

VAM Environment specification

VAM (Voice Access Modernization) Enterprise contact center solution and IVR include the following major services:

1. Cisco – supplied hardware (Unified Computing System (UCS) servers and 3925E/3925/2190 integrated services routers (ISR));
2. Cisco UCCE platform;
3. Customer Voice Portal (CVP) for call segmentation, IVR based self-services and call queuing;
4. Intelligent Contact Management (ICM) for call routing, Computer Telephony Integration (CTI) messaging and reporting feed;
5. Cisco Unified Communications Manager and Unity for private branch exchange /Voice mail functionality;
6. Finesse and CTI operating system (OS) to provide agent desktop features;
7. Local (Cisco Internet Protocol (IP) Phones and IP Communicator) and remote agents (both virtual private network and mobile client based);
8. Cisco Unified Intelligence Center (CUIC) used for historical and real time reporting and dash boards;
9. Cisco outbound option for outbound voice solution;
10. Custom developed Cisco outbound option based Short Message Service (SMS) solution;
11. Agent end points (Cisco phones and IP Communicators) in call center locations;
12. Courtesy call back;
13. Nice Engage Quality assurance solutions, including voice recording, screen capturing, scoring, interaction and voice analytics;
14. Nice IEX Workforce management solution with real time and historical data feed from Cisco UCCE environment

The implemented system followed typical UCCE deployment model in which all relevant component are mirrored and deployed between two geographically distributed data centers – Philadelphia and Austin.

All applications are deployed in a virtualized environment on Cisco C260M2, C220M3S and C240 M3S Unified Computing Servers (UCS). The environment has five (5) C260 servers and six (6) C240 servers in the Philadelphia data center and four (4) C260 servers, one (1) C220 server and six (6) C460 servers in the Austin data center. The Philadelphia data center is considered "Side A" for this deployment and the Austin data center is "Side B".

Ten 3925E gateways on each side (20 total) serve as the VXML gateways in the environment as well as provide limited IOS media resources including MTP, Conference Bridge, and Transcoding.

Each router handles 14 Primary Rate Interface (PRI) circuits. A DS-3 circuit from Verizon and CenturyLink is terminated at each location for a total of 4 DS-3s.

Each site has one (1) DS3 provided by Century Link and four (4) DS3 provided by Verizon.

Two (2) Cisco 2951 voice gateways deployed with the Cisco Unified SIP Proxy (CUSP) module, one on each side, are leveraged for providing a centralized dial plan and egress gateway load balancing for UCCE outbound calls from the SIP Dialer. There are no analog gateways as part of this install. For system level monitoring and management, Prognosis tools determine network health, performance, utilization and availability of the covered systems. Spectrum solution performing the same monitoring functions are in process of been deployed.

The product provides real-time and near real-time views for availability and performance metrics for the UCCE components including the Routers, Loggers, Peripheral Gateways, CUIC, AW/HDS, CVP, CUSP, PSTN gateways, CUCM, and CUXN.

The Prognosis notification engine automatically invokes notifications when system errors occur. Reports from Prognosis may be viewed in the secure browser session, opened in the appropriate application, e-mailed or printed. This includes events, logs, history and errors. Scheduled printing for specific reports is also available.

The solution consists of a single Cisco Unified Communications Manager (CUCM) cluster consisting of one publisher, four subscribers and 2 Trivial File Transfer Protocol (TFTP) servers. The servers are sized to handle 2000 agents. All configured devices are spread equally among the four UCM servers with 1:1 redundancy. Each of the four servers supports a maximum of 500 agents during normal operation and 1000 agents in a fail-over scenario. Only contact center agents are configured to use this system.

Two Cisco Unity Connection (CUC) servers are configured to provide voice mail. The server is sized to handle 10,000 users with redundancy.

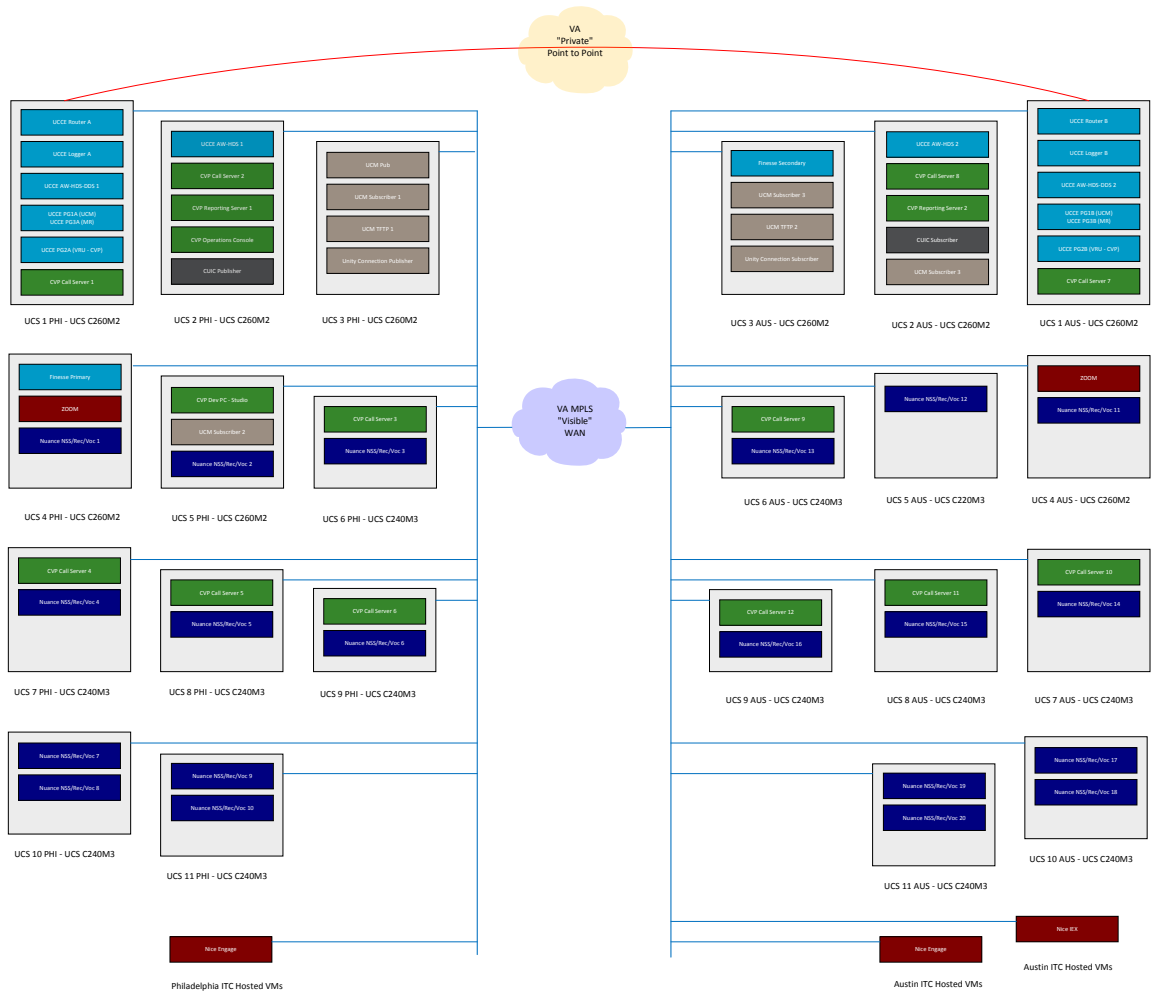
The CUCM publisher, two CUCM subscribers, 1 TFTP, and the CUC primary server are installed in Philadelphia, PA. The other two UCM subscribers, 1 TFTP, and the CUC secondary server are installed in Austin, TX.

Voice Gateway sizing:

Voice Gateway PSTN \ VXML		
Router: 3925E		
IOS: 15.1(4)M		
DSP Module Allocation:	Voice Channels	
PVDM Slot 0/0: PVDM3-256	313 Voice (98%)	7 Available (2%)
PVDM Slot 0/1: PVDM3-64		
PVDM Slot 1/0: PVDM2-48	46 Voice (96%)	2 Available (4%)
Call Volume Allocation:	Quantity @ G711	
VVIC3-4MFT-T1/E1(T1)	95	
VVIC3-4MFT-T1/E1(T1)	95	

VVIC3-4MFT-T1/E1(T1)	95	
NM-HDV2-2T1/E1(T1)	46	
Conference	Quantity @ G711	
Conference DSP	32	
DTMF	DTMF	Speech Rec. With TTS
PSTN+VXML	570	375

Diagram 1. High level VAM server layout



Server summary:

NN	"Call sign"	ITC	Role	Model	OS	Location
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UCS Servers						
1	UCS 1 PHI	Philadelphia ITC	Call Router A, Logger A, CVP1, AW HDS1 PG1A, PG2A	C260-M2	VMWare ESXi 5.1	PHI
2	UCS 2 PHI		CVP 2, AW HDS 2, CVP Reporting 1, CUIC A, CVP OC	C260-M2	VMWare ESXi 5.1	PHI
3	UCS 3 PHI		CUCM Publisher, CUCM Subscriber 1, CUCM TFTP1, Unity Primary	C260-M2	VMWare ESXi 5.1	PHI
4	UCS 4 PHI		Zoom QA, Nuance 1, Finesse 1	C260-M2	VMWare ESXi 5.1	PHI
5	UCS 5 PHI		Nuance 2, CUCM Subscriber 2, CVP Studio, SFTP 1, Middleware 1	C260-M2	VMWare ESXi 5.1	PHI
6	UCS 6 PHI		CVP 5, Nuance 5, Nuance Boss	C240-M3S	VMWare ESXi 5.1	PHI
7	UCS 7 PHI		CVP 6, Nuance 6	C240-M3S	VMWare ESXi 5.1	PHI
8	UCS 8 PHI		CVP 7, Nuance 9	C240-M3S	VMWare ESXi 5.1	PHI
9	UCS 9 PHI		CVP 8, Nuance 10	C240-M3S	VMWare ESXi 5.1	PHI
10	UCS 10 PHI		Nuance 13, Nuance 14	C240-M3S	VMWare ESXi 5.1	PHI
11	UCS 11 PHI		Backup 1	C240-M3S	VMWare ESXi 5.1	PHI
12	UCS 1 AUS	Austin ITC	Call Router B, Logger B, CVP3, AW HDS3 PG1B, PG2B	C260-M2	VMWare ESXi 5.1	AUS
13	UCS 2 AUS		CVP 4, AW HDS 4, CVP Reporting 2, CUIC B, CUCM Subscriber 3	C260-M2	VMWare ESXi 5.1	AUS
14	UCS 3 AUS		CUCM Subscriber 4, CUCM TFTP2, Unity Secondary, Finesse 2	C260-M2	VMWare ESXi 5.1	AUS
15	UCS 4 AUS		Prognosis 1, Nuance 3, SFTP 2	C260-M2	VMWare ESXi 5.1	AUS
16	UCS 5 AUS		Nuance 4	C220-M3S	VMWare ESXi 5.1	AUS
17	UCS 6 AUS		CVP 9, Nuance 7	C240-M3S	VMWare ESXi 5.1	AUS
18	UCS 7 AUS		CVP 10, Nuance 8	C240-M3S	VMWare ESXi 5.1	AUS
19	UCS 8 AUS		CVP 11, Nuance 11	C240-M3S	VMWare ESXi 5.1	AUS
20	UCS 9 AUS		CVP 12, Nuance 12	C240-M3S	VMWare ESXi 5.1	AUS
21	UCS 10 AUS		Nuance 15, Nuance 16	C240-M3S	VMWare ESXi 5.1	AUS
22	UCS 11 AUS		Backup 2	C240-M3S	VMWare ESXi 5.1	AUS

Voice Gateways						
23	VGW 1 PHI Vz	Philadelphia ITC	Ingress/VXML Vz DS3-01 PRIs 15-28	Cisco 3925E	IOS 15.2(4)M6a	PHI
24	VGW 2 PHI Vz		Ingress/VXML Vz DS3-01 PRIs 1-14	Cisco 3925E	IOS 15.2(4)M6a	PHI
25	VGW 3 PHI CL		Ingress/VXML CL DS3-01 PRIs 15-28	Cisco 3925E	IOS 15.2(4)M6a	PHI
26	VGW 4 PHI CL		Ingress/VXML CL DS3-01 PRIs 1-14	Cisco 3925E	IOS 15.2(4)M6a	PHI
27	VGW 5 PHI Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	PHI
28	VGW 6 PHI Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	PHI
29	VGW 7 PHI Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	PHI
30	VGW 8 PHI Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	PHI
31	VGW 9 PHI Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	PHI
32	VGW 10 PHI Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	PHI
33	VGW Spare 01 PHI		Spare not configured	Cisco 3925E	IOS 15.2(4)M6a	PHI
34	VGW Spare 02 PHI		Spare not configured	Cisco 3925E	IOS 15.2(4)M6a	PHI
	VGW Warehouse 01 PHI		In the warehouse PITC	Cisco 3925E	IOS 15.2(4)M6a	PHI
	VGW Warehouse 02 PHI		In the warehouse PITC	Cisco 3925E	IOS 15.2(4)M6a	PHI
35	VGW 1 AUS CL	Austin ITC	Ingress/VXML CL DS3-01 PRIs 15-28	Cisco 3925E	IOS 15.2(4)M6a	AUS
36	VGW 2 AUS CL		Ingress/VXML CL DS3-01 PRIs 1-14	Cisco 3925E	IOS 15.2(4)M6a	AUS
37	VGW 3 AUS Vz		Ingress/VXML Vz DS3-01 PRIs 1-14	Cisco 3925E	IOS 15.2(4)M6a	AUS
38	VGW 4 AUS Vz		Ingress/VXML Vz DS3-01 PRIs 15-28	Cisco 3925E	IOS 15.2(4)M6a	AUS

39	VGW 5 AUS Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	AUS
40	VGW 6 AUS Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	AUS
41	VGW 7 AUS Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	AUS
42	VGW 8 AUS Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	AUS
43	VGW 9 AUS Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	AUS
44	VGW 10 AUS Vz		Ingress/VXML Vz	Cisco 3925E	IOS 15.2(4)M6a	AUS
45	VGW Spare 01 AUS		Spare not configured, powered, IP assigned	Cisco 3925E	IOS 15.2(4)M6a	AUS
46	VGW Spare 02 AUS		Spare not configured, powered, IP assigned	Cisco 3925E	IOS 15.2(4)M6a	AUS

CUSPs						
47	CUSP 01 PHI	P	Outbound dialer SIP Proxy 01	Cisco 2921	IOS 15.2(4)M6a	PHI
	Proxy 01 PHI	P	SIP Proxy Module	SM-SRE-900-K9	SIP Proxy Rel. 8.5.8	CUSP 01 PHI
48	CUSP 01 AUS	A	Outbound dialer SIP Proxy 02	Cisco 2921	IOS 15.2(4)M6a	AUS
	Proxy 01 AUS	A	SIP Proxy Module	SM-SRE-900-K9	SIP Proxy Rel. 8.5.8	CUSP 01 AUS

Private network routers						
49	Router 01 PHI	P	ICM Private (Synchronization) network	Cisco 3925	IOS 15.2(4)M6a	PHI
50	Router 01 AUS	A	ICM Private (Synchronization) network	Cisco 3925	IOS 15.2(4)M6a	AUS

Virtual servers (VAM owned)

Central Controller

51	Call Router A	P	ICM Call router A	N/A	Win 2008 R2 (SP1+) Std	UCS 1 PHI
52	Call Router B	A	ICM Call router B	N/A	Win 2008 R2 (SP1+) Std	UCS 1 AUS
53	Logger A	P	ICM Logger A	N/A	Win 2008 R2 (SP1+) Std	UCS 1 PHI
54	Logger B	A	ICM Logger B	N/A	Win 2008 R2 (SP1+) Std	UCS 1 AUS

Peripheral Gateways

55	PG1A host	P	PG1 App: CCM, CTIOS PG2 App: MR SIP Dialer	N/A	Win 2008 R2 (SP1+) Std	UCS 1 PHI
56	PG1B host	A	PG1 App: CCM, CTIOS PG2 App: MR SIP Dialer	N/A	Win 2008 R2 (SP1+) Std	UCS 1 AUS
57	PG2A host	P	PG3 Application: CVP VRU	N/A	Win 2008 R2 (SP1+) Std	UCS 1 PHI
58	PG2B host	A	PG3 Application: CVP VRU	N/A	Win 2008 R2 (SP1+) Std	UCS 1 AUS

Administrative workstations / historical data servers

59	AW HDS 1	PHI	AW-HDS-DDS	N/A	Win 2008 R2 (SP1+) Std	UCS 1 PHI
60	AW HDS 2		AW-HDS-DDS	N/A	Win 2008 R2 (SP1+) Std	UCS 2 PHI
61	AW HDS 3	AUS	AW-HDS-DDS	N/A	Win 2008 R2 (SP1+) Std	UCS 1 AUS
62	AW HDS 4		AW-HDS-DDS	N/A	Win 2008 R2 (SP1+) Std	UCS 2 AUS

Call Manager servers

63	CUCM Publisher	PHI	Call Manager Publisher	N/A	Cisco VOS (Linux)	UCS 3 PHI
64	CUCM Subscriber 1		CUCM Subscriber 1	N/A	Cisco VOS (Linux)	UCS 3 PHI
65	CUCM Subscriber 2		CUCM Subscriber 2	N/A	Cisco VOS (Linux)	UCS 5 PHI
66	CUCM Subscriber 3	AUS	CUCM Subscriber 3	N/A	Cisco VOS (Linux)	UCS 3 AUS
67	CUCM Subscriber 4		CUCM Subscriber 4	N/A	Cisco VOS (Linux)	UCS 3 AUS
68	CUCM TFTP1	P	CUCM Subscriber TFTP 1	N/A	Cisco VOS (Linux)	UCS 3 PHI
69	CUCM TFTP2	A	CUCM Subscriber TFTP 2	N/A	Cisco VOS (Linux)	UCS 3 AUS

Unity Connection Voice Mail servers

70	Unity Primary	P	Unity Connection Primary (VM)	N/A	Cisco VOS (Linux)	UCS 3 PHI
71	Unity Secondary	A	Unity Connection Secondary (VM)	N/A	Cisco VOS (Linux)	UCS 3 AUS

Agent desktop servers

72	Finesse 1	P	Finesse server 1	N/A	Cisco VOS (Linux)	UCS 4 PHI
73	Finesse 2	A	Finesse server 2	N/A	Cisco VOS (Linux)	UCS 4 AUS

CUIC Reporting

74	CUIC A	P	CUIC Reporting server A	N/A		UCS 2 PHI
75	CUIC B	A	CUIC Reporting server B	N/A		UCS 2 AUS

CVP Call servers

76	CVP 1	PHI	Call server / VXML browser / Media server	N/A		UCS 1 PHI
77	CVP 2		Call server / VXML browser / Media server	N/A		UCS 2 PHI
78	CVP 3	AUS	Call server / VXML browser / Media server	N/A		UCS 1 PHI
79	CVP 4		Call server / VXML browser / Media server	N/A		VAAUSIVRESX220
80	CVP 5	PHI	Call server / VXML browser / Media server	N/A		UCS 6 PHI
81	CVP 6		Call server / VXML browser / Media server	N/A		UCS 7 PHI
82	CVP 7		Call server / VXML browser / Media server	N/A		UCS 8 PHI
83	CVP 8		Call server / VXML browser / Media server	N/A		UCS 9 PHI
84	CVP 9	AUS	Call server / VXML browser / Media server	N/A		UCS 6 AUS
85	CVP 10		Call server / VXML browser / Media server	N/A		UCS 7 AUS
86	CVP 11		Call server / VXML browser / Media server	N/A		UCS 8 AUS

87	CVP 12		Call server / VXML browser / Media server	N/A		UCS 9 AUS
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CVP Management, Development and reporting servers

88	CVP Studio	P	Workstation with CVP Studio	N/A		UCS 5 PHI
89	CVP OC	P	CVP Operations Console	N/A		UCS 2 PHI
90	CVP Reporting 1	P	CVP reporting server 1	N/A		UCS 2 PHI
91	CVP Reporting 2	A	CVP reporting server 2	N/A		UCS 2 AUS

Nuance NSS Recognizer / Vocalizer servers

92	Nuance 1	PHI	ASR / TTS for CVPs	N/A		UCS 4 PHI
93	Nuance 2		ASR / TTS for CVPs	N/A		UCS 5 PHI
94	Nuance 3	AUS	ASR / TTS for CVPs	N/A		UCS 4 AUS
95	Nuance 4		ASR / TTS for CVPs	N/A		UCS 5 AUS
96	Nuance 5	Philadelphia ITC	ASR / TTS for CVPs	N/A		UCS 6 PHI
97	Nuance 6		ASR / TTS for CVPs	N/A		UCS 7 PHI
98	Nuance 7		ASR / TTS for CVPs	N/A		UCS 8 PHI
99	Nuance 8		ASR / TTS for CVPs	N/A		UCS 9 PHI
100	Nuance 9		ASR / TTS for CVPs	N/A		UCS 10 PHI
101	Nuance 10		ASR / TTS for CVPs	N/A		UCS 10 PHI
102	Nuance 11	Austin ITC	ASR / TTS for CVPs	N/A		UCS 6 AUS
103	Nuance 12		ASR / TTS for CVPs	N/A		UCS 7 AUS
104	Nuance 13		ASR / TTS for CVPs	N/A		UCS 8 AUS
105	Nuance 14		ASR / TTS for CVPs	N/A		UCS 9 AUS
106	Nuance 15		ASR / TTS for CVPs	N/A		UCS 10 AUS
107	Nuance 16		ASR / TTS for CVPs	N/A		UCS 10 AUS

Nuance management

108	Nuance Boss	P	Nuance Management server	N/A		UCS 6 PHI
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Third party software servers

109	Zoom QA	PHI	Zoom Quality Assurance (voice recording)	N/A		UCS 4 PHI
110	Middleware 1		Post call survey, SMS, Prompt recorder	N/A		UCS 5 PHI
111	SFTP 1		Secured FTP server 1	N/A		UCS 5

						PHI
112	SFTP 2	A	Secured FTP server 2	N/A		UCS 4 AUS

System monitoring servers

113	Prognosis 1	A	Prognosis Polling Engine	N/A		UCS 4 AUS
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Backup servers

114	Backup 1	P	VAM backup server 1	N/A		UCS 11 PHI
115	Backup 2	A	VAM backup server 2	N/A		UCS 11 AUS

Virtual servers (EO Hosted)

Nice Engage QA Servers

116	AIR1	A	Advanced Interaction Recorder			AUS
117	AIR2	P	Advanced Interaction Recorder			PHI
118	Cognos	Austin ITC	Cognos			AUS
119	DM		Data Mart, Reporter			AUS
120	DB		Database			AUS
121	NEP		Nice Engage			AUS
122	RTDB		Real Time Database			AUS
123	RTAPP		Real Time Server			AUS
124	Sentinel		NICE Deployment Manager, NICE Sentinel 4.1			AUS
125	STT		Speech To Text Engine, Stream Server			AUS
126	TMS		Text Mining Engine			AUS
127	WS		Standard Word Search Server, Stream Server			AUS

Nice WFM servers

128	WFM-DB-SQL	AUS	WFM Database Server			AUS
129	WFM-APP		WFM Application Server			AUS

Server capacity:

Cisco C260 M2

- 2 x E7-2870 10-core 2.4 GHz
- 128 GB DRAM
- 16x300GB HDD (3.86 TB of Storage)

Cisco C220 M3S

- 2 x E5-2643 4-core 3.3 GHz
- 64 GB DRAM
- 1.93 TB of Storage

Cisco C240 M3

- SFF dual-8-core 2.7 GHz
- 96 GB RAM
- 16x300GB 15 (3.86 TB of Storage)

Software versions:

UCCE / ICN 10.5 (1)

CUCM 10.5 (1)

CVP 10.5 (1)

UCxN (Unity) 10.5 (1)

CUIC 10.5 (1)

Finesse 10.5 (1)