type of handsets connect to the IP Office via an Ethernet Network connection providing call handling functionalities.
You might also find an Avaya Voice Priority Processor interfacing with the WAPs and the IP Office system.

Lesson Summary

In this lesson you have learned which type of control units are used nowadays for the IP Office system.

Under the Base Cards lesson we have covered the different types of cards use to provide connectivity for Analog, Digital, H.323 and SIP technology.

We also saw how Expansion modules help to expand the system capacity of digital and analog ports.

In the server edition lesson, we got to see the hardware necessary to implement various types of IP Office system configurations.

We saw how different types of devices work in conjunction to allow the IP Office system to do external announcements, open doors, play music, etc

And finally under the Endpoint's lesson, you saw the different types of telephone supported by the IP Office system.

IP Office
The course