Cisco ISR G2 for Voice

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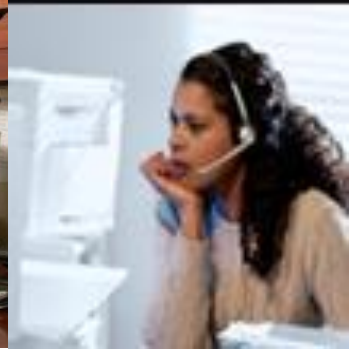
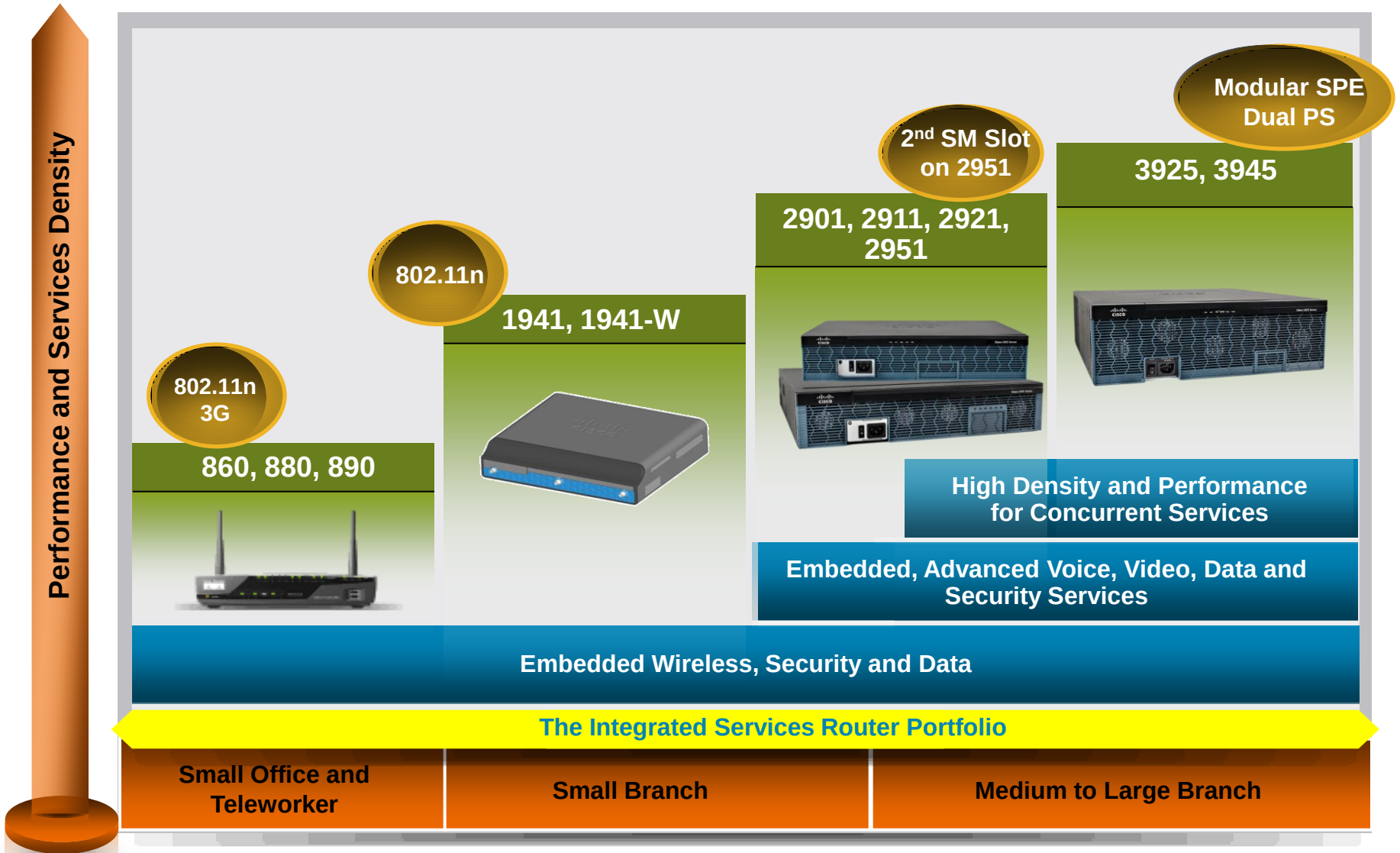
Agenda

- Cisco 2900/3900 Series Overview
- UC Interface Card Support
- UC Applications and Capacity
- DSPs and Media Resources
- UC Bundles Licensing and Packaging
- Detailed UC Capacity Engineering



Cisco 2900/3900 Series Overview

Cisco 1900, 2900 and 3900 ISR G2



Cisco 1900, 2900 and 3900 Series ISR G2

Under the Covers

Services Performance Engine Services Performance Engine (3900)

- Upgradeable with newer engines in the future

Multi-core Network Processor

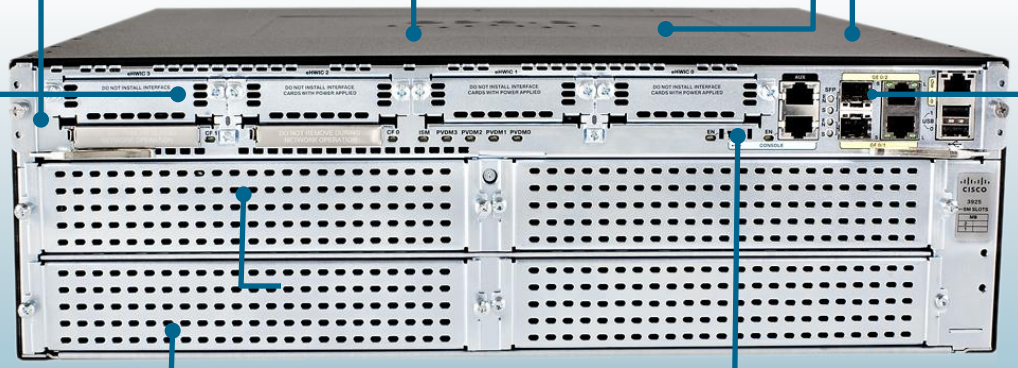
- 4x performance increase

Multi Gigabit Fabric

- Module to module communications
- Packet prioritization and shaping

NG DSP Modules

- Video ready DSP modules
- Up to 4x density increase
- Configurable power savings modes



EHWIC

- 2x performance increase
- HWIC/WIC/VWIC/VIC support natively
- EPoE capable

GE Ports

- Plus GE ports (3 on 2911+)
- SFP slots on 2921 and above

Service Modules

- 3x-7x increase in service module performance
- Existing NM support through adapter
- EPoE capable

Internal Services Module

- 3x increase in service module performance
- Configurable power savings mode
- 802.11n Option 19xx

USB

- Console over USB
- Convenience storage
- Security credentials

Cisco 2900 Series

	2901	2911	2921	2951
SM Slots	0	1	1	2
ISM Slots	1	1	1	1
EHWIC Slots	4	4	4	4
Onboard DSP Slots	2	2	3	3
Onboard WAN Ports	2 GE	3 GE	3 GE (1 SFP)	3 GE (1 SFP)
Default Flash	256 MB	256 MB	256 MB	256 MB
Max Flash	4 GB	4 GB	4 GB	4 GB
Default DRAM	512 MB	512 MB	512 MB	512 MB
Max DRAM	2.5 GB	2.5 GB	2.5 GB	2 GB
Form Factor	1RU	2RU	2RU	2RU

Secure Collaboration Platform

- Up to 75Mbps WAN Access with Services
- Video-ready DSP support
- Increased service density with Second Services module Slot
- 12 Inch Depth on 2911

Cisco 3900 Series

	3925	3945
SM Slots	2	4
ISM Slots	1	1
EHWIC Slots	4	4
Onboard DSP Slots	4	4
Field Upgradeable Motherboards	SPE-100	SPE-150
Integrated Redundant PS	Yes	Yes
Onboard WAN	3GE (2 SFP)	3GE (2 SFP)
Default Flash	256MB	256MB
Max Flash	4 GB	4 GB
Default DRAM	1 GB	1 GB
Max DRAM	2 GB	2 GB
Form Factor	3RU	3RU

Scalable Rich-media Services Platform

- Up To 150Mbps WAN Access With Services
- Upgradeable services performance engine (SPE) for future expansion
- Configurable dual Integrated Redundant Power supplies
- 2x Default Memory

Cisco ISR G2 Benefits

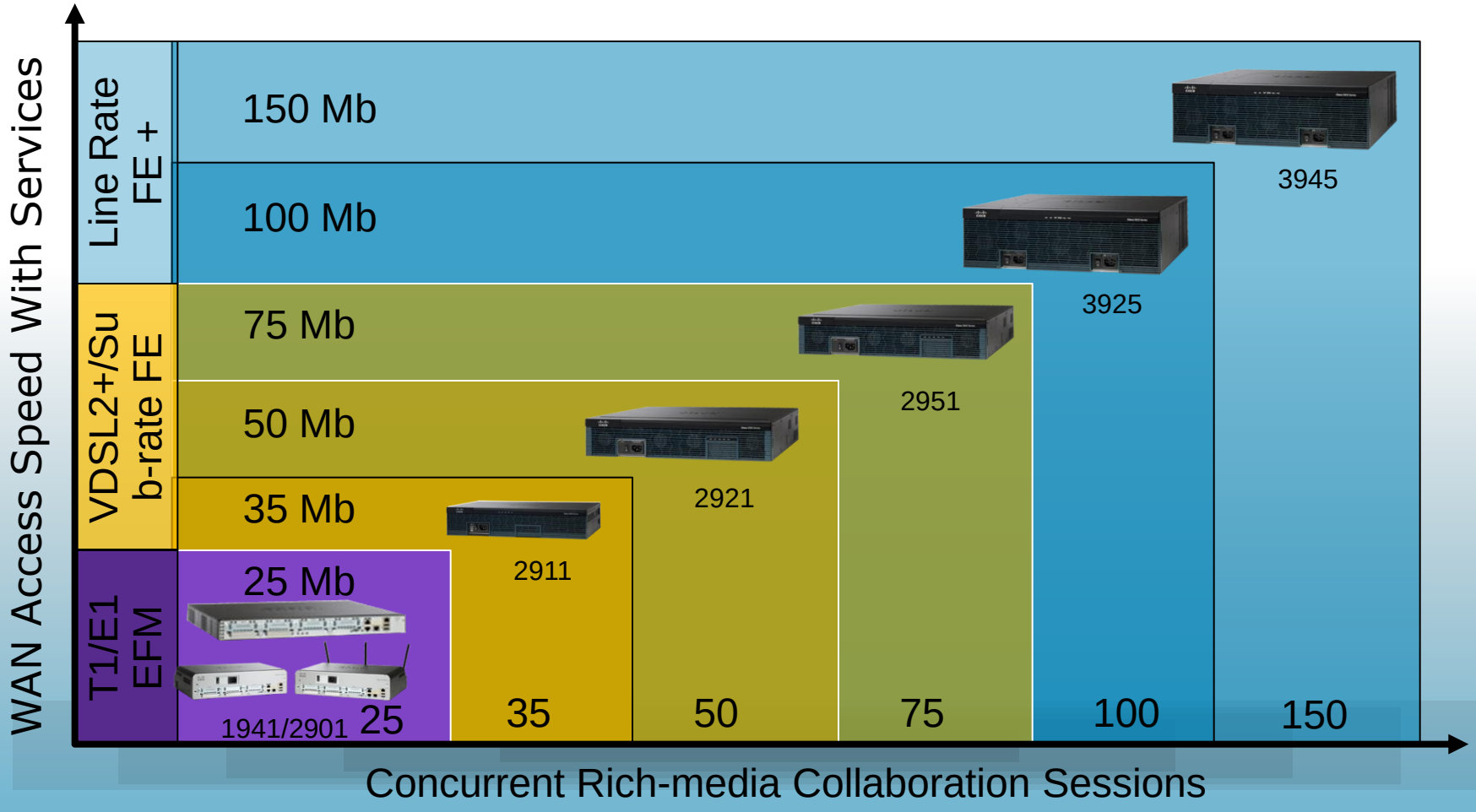
Making the best …even better!

Cisco ISR		Cisco ISR G2
Up to 45 Mbps with Services	**WAN Performance**	Up to 150 Mbps with Services
Single	**Network processor**	Multi-core
X with 160GB	**Service Module Performance and Capacity**	Up to 7X with Dual Core and 1TB storage
Voice Only	**Onboard DSPs**	Voice + Video
Fast Ethernet with PoE. Based on Catalyst 3560/3750	**Switch Modules**	FE/Gigabit Ethernet with PoE+ Based on Catalyst 3560–E/2960
Multiple	**IOS Images**	Single Universal IOS Image
Hardware Coupled	**Service Delivery**	Virtual Services " On-Demand"
Single Motherboard	**Redundancy**	Redundant power supplies. Field-upgradeable motherboard
EnergyWise	**Energy Efficiency**	EnergyWise with slot based controls.

Up to 5X the Performance. Similar price points.

ISR G2 Performance Positioning

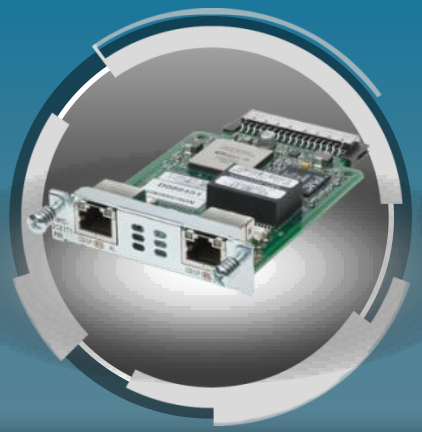
WAN Access and Collaboration



UC Interface Card and Module Support

Service Modules and Interface Cards

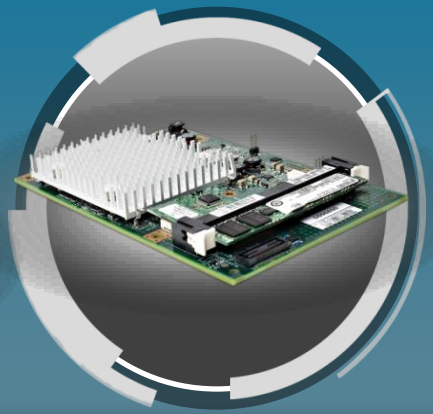
Interface Cards (WAN or LAN)



EHWIC
Enhanced High Speed WAN Interface Card

Internal Module for Running Services using router ports

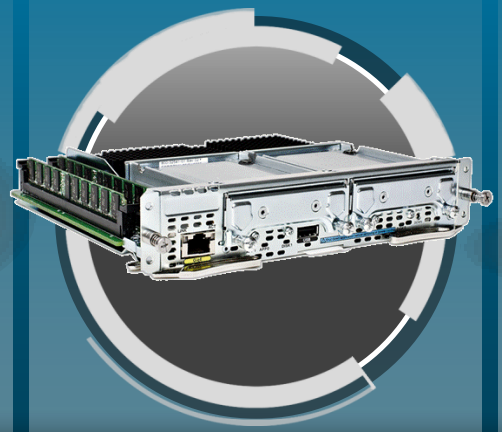
Example: Cisco Unity Express



ISM
Internal Service Module

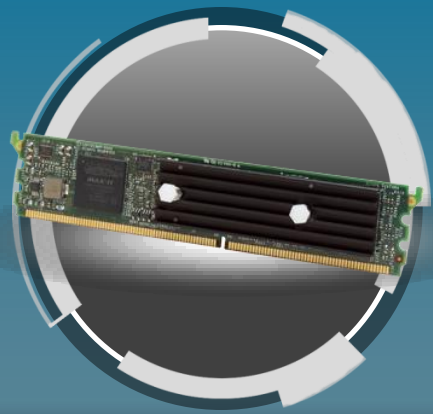
Hosting Services with external interface ports.

Examples: Wireless LAN Controller, WAN Optimization, Etherswitch Module



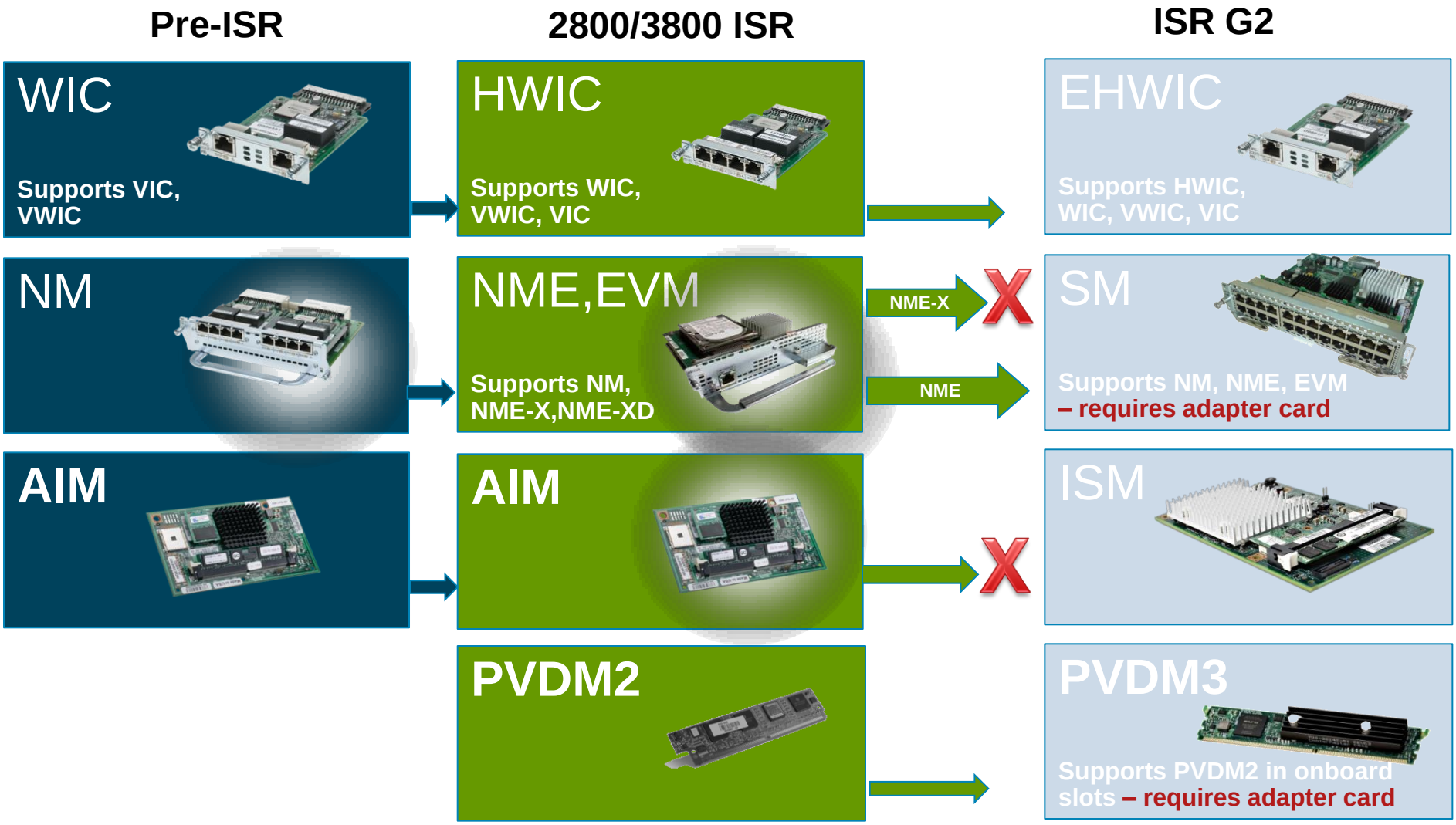
SM
Service Module

High Density Rich-Media Voice and Video DSP Modules



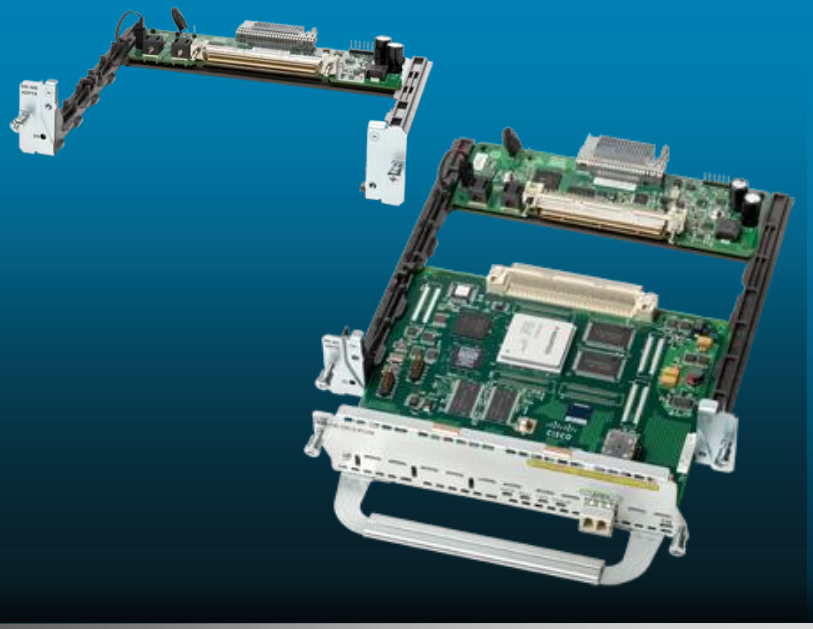
PVDM3
Packet Voice/Video DSP Module

Platform Module Slot Evolution



Adapters

- Maximize investment protection, while allowing for platform evolution
- Provide maximum interface coverage at platform FCS



NM to SM Adapter

PVDM2 to PVDM3 Adapter

UC Module Support Summary

EHWIC Slots VIC Cards	• Slots are backwards compatible • VIC cards are not supported • VIC2 cards are supported unless superceded by a VIC3 card • All VIC3 cards are supported

SM Slots
NM, EVM Cards
	• Existing NMs and EVM supported using NM-adapter card
	• EVM-based EM cards are supported
	  • NM-HDA-specific EM cards are not supported
	  • EM3-HDA-8FXS/DID supported (old EM-HDA-8FXS is not)
	• No dedicated EVM slots, all SM slots can be used
	• SM-SRE-700-K9 for CUE

ISM Slots AIM/ISM Cards	• No AIM form factor cards are supported • ISM-SRE-300-K9 supported for CUE
DSP Slots PVDM2, PVDM3	• Motherboard DSP slots use PVDM3s • Existing PVDM2s supported using PVDM2-adapter card • The NM-HDV2s continue to support PVDM2s (no PVDM3)

Reference

UC Module Support and Migration

Supported	Unsupported
Analog and BRI Cards (VIC)	
VIC2-2FXO	VIC-2FXS
VIC2-4FXO	VIC-2FXO
VIC2-2BRI-NT/TE	VIC-2FXO-EU
VIC3-2E/M	VIC-2FXO-M1/M2/M3
VIC3-2FXS/DID	VIC-2E/M
VIC3-2FXS-E/DID	VIC-2DID
VIC3-4FXS/DID	VIC-2BRI-S/T-TE
	VIC-2BRI-NT/TE
	VIC-2CAMA
	VIC-1J1
	VIC-4FXO-M1
	VIC-4FXS/DID
	VIC2-2FXS
	VIC2-2E/M

Supported	Unsupported
Digital T1/E1 Cards (VWIC)	
VWIC2-1MFT-T1/E1	VWIC-1MFT-T1
VWIC2-2MFT-T1/E1	VWIC-1MFT-E1
VWIC2-1MFT-G703	VWIC-2MFT-T1
VWIC2-2MFT-G703	VWIC-2MFT-E1
	VWIC-2MFT-T1-DI
	VWIC-2MFT-E1-DI
	VWIC-1MFT-G703
	VWIC-2MFT-G703
EVM and EM Cards	
EVM-HD-8FXS/DID*	NM-HDA
EM-4BRI-NT/TE	EM-HDA-8FXS
EM-HDA-3FXS/4FXO	EM-HDA-4FXO
EM-HDA-6FXO	EM2-HDA-4FXO
EM3-HDA-8FXS/DID	

***Requires SM-NM-ADPTR card**

Reference

UC Module Support and Migration

Supported	Unsupported
Network Modules (NM)	
NM-HD-1V*	NM-1V/2V
NM-HD-2V*	NM-HDA
NM-HD-2VE*	NM-HDV
NM-HDV2*	NM-HDV-FARM-C36
NM-HDV2-1T1/E1*	NM-HDV-FARM-C54
NM-HDV2-2T1/E1*	NM-HDV-FARM-C90
Application Modules	
NME-CUE*	AIM-CUE
NME-UMG*	NM-CUE
NME-UMG-EC*	NM-CUE-EC
NM-CUSP-522*	
NME-APPRE*	
ISM-SRE-300-K9 (CUE)	
SM-SRE-700-K9 (CUE)	

*Requires SM-NM-ADPTR card
**Requires PVDM2-ADPTR card

Supported	Unsupported
DSP Cards (DSP, PVDM, EC)	
PVDM2-8**	PVDM-12
PVDM2-16**	DSP-HDA-16
PVDM2-32**	PVDM-4
PVDM2-48**	PVDM-8
PVDM2-64**	PVDM-256K-4
EC-MFT-32	PVDM-256K-8
EC-MFT-64	PVDM-256K-12
PVDM3-16	PVDM-256K-16
PVDM3-32	PVDM-256K-20
PVDM3-64	PVDM-256K-16HD
PVDM3-128	PVDM-256K-20HD
PVDM3-192	
PVDM3-256	
Adapter Cards	
PVDM2-ADPTR	
SM-NM-ADPTR	

Reference

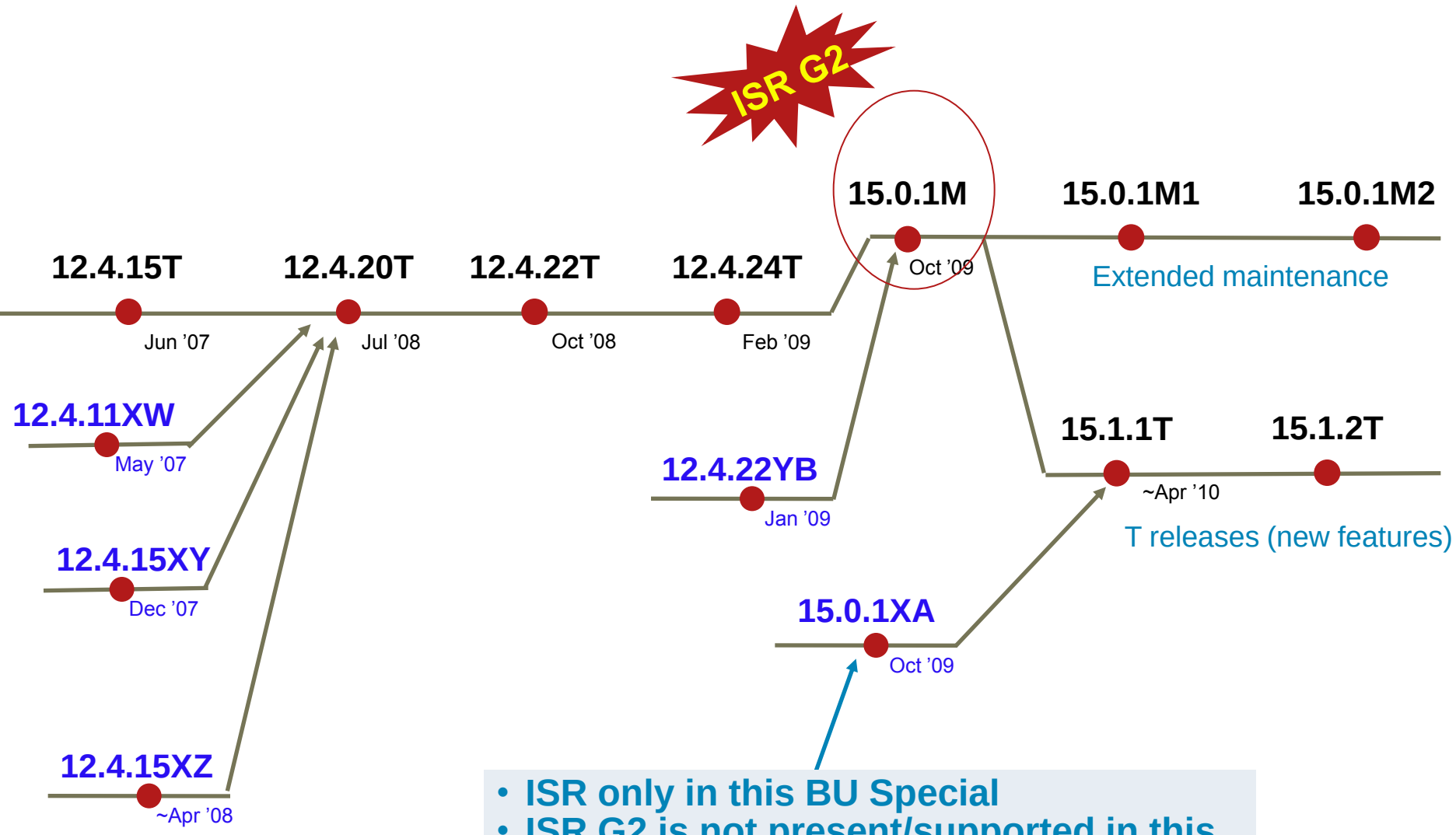
Additional UC Slot and Module Support Notes

	2901	2911	2921	2951	3925	3945
EHWIC Slots	**4**	**4**	**4**	**4**	**4**	**4**
Onboard DSP Slots	**2**	**2**	**3**	**3**	**4**	**4**
ISM Slots	**1**	**1**	**1**	**1**	**1**	**1**
SM (EVM*) Slots	**0**	**1**	**1**	**2**	**2**	**4**
CUSP Support	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

- *EVM Support
  - ISR G2: SM slots can be fully populated with EVM cards
  - ISR: Max 1 on 3825, max 2 on 3845
- CUSP Support
  - ISR G2: Supported on all SM-capable platforms using the SM-NM adapter
  - ISRs: Supported on 3800s only
- Image pre-requisites
  - CUE and CUSP are supported on IP Base
  - All other UC modules require the UC Technology Package

UC Applications and Capacity

IOS Releases for ARTG Products



- ISR only in this BU Special
- ISR G2 is not present/supported in this BU Special (only in the 15.1.1T release)

ISR G2 Collaboration Enhancements

- Next generation DSPs
  - Higher density voice features
  - Video-ready
- High-density analog support
  - Fully populated EVM in SM slots
  - Up to 112 FXS; 64 FXO; 80 DID; 24 E&M
- Full digital DS0 connectivity support
  - 24 T1/E1
- VIC and VWIC native backward compatibility in EHWIC slots
- Significant NM backward compatibility in the SM slots with adapter card
- Onboard POE for up to 98 phones
- UC feature parity with Cisco 2800/3800 ISRs
  - Except: VoFR and VoATM no longer supported

Collaboration Feature and Application Support

- ISR G2s have feature parity with the 2800/3800 ISRs for all UC gateways, applications and services
  - Except: VoFR and VoATM no longer supported

- Voice and Video Gateway
  - Voice GW (Termination)
  - Video GW (Termination)
  - SIP trunking (CUBE)
- Call Agents
  - CME, SRST
- Applications
  - CUE, AXP
- Call Routing
  - CUSP, GK

- Contact Center GW
  - VXML GW
- IP Network Services
  - CUBE (SIP Trunking)
  - RSVP Agent
  - UC-Trusted Firewall (TRP)
  - MTP
- DSP Media Services
  - Conferencing
  - Transcoding

ISR G2 Release Compatibility

- ISR G2 is part of the Moscow UC-solution launch
  - CUCM 7.1.3
  - IOS 15.0.1M
- CME and SRST 7.1
- CUE
  - ISM: CUE 7.1
  - SM: CUE 8.0 (future)
- CUCM
  - MGCP GWs
    - 6.1.5 – Target release date: Dec 2009
    - 7.1.3 – Target release date: September 18, 2009
    - 8.0.1 – Target release date: Feb 2010
  - SIP/H.323 GWs
    - No dependency, any release can be used
- CVP 7.02

Overall 2900/3900 UC Positioning

Platform	Data Circuit Speed	TDM Gateway DS0s	CUBE Sessions	CTS Sessions		CME Phones	SRST Phones
				1000	3000		
2901	25M	100	100	-	-	35	35
2911	35M	150	200	2	1	50	50
2921	50M	240	400	4	2	100	100
2951	75M	400	600	6	3	150	250
3925	100M	480	800	10	5	250*	730
3945	150M	720	1000	20	10	350*	1200

***At FCS 200 (3925) and 300 (3945) phones are supported. The higher numbers are targeted to become available in a post-FCS 15.0.1M rebuild as a software-only upgrade.**

TDM GW Overall Positioning

Platform	Channels	T1s	E1s
2801	32	1	1
2811	70	3	2.5
2821	112	4	3.5
2851	170	7	5.5
3825	340	14	11
3845	450	18	15
2901	100	4	3
2911	150	6	5
2921	240	10	8
2951	400	16	13
3925	480	20	16
3945	720	24	24

Reference

TDM Gateway: Physical DS0 Connectivity

	2801	2811	2821	2851	3825	3845	2901	2911	2921	2951	3925	3945
FXS	16	28	52	52	52	88	16	40	40	64	64	112
FXO/CAMA	16	24	36	36	36	56	16	28	28	40	40	64
E&M	8	12	12	12	16	24	8	12	12	16	16	24
Analog-DID	16	24	40	40	40	64	16	32	32	48	48	80
BRI Ports	8	12	20	20	20	32	8	16	16	24	24	40
BRI Channels	16	24	40	40	40	64	16	32	32	48	48	80
Total T1/E1 Ports	8	12	12	12	16	24	8	12	12	16	16	24
Onboard T1/E1 Ports	8	8	8	8	8	8	8	8	8	8	8	8
NM-based T1/E1 Ports	0	4	4	4	8	16	0	4	4	8	8	16
T1 Channels: DS0 Connectivity	192*	288	288	288	384	576	192	288	288	384	384	576
Onboard T1 DS0 Connectivity	192*	192	192	192	192	192	192	192	192	192	192	192
NM-based T1 DS0 Con'tivity	0	96	96	96	192	384	0	96	96	192	192	384
E1 Channels: DS0 Connectivity	240*	360	360	360	480	720	240	360	360	480	480	720
Onboard E1 DS0 Connectivity	240*	240	240	240	240	240	240	240	240	240	240	240

*** Limited by DSPs to 128 channels**

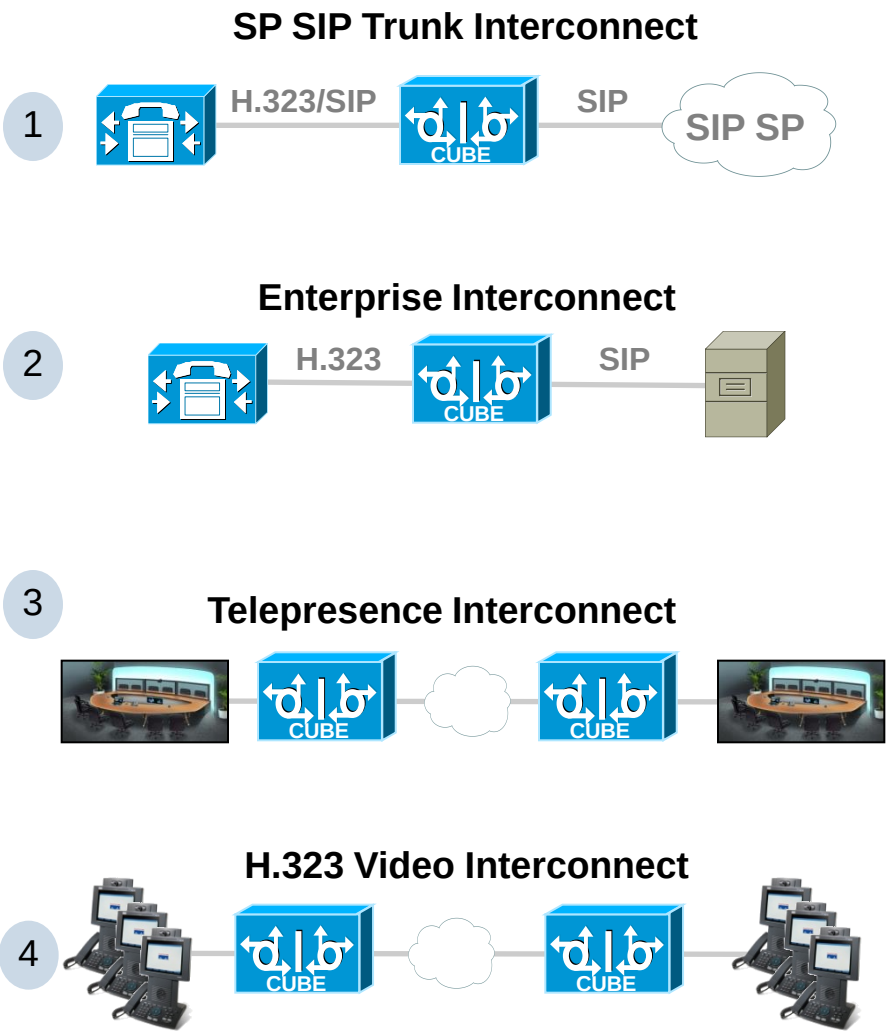
Reference

TDM Gateway Channel Capacity

With Encryption Options, NTE 75% CPU

	2801	2811	2821	2851	3825	3845	2901	2911	2921	2951	3925	3945
Maximum Simultaneous Calls												
Standalone Voice GW												
No encryption	32	70	112	170	340	450	100	150	240	400	480	720
SIP TLS with SRTP	32	65	104	160	320	420	100	150	240	400	480	720
H.323 Signaling-in-IPSec with SRTP	32	60	96	140	290	370	100	150	240	400	480	720
H.323 Signaling-and-Media-in-IPSec	32	34	52	80	150	185	100	150	195	325	360	385
WAN Edge GW												
No encryption	32	48	80	140	270	320	100	150	240	400	480	650
SIP TLS with SRTP	32	45	75	130	250	300	100	150	240	400	480	645
H.323 Signaling-in-IPSec with SRTP	32	41	80	124	220	270	100	150	240	400	480	565
H.323 Signaling-and-Media-in-IPSec	22	22	44	60	110	135	100	125	145	235	265	285
WAN Edge GW with cRTP												
No encryption	26	35	61	120	225	270	100	150	240	400	480	550
SIP TLS with SRTP	26	32	56	112	210	255	100	150	240	400	480	540
H.323 Signaling-in-IPSec with SRTP	22	31	51	100	185	225	100	150	240	400	445	475
H.323 Signaling-and-Media-in-IPSec	14	17	28	50	93	113	95	105	120	200	220	240
Max CPS	0.5	0.7	0.8	1	3	7	1	1.5	2	3	10	15

Cisco Unified Border Element (CUBE)



- CUBE enables
  - 1) SIP Trunk interconnection
  - 2) Application interworking with CUCM and IP PBXs
  - 3) Telepresence business interconnect
  - 4) Video Business interconnect
- Enterprise SBC functions
  - Session Management
  - Protocol Interworking
  - Demarcation
  - Security
- Capacity
  - Up to 1000 VAD-on sessions
  - Up to 1250 VAD-off sessions

Reference

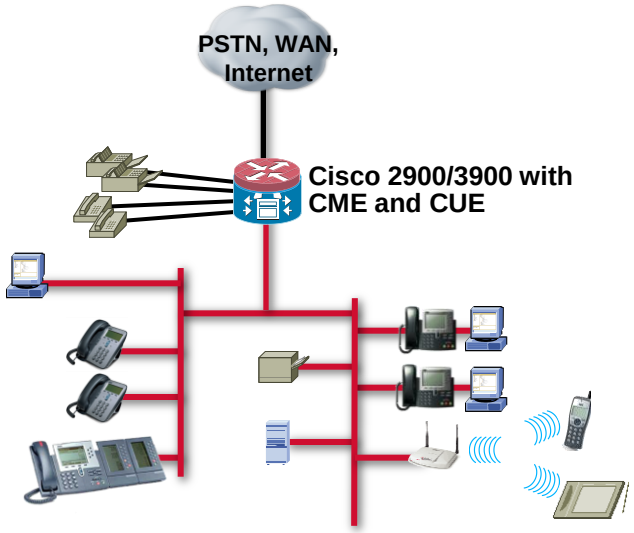
CUBE Performance with Additional Features

Platform	CUBE (VAD-Off)	CUBE (VAD-On)	SW MTP	CUBE + SW MTP	CUBE + Xcoding
2801	55	75	60	30	30
2811	110	150	120	55	55
2821	200	300	220	105	105
2851	225	325	250	115	115
3825	400	500	440	210	210
3845	500	600	550	260	260
AS5000XM	600	850	N/A	N/A	310
2901	100	130	110	55	55
2911	200	260	220	110	110
2921	400	520	440	220	220
2951	600	780	660	330	330
3925 SPE-100	800	1000	880	440	440
3945 SPE-150	1000	1250	1050	500	500

Based on 15.0.1M, G.711/20ms, flow-through, VAD-off, Xcoding is G.711-G.729/20ms, basic calls, Ethernet egress, CPU NTE 75%

Cisco Unified Communications Manager Express (CME)

CME and CUE for the Small Business or Enterprise Branch



Platform	CUCME Phones
2901	35
2911	50
2921	100
2951	150
3925	250*
3945	350*

- Integrated IOS call management features with for up to 350* IP phones
- Range of SCCP and SIP IP Phone Support
- Integrated TDM or SIP trunking for PSTN access
- Secure RTP support
- Built-in Basic ACD
- Integrated Video Communications with VT Advantage
- Unified Messaging with Visual Voicemail
- Automated Attendant & Dial-by-name
- Intuitive / Easy to use GUI for day two system administration

*At FCS 200 (3925) and 300 (3945) phones are supported. The higher numbers will become available in a post-FCS 15.0.1M rebuild.

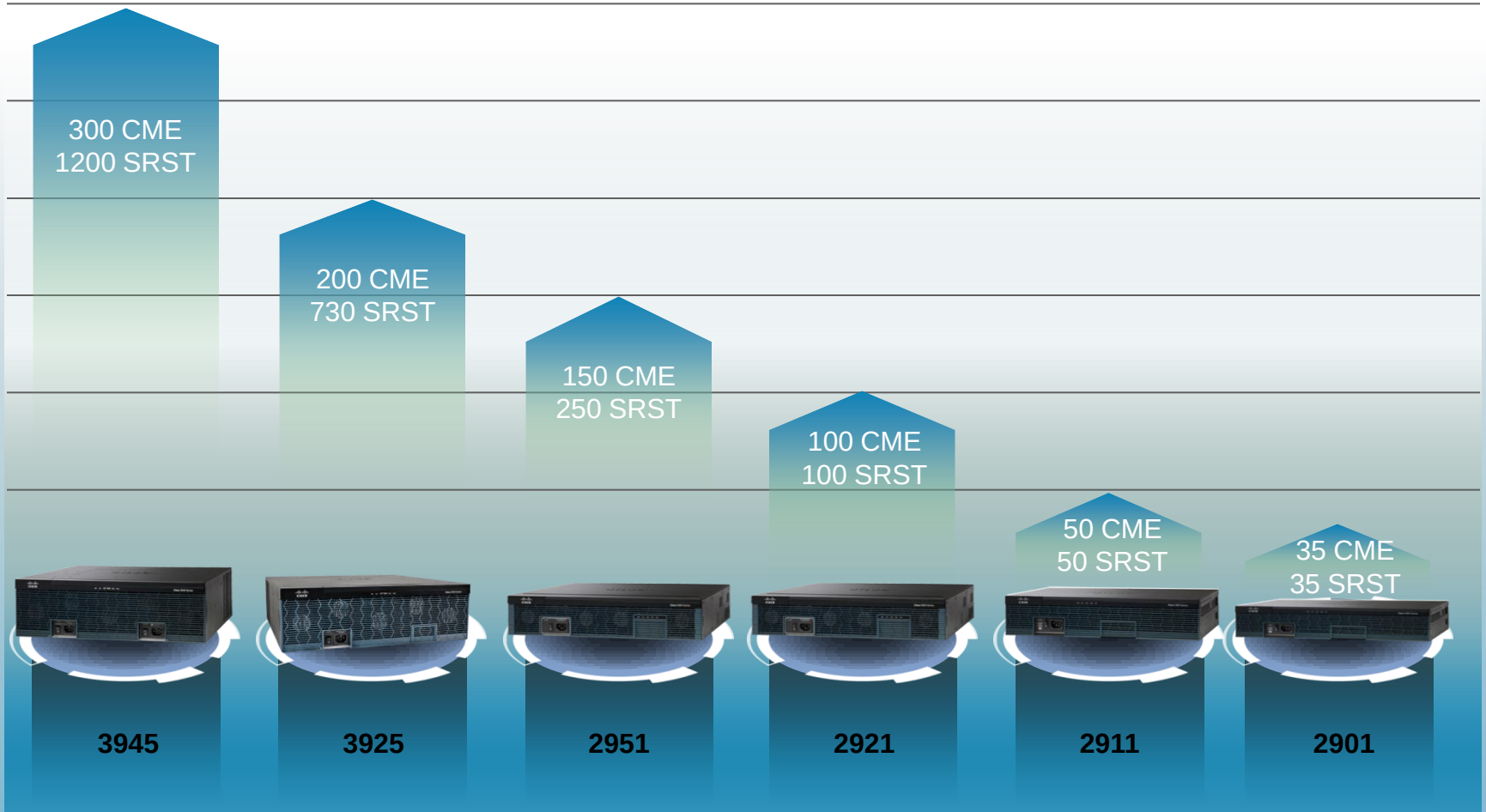
Reference

SRST/CME Phone/DN Capacity

*At FCS 200 (3925) and 300 (3945) phones are supported. The higher numbers will become available in a post-FCS 15.0.1M rebuild.

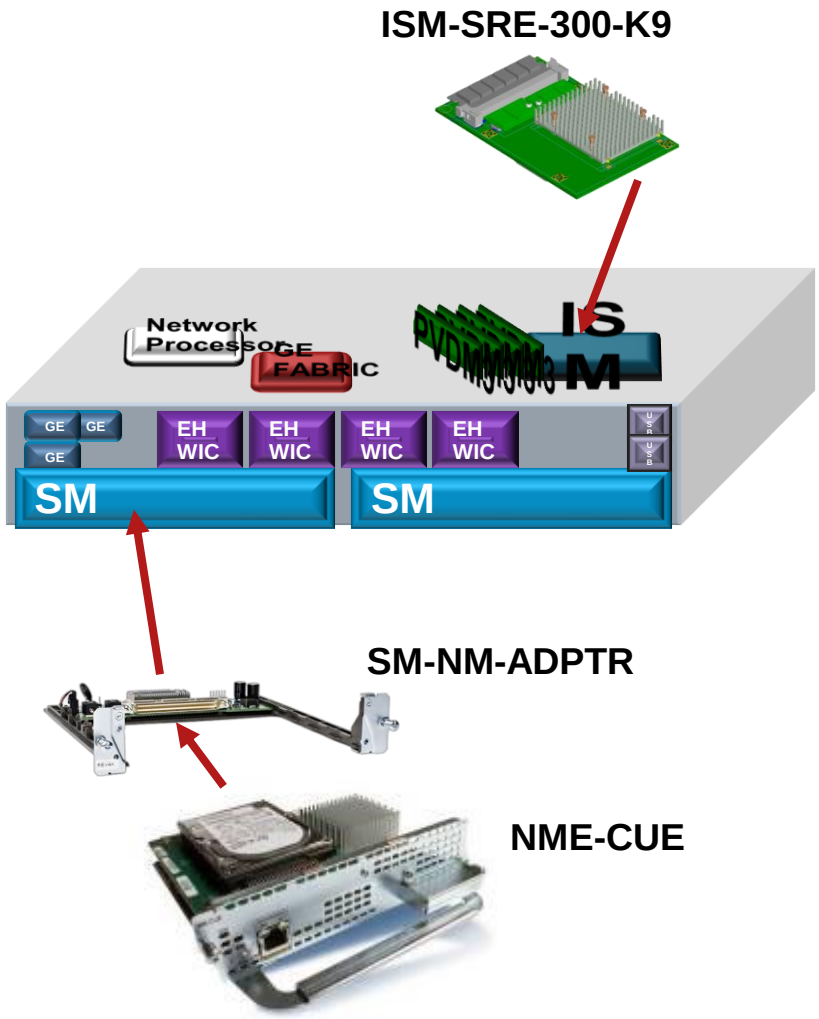
Platform	SRST Phone	SRST DN	CME Phone	CME DN
880-SRST	4	50	N/S	N/S
1861	15	76	15	76
IAD2430	N/S	N/S	24	
3250	N/S	N/S	20	100
3270	N/S	N/S	48	240
3725	144	960	144	500
3745	480	960	192	500
2801	25	150	25	150
2811	35	144	35	144
2821	50	192	50	192
2851	100	288	100	288
3825	350	960	175	500
3845	730	960	250	720
2901	35	200	35	200
2911	50	300	50	300
2921	100	400	100	400
2951	250	500	150	500
3925	730	1000	250*	600
3945	1200	1800	350*	900

Unified Communications Max User Counts



Cisco Unity Express (CUE)

- Support ISM with CUE 7.1; Future SM support with CUE 8.0
- With CUE 7.1 CSL licensing covers the total number of mailboxes available on the system
  - Higher capacity for all services: voicemail, auto-attendant and IVR – 10/100 ports/mailboxes on the ISM and 32/300 on the SM
  - GDMs and user mailboxes are no longer licensed separately



Reference

CUE Hardware, AA, Mailbox and IVR Support

CUE 7.1 Hardware Support

- 2800/3800
  - AIM-CUE, AIM2-CUE
  - NME-CUE
- 2900/3900
  - ISM-SRE-300-K9
  - NME-CUE (SM-NM-ADPTR adapter)

CUE 8.0 Hardware Support

- Target FCS 1H10
- 2800/3800
  - AIM2-CUE, NME-CUE
- 2900/3900:
  - ISM-SRE-300-K9
  - NME-CUE (SM-NM-ADPTR adapter)
  - SM-SRE-700-K9

ISM-SRE-300-K9: 512MB DRAM, 4GB flash
SM-SRE-700-K9: 2GB DRAM, 500GB HDD

Platform	Hardware	Bundled Ports	Max Ports	Max IVR Sessions	Max Mailboxes	Storage (hours)
2800/3800	AIM2-CUE	6	6	6	65	14
	NME-CUE	8	24	24	275	300
2900/3900	ISM-SRE-300-K9	2	10	10	100	60
	SM-SRE-700-K9	4*	32*	32*	300*	600

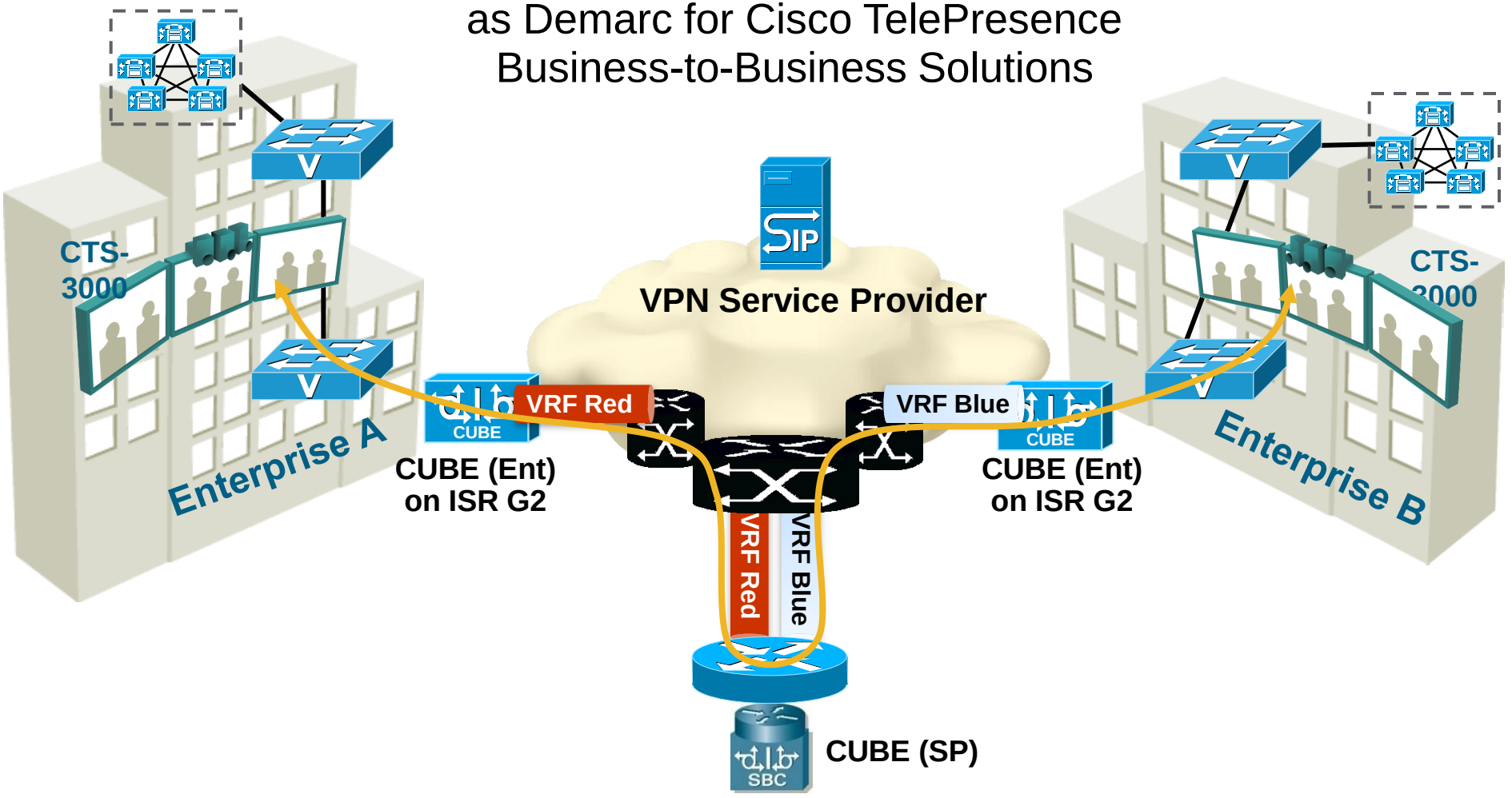
* Numbers are preliminary targets – final support is per the datasheet at FCS

Video Categories – Traffic Types

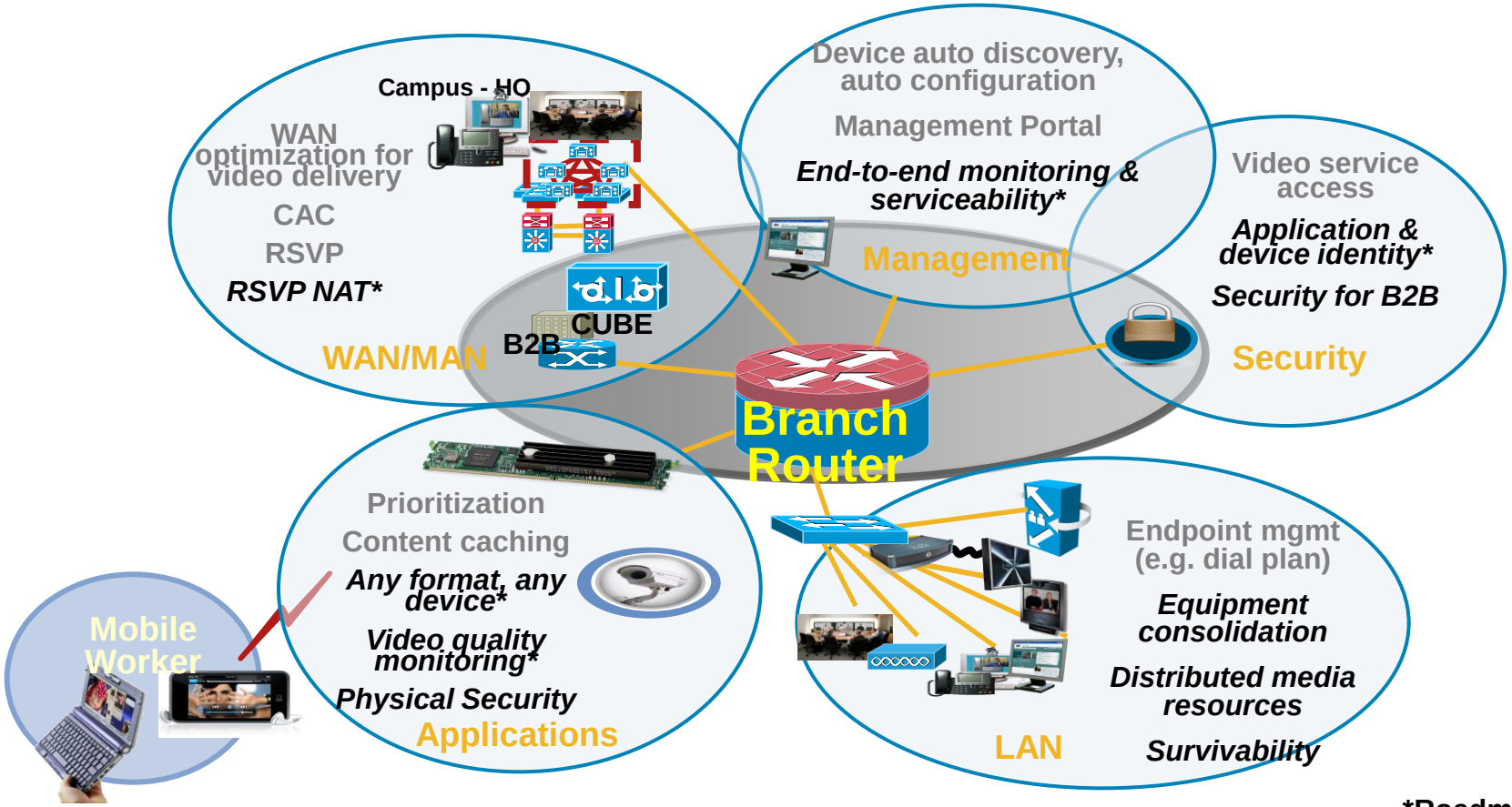
- Desktop Video (Streaming, VODs)
- Desktop Video Collaboration
  - Webex, CUVA, CUPC, 7985G IP phone
- TelePresence
  - CTS500/1000 (720p, 1080p)
  - CTS3000/3200 (720p, 1080p)
- H.320 ISDN Gateway
  - Bonding of 2-16 channels H.320 Video to H.323 or SIP
- Video Surveillance
  - SD (MPEG-4) and HD
- Digital Signage
  - SD and HD streams

TelePresence Interconnect with CUBE

The Cisco Unified Border Element as Demarc for Cisco TelePresence Business-to-Business Solutions



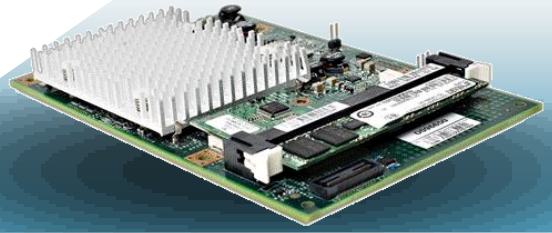
MediaNet: Enterprise Branch Video Elements



*Roadmap

1.0 - CY09 (shipping)	2.0 – 1HCY11: PI14/15 (concept commit)	3.0 & beyond (planning)
Create vision, organize and document existing capabilities	Optimize the Infrastructure for rich media	Optimize video application delivery

Services Virtualization – ISR G2 Services Ready Engines (SRE)



Internal Service Module (ISM)

Single Core x86
512MB RAM, 4GB Flash
Available on 1941 & above—Selected Services

Service Module (SM)

Dual Core High Performance x86
2–4GB RAM, 500GB-1TB HDD
Available on 2811 and above—Full Range of Services

Up to 7x Performance Improvement Compared to Previous Generation

Support for EnergyWise®—Reduces Power Consumption,

High Capacity Storage, RAID Capable and FRU Disks—Enable HA Deployments

Integrated Management, Troubleshooting, on-board HW Diagnostics Tool

Flexible "Service Ready" Deployment Model

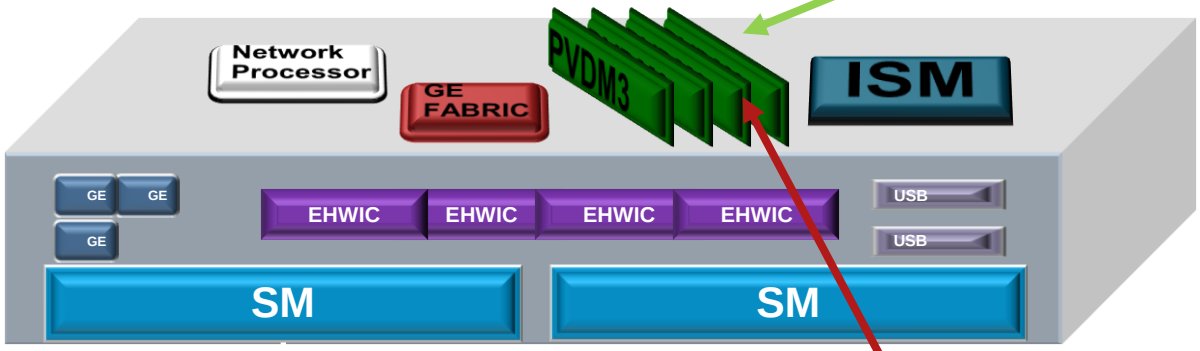
- Deploy HW with router—SW can be deployed remotely saving truck roll costs
- Centralized deployment and management of services
- Available Services: Cisco Unity Express, Application eXtension Platform (NICE Voice Recording, Sagem Interstar Fax over IP)
- Roadmap: WAAS, Wireless LAN Controller, Video Surveillance, Network Analysis, Server Virtualization, Windows Server

DSPs and Media Resources

Cisco 2900/3900 DSP Hardware Overview

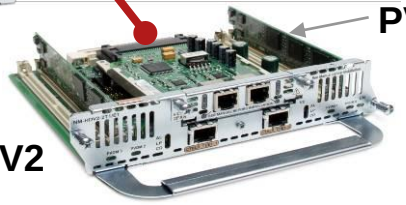
PVDM3 fits natively in the motherboard DSP slots of the Cisco 2900 and 3900 series platforms

PVDM3-xx



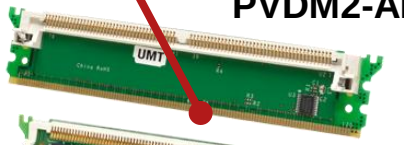
SM-NM-ADPTR

PVDM2-xx



NM-HDV2

PVDM2-ADPTR



PVDM2-xx

PVDM2-xx

Key Highlights of the PVDM3 DSPs

- All PVDM3 SKUs supported on all ISR G2s
- Up to 4x voice channel density per slot
  - Up to 64-party G.711 conferences
- Single universal software image, packaged with the UC Technology Package
- Video feature ready
  - Enhanced multi-core DSP architecture optimized for rich-media UC applications
- Architectural and infrastructure enhancements
  - GE backplane interface for increased IP throughput
  - Improved DSP failure detection and health monitor features
- Easy migration: Co-existence of PVDM2 and PVDM3 on ISR G2
- Feature parity with the PVDM2 DSPs
  - TDM voice termination, fax/modem (except Cisco Fax Relay)
  - Voice conferencing and transcoding
  - H.320 video features
- Power save mode

PVDM3 SKUs	G.711 Channels
PVDM3-16	16
PVDM3-32	32
PVDM3-64	64
PVDM3-128	128
PVDM3-192	192
PVDM3-256	256

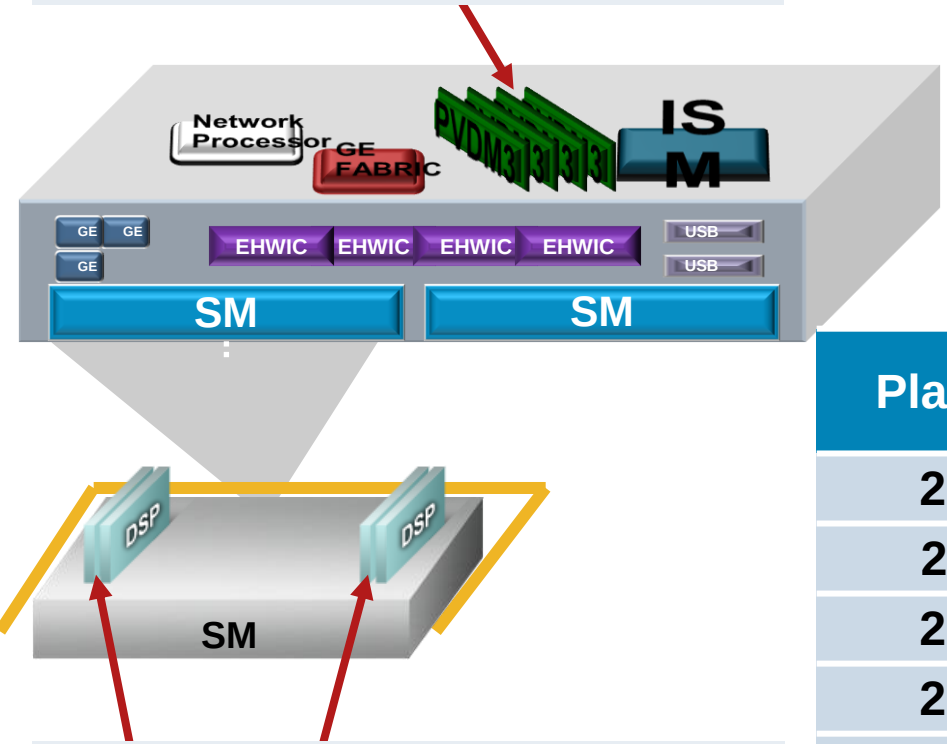
PVDM3 Technology Overview

- PVDM SKU labels indicate the maximum number of G.711 calls supported
- PVDM3 DSP modules are supported on the motherboard slots of the 2900 and 3900 platforms
- Requires 15.0.1M

PVDM3	G.711 Channels	DSP Technology
PVDM3-16	16	Single DSP, single-core
PVDM3-32	32	Single DSP, single-core
PVDM3-64	64	Single DSP, dual-core
PVDM3-128	128	Single DSP, three-cores
PVDM3-192	192	Two DSPs: One dual-core DSP, one three-core DSP
PVDM3-256	256	Two DSPs Each with three-cores

DSP Architecture of the 2900/3900s

PVDM2 or PVDM3: Onboard DSP slots (2, 3 or 4), accessed by the EVM and voice cards in EHWIC Slots



PVMD2: NM-HDV2 provides 4 more DSP slots (HDV2 requires SM-NM-ADPTR to fit into SM slot)

- PVDM3s supported on
  - Onboard slots (natively)
- PVDM2s supported on
  - Onboard slots with PVDM2-ADPTR adapter card
  - SM slots with NM-HDV2 and SM-NM-ADPTR adapter card

Platform	Onboard PVDM3 (or PVDM2) slots	SM-Based PVDM2 slots
2901	2	0
2911	2	4
2921	3	4
2951	3	8
3925	4	8
3945	4	16

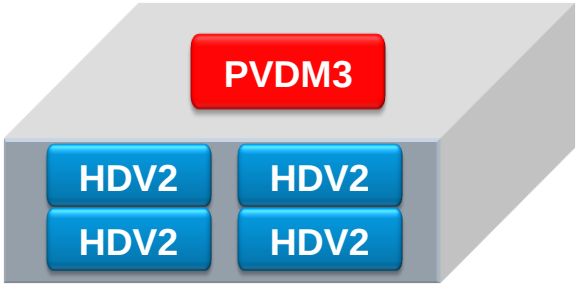
PVDM2 and PVDM3 Features

- Feature parity
  - PVDM2 and PVDM3 generally has feature parity
    - No VoATM and VoFR on ISR G2s or PVDM3
  - PVDM3 has codec parity with PVDM2, except:
    - No Cisco Fax Relay support on PVDM3
  - Future features increasingly available only on PVDM3 DSPs
- DSP firmware images
  - PVDM2 has 2 firmware images: voice termination/xcoding, conferencing
  - PVDM3 has single universal image for all services
- General Platform Support
  - All PVDM2 and PVDM3 SKUs are supported on all ISR G2
  - The 2800/3800 ISRs support only PVDM2s
  - PVDM3 have energy-savings mode
- PVDM2 and PVDM3 DSPs can co-exist on the same ISR G2 platform, but each DSP domain can have only a single type of DSP

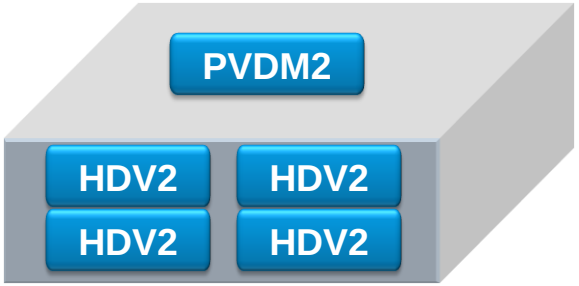
DSP Calculator: http://www.cisco.com/web/applicat/dsprecal/tdm_services.html

PVDM2 and PVDM3 Co-Existence

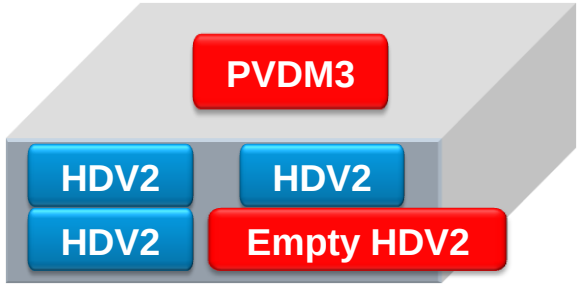
- PVDM2 and PVDM3 DSP can co-exist on the same platform
- Each DSP domain can only contain a single type of DSP
  - Onboard slots are a domain
  - Each SM (NM) is a domain
- DSP sharing can be done only across domains that have the same DSP type (T1/E1 only)



- **PVDM3 on motherboard**
- **PVDM2 in SM slots**
- **All SM interfaces can share DSPs**



- **PVDM2 on motherboard**
- **PVDM2 in SM slots**
- **All EHWIC and SM interfaces can share DSPs**



- **PVDM3 on motherboard**
- **PVDM2 in some SM slots**
- **All PVDM2-based SM interfaces can share DPSs**
- **Empty (no DSPs) HDV2 interfaces can share PVDM3 DSPs from motherboard slots**

DSP Capacity Summary

*Post-FCS numbers

PVDM	TDM DS0s (G.711)	Transcoding (G.711-G.729A)	Conferences* (8-party G.711)	H.320 video (384K calls)
PVDM2				
PVDM2-8	8	4	4	1
PVDM2-16	16	8	8	2
PVDM2-32	32	16	16	4
PVDM2-48	48	24	24	6
PVDM2-64	64	32	32	8
PVDM3				
PVDM3-16	16	12	8	2
PVDM3-32	32	21	13	5
PVDM3-64	64	42	26	10
PVDM3-128	128	96	48	21
PVDM3-192	192	138	74	31
PVDM3-256	256	192	96	42

DSP Calculator: http://www.cisco.com/web/applicat/dsprecal/tdm_services.html

UC Packaging, Licensing and Bundles

Evolution of Software Packaging And Activation

IOS
1990s

- Many Images, feature upgrades
- Complex to support

IOS Reformation
2004

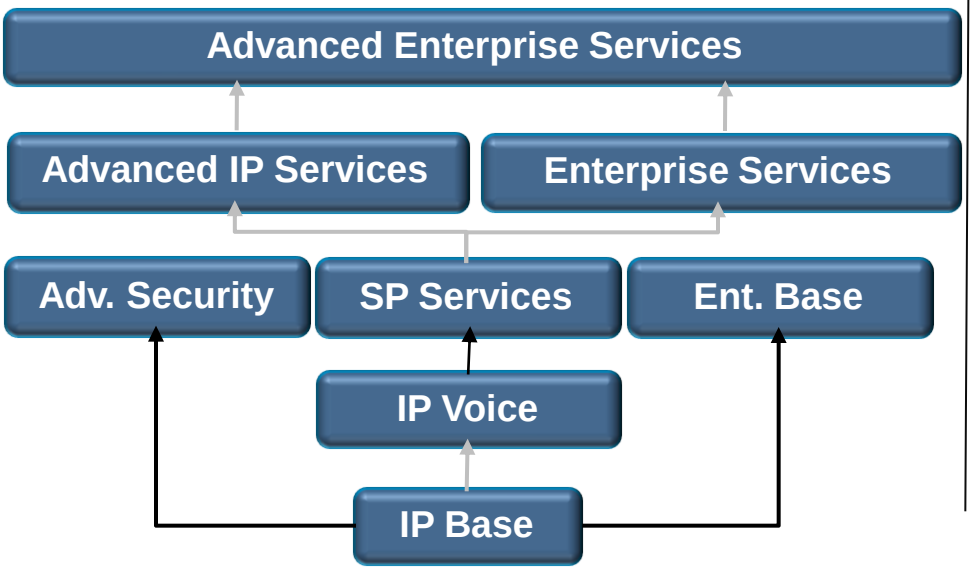
- Introduced with ISRs
- Reduced complexity/Images
- Some SW Licensing

Licensed
2010

- One Universal Image
- Ease Of Ordering
- Services On Demand

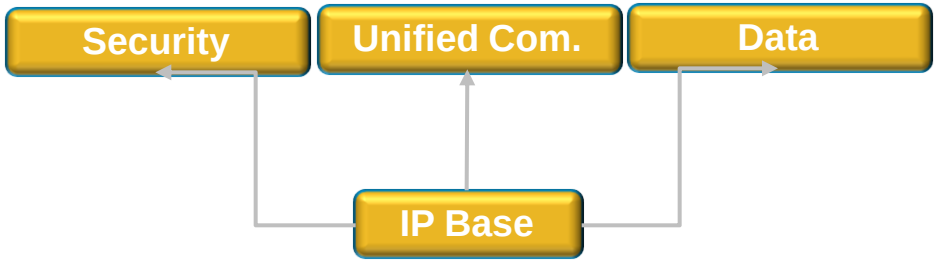
Software Packaging Evolution Summary

2800/3800 ISR



- Different IOS Images
- Feature sets embedded within selected image
  - E.g. IPSec requires Advanced Security image
- Software Licenses for specific capabilities, e.g. CME/SRST

2900/3900 ISR G2



- Single Universal IOS Image
- 4 Technology Packages (IOS enforced)
  - IP Base (IPB), Security (SEC), Data and UC
- Software Licenses for specific capabilities, e.g. CME/SRST

ISR G2 IOS Packaging

Software Activation Feature Licenses

- SSLVPN
- Intrusion Prevention (S)
- Content Filtering (S)

Right to Use Feature Licences

- LMR [Land Mobile Radio]
- CME: Voice and Video (C)
- SRST : Voice and Video (C)
- VXML/IVR Gateway (C)
- CUBE (C)

- SNA switch

- Gatekeeper

- IKE v1 / IPsec / PKI
- IPsec/GRE
- Easy VPN w/ DVTI
- DMVPN
- Static VTI
- Firewall
- Network Foundation Protection
- GETVPN

- TDM/PSTN Gateway
- Video Gateway [H.320]
- Voice Conferencing
- Codec Transcoding
- Secure Voice / SRTP
- RSVP Agent & Preconditions
- Fax T.37/38
- CAC/QOS
- Hoot-n-Holler
- SAF, IPV6 for SIP222

- MPLS BFD RSVP
- L2VPN
- L2TPv3
- Layer 2 Local Switching
- Flexible Netflow
- Mobile IP
- Multicast Authentication
- FHRP—GLBP
- ISIS IPv6 OSPFv6
- ISIS IPv6 OSPFv6
- IP SLAs PfR NTPv4
- DECnet ALPS
- AppleTalk RSRB BIP
- DLSw+ FRAS
- Token Ring
- ISL IPX STUN
- SNTP SDLC QLLC
- LAT

SEC | **UC** | **Data**

Technology Packages

IP Base — AAA BGP, OSPF, EIGRP, ISIS, RIP PBR IGMP, Multicast DHCP HSRP, GLBP NHRP HTTP HQF QoS ACL, NBAR GRE CDP, ARP NTP PPP PPPoA PPPoE RADIUS TACACS SCTP SMDS SNMP STP VLAN DTP IGMP Snooping SPAN WCCP ISDN ADSL over ISDN NAT - Basic X.25, RSVP

Packaging Migration

IOS Reformation Packaging	Suggested Transition to Simplified packaging
IPBase	IPBase
IP Voice	UC
Enterprise Base	DATA
Enterprise Services	DATA + UC
SP Services	DATA + UC (for feature parity and Enterprise Features)
Advanced Security	SEC
Advanced IP Services	SEC+ UC +DATA (for feature parity and Enterprise Features)
Advanced Enterprise Services	SEC+ UC + DATA

UC Licensing

- All Technology Packages and UC features using Software Activation Licenses are enforced via the Cisco Software Licensing framework

Technology Packages		
IP Base	SL-29-IPB-K9 SL-39-IPB-K9	Platform
Data	SL-29-DATA-K9 SL-39-DATA-K9	Platform
Security	SL-29-SEC-K9 SL-39-SEC-K9	Platform
UC	SL-29-UC-K9 SL-39-UC-K9	Platform

UC Software Activation Licenses		
CUE	FL-CUE-MBX-5	Counted
	FL-CUE-PORT-2	Counted
	FL-CUE-IVR-2	Counted
	FL-TCV-USER-1	Counted
GK	FL-GK-2901	Platform
	FL-GK-2911	Platform
	FL-GK-2921	Platform
	FL-GK-2951	Platform
	FL-GK-3945	Platform
	FL-GK-3925	Platform

UC Licensing

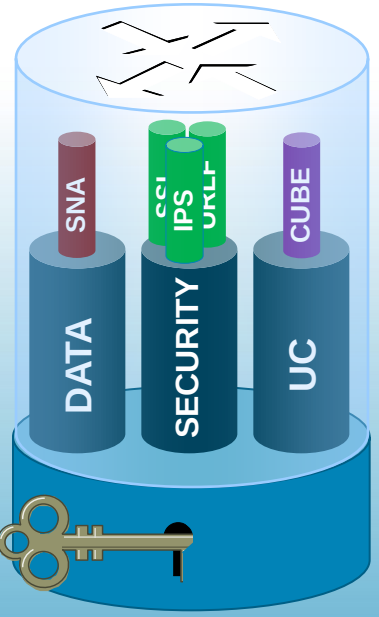
- UC features not yet using Software Activation Licenses can be used upon receipt of Right-to-Use notification

UC Right-to-Use Licenses		
VXML	FL-VXML-1	Counted
	FL-VXML-12	Counted
CUBE	FL-CUBEE-5	Counted
	FL-CUBEE-25	Counted
	FL-CUBEE-100	Counted
	FL-CUBEE-500	Counted
	FL-CUBEE-1000	Counted
CME/SRST	FL-CME	Platform
	FL-SRST	Platform
	FL-CME-SRST-5	Counted
	FL-CME-SRST-25	Counted
	FL-CME-SRST-100	Counted

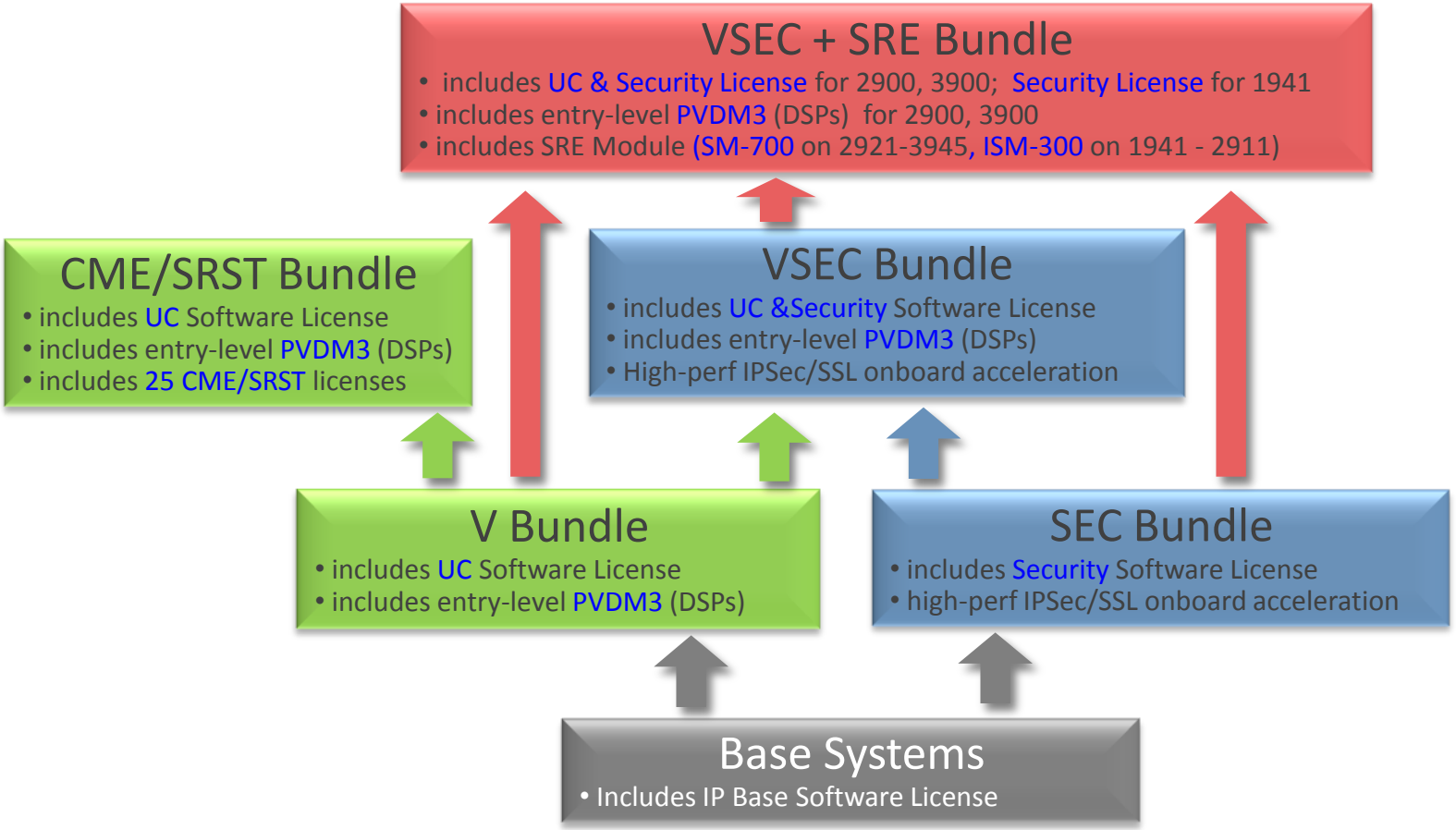
IOS Software Activation After Product Order

1. Customer purchases product activation keys (PAKs) for desired feature set and obtains Unique Device Identifier (Product ID + Serial Number), for the device he wants to upgrade
2. Using the Cisco website, the customer can purchase and generate a license for a feature set on that specific device
3. License is installed and activated using Cisco License Manager, Router Call-Home, or manual copy and install
4. These steps are the same for additional feature sets

Previously Purchased Router



ISR G2 Bundles Available at Launch



- VSEC+SRE bundle provides maximum savings and includes a 'blank' SRE module to enable flexibly deployment of application services
- The ISR G2 portfolio offers SEC, V, VSEC Bundles at FCS similar to ISRs today
- CME & SRST Bundles merge single offering with 25 seats included; can upgrade from 25 seats by adding FLs a-la carte
- All UC ISR G2 bundles include: default platform memory, 15.0.1M, PVDM3 DSPs

ISR to ISR G2 Bundle Migration

2800/3800 ISR Bundle	2900/3900 ISR G2 Bundle
Voice Bundles	
CISCOxxxx-V/K9	CISCOxxxx-V/K9
CISCOxxxx-SRST/K9	Cxxxx-CME-SRST/K9 + (FL-SRST or FL-CME) + additional FL-CME-SRST-xx
CISCOxxxx-CCME/K9	
Cxxxx-xxUC/K9	Cxxxx-CME-SRST/K9 + FL-CME + additional FL-CME-SRST-xx + FL-CUE-xx
Voice + Security	
Cxxxx-VSEC/K9	Cxxxx-VSEC/K9
Cxxxx-H-VSEC/K9	
Cxxxx-VSEC-SRST/K9	Cxxxx-VSEC/K9 + FL-SRST + additional FL-CME-SRST-xx, or Cxxxx-CME-SRST/K9 + SEC + additional FL-CME-SRST-xx
Cxxxx-VSEC-CCME/K9	Cxxxx-VSEC/K9 + FL-CME + additional FL-CME-SRST-xx, or Cxxxx-CME-SRST/K9 + SEC + additional FL-CME-SRST-xx
Cxxxx-VSEC-CUBE/K9	Cxxxx-VSEC/K9 + FL-CUBEE-xx
Cxxxx-xxUC-VSEC/K9	Cxxxx-CME-SRST/K9 + SEC + FL-CME + additional FL-CME-SRST-xx + FL-CUE-xx

http://rtp-filer07b-web/wg-a/artg-isr/Published/Product_Documents/Selling_Resources/isr_g2_mrkt_programs.ppt

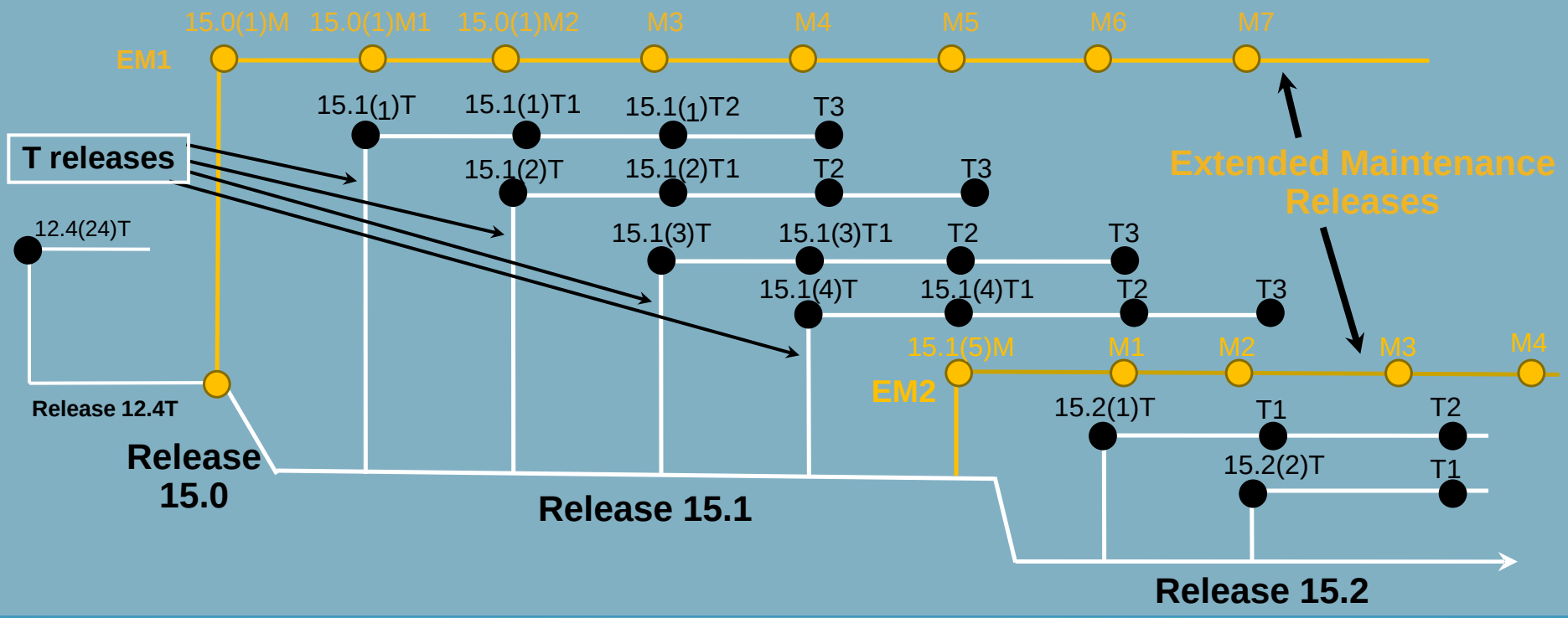
Questions?

Release 15.0 IOS Numbering and Delivery

Single Train Release Model

Improved Quality and Management

Predictable Schedules



Video Traffic Support

Traffic Type	BW	2901	2911	2921	2951	3925	3945
Desktop Video (Streaming, VODs…)	200K	125	175	250	375	500	750
	512K	48	68	97	146	195	292
	1.5M	16	23	33	50	66	100
Desktop Video Collaboration	384K	65	91	130	195	260	390
	768K	32	45	65	97	130	195
TelePresence							
CTS-1000	5M	5	7	10	15	20	30
CTS-3000	14.1M	1	2	3	5	7	10
H.320 ISDN Gateway	384K	65	91	130	195	260	390
	768K	32	45	65	97	130	195
Video Surveillance	SD (MPEG4) 1M	25	35	50	75	100	150
	HD (H.264) 4M	6	8	12	18	25	37
Digital Signage	SD 3M	8	11	16	25	33	50
	HD (H.264) 10M	2	3	5	7	10	15

Maximum support with router's entire throughput dedicate to this traffic

Reference

MediaNet Video BW Ranges

cisco.com/go/medianet

Approximate Bandwidth Requirements Per Video Stream

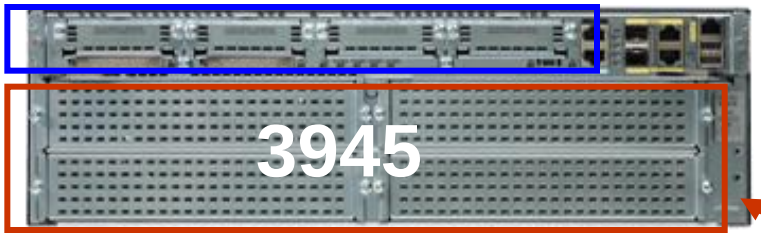
Video Category	Specific Video Application	Approximate Bandwidth Per Stream / Participant
Desktop Video	Standard Definition VoDs and Live	200 Kbps – 1.5 Mbps
Digital Signage / Enterprise TV	Standard Definition VoDs and Live	1.5 Mbps – 5 Mbps
	High Definition VoDs and Live	8 Mbps – 15 Mbps
Cisco TelePresence	CTS-500 / CTS-1000 720p Resolution	2.1 Mbps – 8.7 Mbps
	CTS-500 / CTS-1000 1080p Resolution	4.5 Mbps – 10.8 Mbps
	CTS-3000 / CTS-3200 720p Resolution	4.5 Mbps – 14.1 Mbps
	CTS-3000 / CTS-3200 1080p Resolution	11.7 Mbps – 20.4 Mbps
Desktop Video Collaboration	CUVA and CUPC	50 Kbps – 1.5 Mbps >384 Kbps Recommended
	Cisco IP 7985G Phone	Up to 768 Kbps
	WebEx Conference via Webcam (Video Only)	32 Kbps – 284 Kbps (Max of Six Streams)
IP Video Surveillance	Cisco 4400 Series HD Cameras – H.264 Mode	~ 4 Mbps Typical
	Cisco 2500 Series Cameras – MPEG-4 Mode	~ 1 Mbps Typical

ISRs in a MediaNet Network

Area	Role and Features
QoE	CAC (RSVP, Call Counting, Gatekeeper) WAAS (2800/3800 only) IPSLA QoS, Policing and Marking, Queuing, Traffic Shaping PoE
Delivery	Multicast Performance Routing (PfR) Policy Routing Dynamic Routing (RIP, BGP, OSPF,EIGRP etc)
Security	AAA, Firewall, VPN, DMVPN, GETVPN, IPS, Content Filtering, FPM, AutoSecure, Control Plane Policing VRF, UC-trusted FW (TRP) SRTP, TLS, IPSec
Content	ISR DSP media resources for audio transcoding, conferencing, MTP IVPS-16 and VMSS (2800/3800 only)
Session Control	CUBE; SIP Proxy (CUSP); CUCME Video H.323, SIP, SCCP H.320 Video GW
Mobility	3G WWAN, 802.11a/b/g/n
Management	Cisco Security Manager (CSM), Cisco netManager Unified Comm, Cisco Configuration Professional (CCP), Cisco Unified Operations Manager, SAF…

High-Density Analog GW

- ISR G2 supported fully populated with EVM cards
- Up to 112 FXS ports on 3945



VIC3-4FXS/DID
VIC3-4FXS/DID
VIC3-4FXS/DID
VIC3-4FXS/DID
16

EVM-8FXS/DID with 2xEM3-HDA-8FXS/DID — 24
EVM-8FXS/DID with 2xEM3-HDA-8FXS/DID — 24
EVM-8FXS/DID with 2xEM3-HDA-8FXS/DID — 24
EVM-8FXS/DID with 2xEM3-HDA-8FXS/DID — 24

112 Total FXS Ports

PVDM3 Power Save Mode

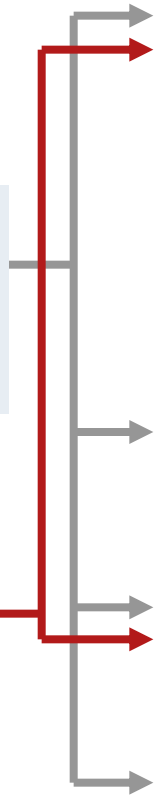
- Introduces the ability to control power supply to hardware modules
- Can be one time or scheduled periodically via CLI
- Considerations when using power save mode
  - Active calls can be forced to disconnect when engaging power save mode
  - Check for active calls, and if found, will not go into power save mode
  - “Missed opportunity”: waits for next schedule to go into power save mode
  - Signaling excluded from power save mode – allows for emergency calls and prevents garbage signaling information

Router#hw-module pvdm pvdm-slot energywise-level {0|6|10}
0 – Sets the power-save mode to shut
6 – Sets the power-save mode to frugal
10 – Sets the power-save mode to full

License Types

- **Technology Packages**
- **Software Activation Licenses**

- **Right-to-Use Licenses**



Permanent

- Valid for the life of the device in which it's installed
- IOS Technology Packages (IPB, UC, SEC, DATA)
- Feature licenses that enable as many users/sessions as the platform supports
  - E.g. Feature Licenses for CME, CUBE, GK etc.

Subscription

- Licenses that are tied to a time period (term)
- E.g. URL filtering, Intrusion prevention system

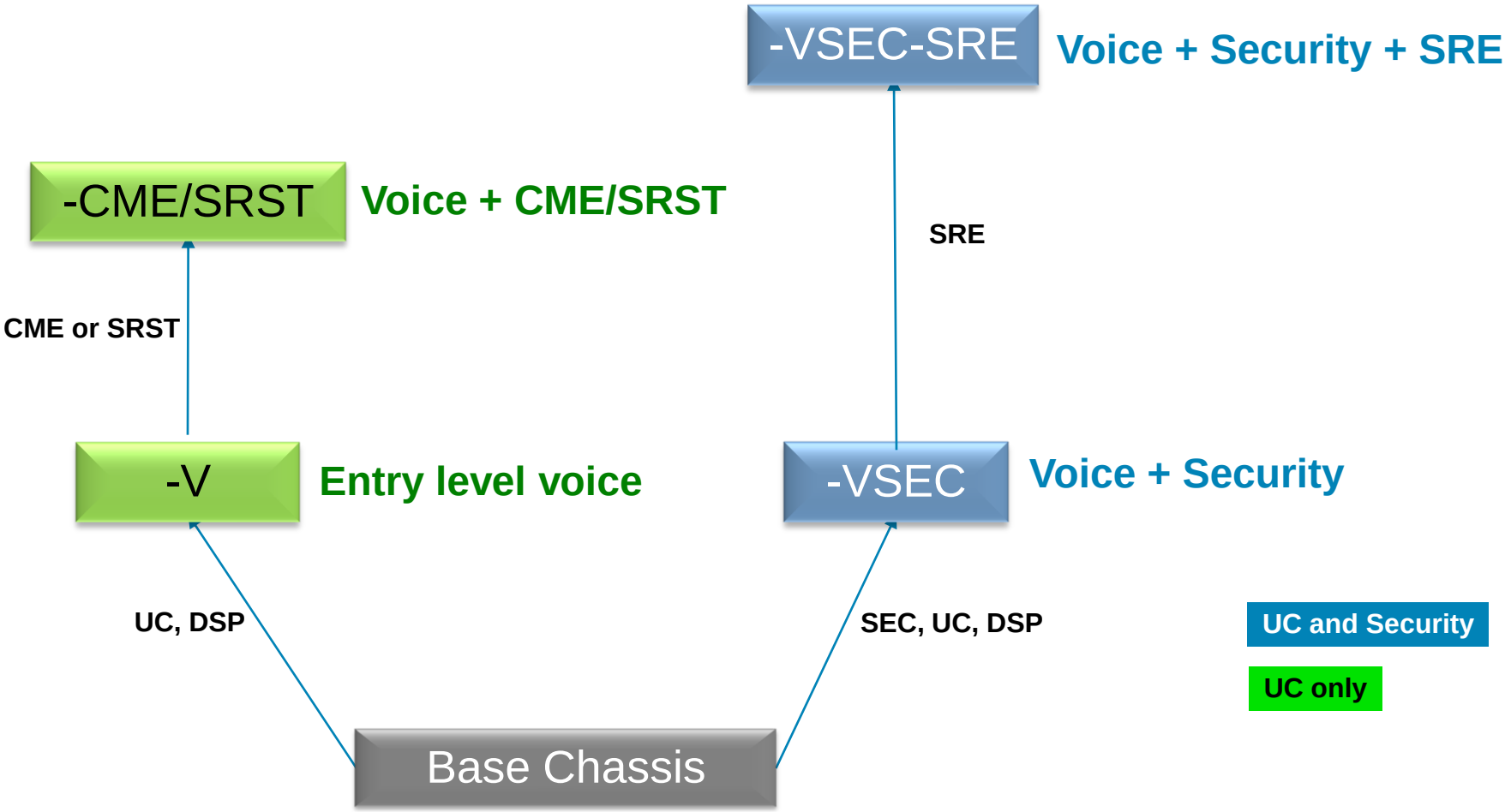
Counted

- Licenses that enable a number of users/sessions
- E.g. SRST, CME, VXML and CUBE licenses

Evaluation (Temporary)

- Built-in licenses allowing feature set use for 60 days
- Used for trials

Cisco 2900/3900 ISR G2 UC Bundles



Reference

2900/3900 ISR Bundle SKU Reference

- ISR G2s bundles combine SRST and CCME into a single bundle
  - Choice of FL-SRST or FL-CME ($0 SKU)
  - Includes 25 seats for all platforms
- All bundles are on 15.0.1M

Voice	CCME-SRST	VSEC
CISCO2901-V/K9	**C2901-CME-SRST/K9**	**C2901-VSEC/K9**
CISCO2911-V/K9	**C2911-CME-SRST/K9**	**C2911-VSEC/K9**
CISCO2921-V/K9	**C2921-CME-SRST/K9**	**C2921-VSEC/K9**
CISCO2951-V/K9	**C2951-CME-SRST/K9**	**C2951-VSEC/K9**
CISCO3925-V/K9	**C3925-CME-SRST/K9**	**C3925-VSEC/K9**
CISCO3945-V/K9	**C3945-CME-SRST/K9**	**C3945-VSEC/K9**
Includes:		
PVDM3	**PVDM3**	**PVDM3**
SL-29-UC-K9 or SL-39-UC-K9	**SL-29-UC-K9 or SL-39-UC-K9**	**SL-29-UC-K9 or SL-39-UC-K9 and SL-29-SEC-K9 or SL-39-SEC-K9**
	FL-CME or FL-SRST and FL-CME-SRST-25	

Reference

2900/3900 ISR G2 UC Bundles Details
–V and –CCME-SRST

- All bundles are on 15.0.1M

Bundle	Technology Package	DSP	License	Memory Flash	Memory DRAM
Voice Bundles					
CISCO2901-V/K9	SL-29-UC-K9	PVDM3-16	None	256M	512M
CISCO2911-V/K9	SL-29-UC-K9	PVDM3-16	None	256M	512M
CISCO2921-V/K9	SL-29-UC-K9	PVDM3-32	None	256M	512M
CISCO2951-V/K9	SL-29-UC-K9	PVDM3-32	None	256M	512M
CISCO3925-V/K9	SL-39-UC-K9	PVDM3-64	None	256M	1G
CISCO3945-V/K9	SL-39-UC-K9	PVDM3-64	None	256M	1G
CCME-SRST Bundles					
C2901-CME-SRST/K9	SL-29-UC-K9	PVDM3-16	FL-CME-SRST-25	256M	512M
C2911-CME-SRST/K9	SL-29-UC-K9	PVDM3-16	FL-CME-SRST-25	256M	512M
C2921-CME-SRST/K9	SL-29-UC-K9	PVDM3-32	FL-CME-SRST-25	256M	512M
C2951-CME-SRST/K9	SL-29-UC-K9	PVDM3-32	FL-CME-SRST-25	256M	512M
C3925-CME-SRST/K9	SL-39-UC-K9	PVDM3-64	FL-CME-SRST-25	256M	1G
C3945-CME-SRST/K9	SL-39-UC-K9	PVDM3-64	FL-CME-SRST-25	256M	1G

Reference

2900/3900 ISR G2 UC Security Bundles Details –VSEC and –VSEC-SRE

- All bundles are on 15.0.1M

Bundle	Technology Package	DSP	Add'nal HW	Memory Flash	Memory DRAM
VSEC Bundles					
C2901-VSEC/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-16	None	256M	512M
C2911-VSEC/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-16	None	256M	512M
C2921-VSEC/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-32	None	256M	512M
C2951-VSEC/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-32	None	256M	512M
C3925-VSEC/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-64	None	256M	1G
C3945-VSEC/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-64	None	256M	1G
VSEC-SRE Bundles					
C2901-VSEC-SRE/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-16	ISM-SRE-300-K9	256M	512M
C2911-VSEC-SRE/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-16	ISM-SRE-300-K9	256M	512M
C2921-VSEC-SRE/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-32	SM-SRE-700-K9	256M	512M
C2951-VSEC-SRE/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-32	SM-SRE-700-K9	256M	512M
C3925-VSEC-SRE/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-64	SM-SRE-700-K9	256M	1G
C3945-VSEC-SRE/K9	SL-29-UC-K9 and SL-29-SEC-K9	PVDM3-64	SM-SRE-700-K9	256M	1G