

# Software Defined Networking Enabled Unified Communications (UC-SDN)



## At a Glance

- Enables faster, easier deployment and management of Unified Communications (UC) networks
- Delivers simplified provisioning and dynamic, on demand, allocation of critical network resources
- Drives efficiencies in provisioning, emergency communications and disaster recovery/resiliency
- Manages real-time traffic requirements for improved user Quality of Experience (QoE)
- Centralizes urgent communications control while establishing end-to-end Software Defined Networking (SDN) traffic prioritization
- Results in significant CAPEX and OPEX cost reductions

## Overview

Network issues are responsible for 60-80% of cases of poor Quality of Experience (QoE) in Unified Communications (UC) calls, the main culprit being the lack of coordination between the application and the network. In addition, complicated network provisioning requires individual configuration of switch ports that are labor-intensive and result in frequent configuration mistakes.

NEC's Software Defined Networking Enabled Unified Communications (UC-SDN) solution aims to address these issues. It automates prioritization of audio and video calls established using NEC's UNIVERGE® SV9500 or UNIVERGE 3C™ communications platforms. The solution is based on a centralized SDN controller, NEC's UNIVERGE Network Operation Engine (NOE), and provides advanced features like dynamic Quality of Service (QoS), Plug & Play and QoS trust.

Dynamic QoS enables NOE to adjust the priority of the Ethernet connections that carry the voice and video packets based on defined rules and the call priority. Plug & Play enables NOE to automatically detect IP phones and sets-up the network accordingly.

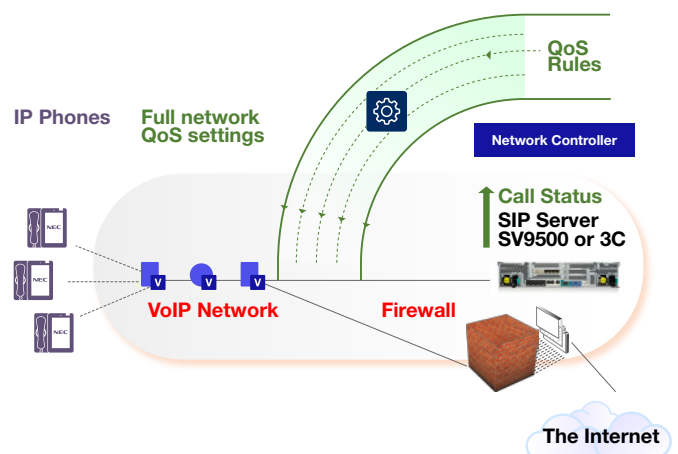
The solution provides an advanced Graphical User Interface (GUI) to simplify the view and configuration settings for the user. The GUI dashboard provides real-time information of the calls and network status.

UC-SDN improves the Quality of Experience for end users through advanced call priority functions. The solution optimizes the usage of network resources and eases the deployment and management of UC.

It eliminates the need of static configurations in the network or phone terminals. It makes it possible to call high priority and/or emergency numbers without being affected by traffic congestion in the network. It also supports 2-way calls, external calls like 911, transfer calls and 3-party conference calls.

The SDN controller, NEC's UNIVERGE Network Operation Engine promotes optimal network operations and enables centralized management of multiple network devices. It also detects the location information of connected IP terminals.

The conceptual diagram of NOE-based UC-SDN solution is as follows:



## Highlights

### Dynamic Quality of Service (QoS)

- Dynamically prioritizes voice and video calls. No need for static configurations in the network or phone terminals
- Ability to predefine high priority calls and/or extensions, such as, emergency calls, CEO's extension, conference bridge, Nurse Call, security phone, etc..., to ensure they are not affected by traffic congestion in the network-improving the user experience of NEC's UC solutions
- Supports 2-way calls, outside calls like 911 etc., transfer calls and 3-party conference or conference bridge calls
- As soon as the call is initiated by a registered phone number, UC-SDN solution displays all the information of the call (caller, call recipient, start time, call status, etc.) and immediately prioritizes the initiated call by configuring the underlying network devices
- As soon as the call is terminated, UC-SDN solution will remove the priority settings from the underlying network devices

### Plug & Play

- Automatically detects IP phones as soon as they are connected to the switch
- Automatically sets the VLANs using LLDP protocol-reducing the workload of system engineers
- Place VIP or Emergency numbers without being affected by traffic congestion in the network-improving the user experience of NEC's UC solution

### Static QoS

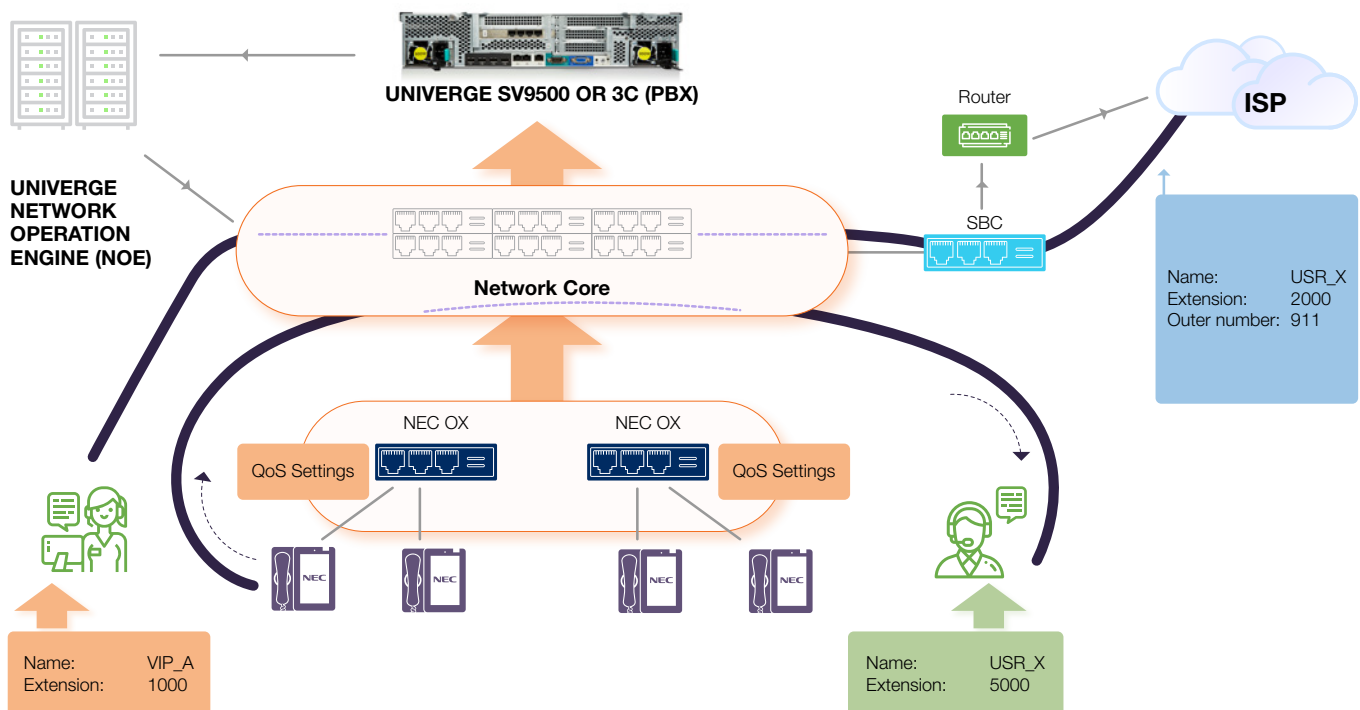
- Provision network priority based on pre-configured rules

## Main Product Features

### Solution Components

UC-SDN consists of several NEC solutions:

- UNIVERGE Network Operation Engine – SDN controller, used to configure and manage the campus network (LAN) from a centralized application. It eliminates the need to configure and monitor each switch individually and dramatically reduces CAPEX and increases network availability.
- Unified Communications – both UNIVERGE SV9500 and UNIVERGE 3C unified communications and collaboration solutions are supported.
- QX switches – used to implement the campus network. These include models with Power over Ethernet (PoE) capability that can supply IP phones remotely. Several families of switches are available, both access switches (with 8, 16, 24 and 48 Gigabit Ethernet PoE ports and either 1 or 10 Gigabit Ethernet uplinks) and aggregation switches (with 48 x 10 Gigabit Ethernet ports and 40 Gigabit Ethernet uplinks).
- NEC or third party IP phones complement these.

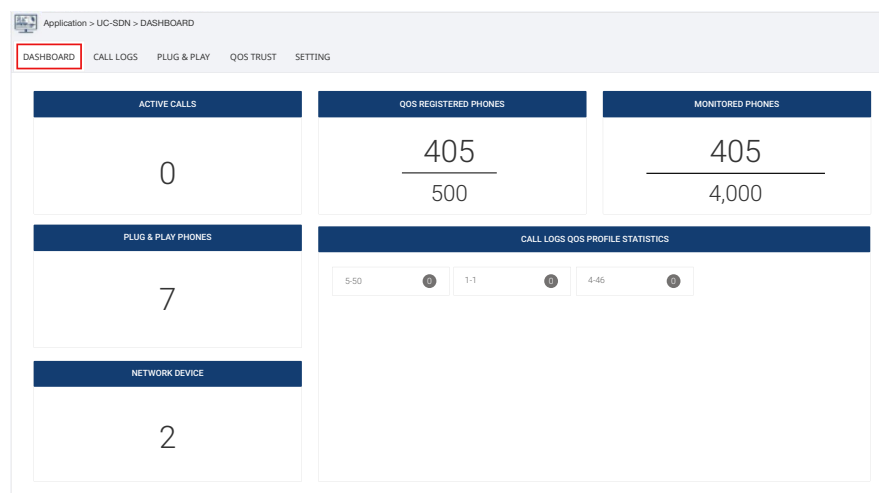


## Compatibility

Device or System	Family	Device	Software version
Networking Devices	QX-S4100 family	QX-S4108GT-2G-PW	7.2.6 onward
		QX-S4116GT-4G-PW	
		QX-S4124GT-4G-PW	
		QX-S4148GT-4G-PW	
	QX-S5200 family	QX-S5224GT-4X-PW	7.2.23 onward
		QX-S5348GT-4X-PW	
Communications Platform	UNIVERGE SV9500	UT880	SV9500 v5.03
		DT800	
		DT820	
		GT210	
		SP350	
	UNIVERGE 3C	DT730DG; DT730CG	3C v9.1.2.7
		UT880	
		DT820	
		GT210	
		Polycom VVX	

## GUI

The GUI Dashboard shows the status of the system together with some statistics. It also allows access to other menus to display the call logs and take actions like set Plug & Play, QoS trust and other settings:



The Plug & Play menu allows quick and reliable addition of terminals:

PLUG & PLAY

SELECT ALL

REFRESH

SCAN

DELETE

Filter

Show Entry

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PnP state	PnP Conf	Vendor	Model	IP	MAC address	Voice (VLAN)	Data (VLAN)	QoS trust	Interface	Switch	Time
completed	applied	NEC	DT830G(8LDG)	192.168.1.112	00:66:b9:f6:fd:5c	completed	96	802.1p	GigabitEthernet1/0/19	QX5224GT	11/10/18 03:31:22(EST)
completed	applied	NEC	DT830G(CG)	192.168.1.113	00:66:b9:b4:2d:53	completed	96	802.1p	GigabitEthernet1/0/18	QX5224GT	11/10/18 03:31:22(EST)
completed	applied	NEC	DT830G(CG)	192.168.1.111	00:60:b9:ba:e7:9d	completed	96	802.1p	GigabitEthernet1/0/20	QX5224GT	11/10/18 03:31:22(EST)
completed	applied	NEC Sphere Communications Inc.	ITL-8LD	172.16.0.100	00:60:b9:5d:49:e4	completed	174	802.1p	GigabitEthernet2/0/3	QX4100domain0	11/10/18 03:31:11(EST)
completed	applied	NEC Sphere Communications Inc.	ITL-12d	172.16.0.102	00:60:b9:8c:a7:26	completed	174	802.1p	GigabitEthernet1/0/5	QX4100domain0	11/10/18 03:31:11(EST)
completed	applied	Polycom	VVX-VVX_1500	172.16.0.101	00:04:f2:ba:84:d5	completed	174	802.1p	GigabitEthernet2/0/4	QX4100domain0	11/10/18 03:31:11(EST)
completed	applied	Polycom	VVX-VVX_500	172.24.130.15	00:04:f2:7a:4f:f0	completed	174	802.1p	GigabitEthernet2/0/46	QX4100domain0	11/10/18 03:31:11(EST)

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The QoS Trust menu allows setting both static and dynamic QoS rules. The static rules are the default ones, while the dynamic rules are active when a certain call is ongoing. Once the call ends the rules reverse back to default.

QoS TRUST

SELECT ALL

REFRESH

ADD

MODIFY

DELETE

Filter

Show Entry

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Switch name	Interface name	Trust type	Uplink interface	Status
QX5224GT	GigabitEthernet1/0/1	802.1p	-	applied
QX5224GT	GigabitEthernet1/0/10	802.1p	-	applied
QX5224GT	GigabitEthernet1/0/10	802.1p	-	applied

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The Call History provides details about the most recent calls:

CALL HISTORY

SELECT ALL

REFRESH

DELETE

Filter

Show Entry

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Type	Start tme	End tme	Duration	Caller	Callee/3rd party	Call state	QoS profile	QoS status
voice	11/10/18 033:33:01 (EST)	11/10/18 10:23:20(EST)	06:50:19	4355	4449	no data, connection with 3C lost		
voice	11/10/18 033:33:01 (EST)	11/10/18 10:23:20(EST)	06:50:19	4387	4333	no data, connection with 3C lost		
voice	11/10/18 033:33:01 (EST)	11/10/18 10:23:20(EST)	06:50:18	4374	4495	no data, connection with 3C lost		
voice	11/10/18 033:33:01 (EST)	11/10/18 10:23:20(EST)	06:50:18	4471	4388	no data, connection with 3C lost		
voice	11/10/18 033:33:01 (EST)	11/10/18 10:23:20(EST)	06:50:18	4412	4399	no data, connection with 3C lost		
voice	11/10/18 033:33:01 (EST)	11/10/18 10:23:20(EST)	06:50:19	4448	4340	no data, connection with 3C lost		
voice	11/10/18 033:33:00 (EST)	11/10/18 10:23:19(EST)	06:50:19	4156	4459	no data, connection with 3C lost		
voice	11/10/18 033:33:00 (EST)	11/10/18 10:23:19(EST)	06:50:19	4417	4145	no data, connection with 3C lost		
voice	11/10/18 033:33:00 (EST)	11/10/18 10:23:19(EST)	06:50:19	4172	4408	no data, connection with 3C lost		
voice	11/10/18 033:33:00 (EST)	11/10/18 10:23:19(EST)	06:50:19	4165	4139	no data, connection with 3C lost		

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These are only some examples of the many functions that are available. A complete list can be found in the “UNIVERGE Network Operation Engine Based UC SDN Solution Ver. 1.0 Operation Manual”.