

# WiNG 5 Installation Guide

## VX 9000 – Amazon EC2 Cloud

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### Overview

The VX virtualized controller is a software WLAN controller appliance running as a virtual machine (VM) on a variety of Hypervisor and Amazon EC2 cloud infrastructures. The VX 9000 supports virtually any server and commercially available Hypervisors for fast and seamless integration into an existing network infrastructure, without adding new hardware. You can run multiple instances of the VX 9000 on a single server, reducing cost, space and power in the Network Operations Center (NOC). With the ability to run in a private or public cloud, you have the freedom to choose the model that works best for your deployment needs, install on your own servers or lease a server in the public cloud.

#### Prerequisites

- VX 9000 ISO image version 5.8.4.0 or above
- Amazon EC2 CLI tools installed.

Note

Only legacy EC2 CLI tools are supported (tested version 1.7.5.1). New AWS CLI Tools will not work.

After unpacking the CLI Tools following environmental variables needs to be added into the system: User Variables:

- **%EC2\_HOME%** point to the location of \ec2-api-tools\ec2-api-tools-1.7.5.1 folder.
- **%JAVA\_HOME%** point to the location of java jre folder, for example C:\Program Files (x86)\Java\jre1.8.0\_101
- Path add %EC2\_HOME%\bin and %JAVA\_HOME%
- Local supported hypervisor available for initial image porting (VMWare ESXi, Citrix XenServer or Microsoft Hyper-V).

### VX 9000

1. Create virtual machine on supported hypervisor (recommend minimum 4 GB RAM, 8 GB HDD).

Note

If installing for running Guest Registration or NSight database assign disk space at this stage. Use Thin Provisioning in ESXi. Currently EC2 Elastic Storage is not supported.

- 2. Start the VX 9000 installation process. Hit Enter when prompted to start the process.
- 3. When prompted to enable support for Amazon (EC2) HVM mode type yes and hit Enter.



4. Once the install is complete, power off the VM. Do NOT press Enter at this stage:



- 5. Export VM image to local system. In VMWare ESXi use File -> Export -> Export OVF Template. Select "Folder of Files" format.
- 6. After Export in the destination folder locate the .vmdk file with the VM image.

- 7. Log in into Amazon AWS Console.
- 8. Go to S3 and create a data bucket:



9. Select Create Bucket:



10. Specify bucket name and region where you want to run the VX 9000 and select the Create button.

Create a Bucke	et - Select a Bucket Name and Region	Cancel 🗙
A bucket is a conta Region to optimize regarding bucket n	iner for objects stored in Amazon S3. When creating a bucket, you can ch for latency, minimize costs, or address regulatory requirements. For more aming conventions, please visit the Amazon S3 documentation.	oose a information
Bucket Name:	VX9K-Image-Import	
Region:	Frankfurt 👻	
	Set Up Logging > Create	Cancel

11. Open a command shell on your PC and issue the following import commands (assuming Amazon CLI tools are installed):

C:\ec2-import-volume <image-file-name>.vmdk -f vmdk -b <s3 bucket="" name=""> -O <access key=""> -W <security key=""> - o <access key=""> -w <security key=""> -z <your e.g.="" eu-central-la="" zone,="">region <your e.g.="" eu-central-<br="" region,="">l&gt;</your></your></security></access></security></access></s3></image-file-name>
12. Check the porting status from another command line shell:
C:\ec2-describe-conversion-tasks -region eu-central-1

This command will display the volume ID to be created on S3, for example "vol-7b596774".

13. On AWS navigate to EC2.



14. Go to Volumes. Highlight imported volume and select Create Snapshot:

T AWS 🗸	Servio	ces 👻 Edit 👻					TMEAdmins 🗸	Frankfurt 👻 Support 🗸
EC2 Dashboard Events Tags	•	Create Volume	Actions v	h by keyword			0	<ul> <li></li></ul>
Limits		Name	- Volume ID	Size	- Volume	Туре - ІОР S	- Snapshot	• Created
INSTANCES			vol-c1 Delete	e Volume		-		August 25, 2016 at 4:39:15°F
Instances			vol-de Attacl	h Volume		600 / 300	0 snap-9ab1e190	August 9, 2016 at 11:28:24 A
Spot Requests			vol-2a Detac	h Volume		150 / 300	0 snap-459a18ae	June 11, 2016 at 7:37:26 PM
Reserved Instances			vol-eb	Detach Volume		150 / 300	0 snap-459a18ae	June 11, 2016 at 1:21:07 PM
Dedicated Hosts			vol-39 Create	e Snapshot	IO Setting	600 / 300	0 snap-9ab1e190	June 11, 2016 at 12:36:38 PI
IMAGES			vol-51 Add/E	Edit Taqs	obetting	100 / 300	0 snap-2e4082aa	June 2, 2016 at 9:51:52 PM
AMIs			vol-541973ee	30 GiB	gp2	100 / 300	0 snap-3eff8335	May 13, 2016 at 12:08:48 AM
Bundle Tasks			vol-d419736e	30 GiB	gp2	100 / 300	0 snap-3eff8335	May 13, 2016 at 12:04:37 A
ELASTIC BLOCK STORE			vol-fb197341	30 GiB	gp2	100 / 300	0 snap-3eff8335	May 13, 2016 at 12:04:08
Volumes Snapshots		Volumes: vol-c1	f8854b			2.0.0		

Create Snap	oshot		×
Volume	i	vol-c1f8854b	
Name	i	<u>VX9K</u> -584	
Description	i		
Encrypted	i	No	
		Cancel	ate

16. You will be redirected to the snapshots screen. From that screen highlight newly created snapshot and select **Create Image**:

🏹 AWS 🗸	Services -> Edit -> TMEAdmins -> Frankfurt -> Support ->
EC2 Dashboard Events Tags	Create Snapshot       Actions *         Owned By Me *       Q, search : snap-81842e6a        Add filter
Limits	Name      Snapshot II      Size      Description      Status      Statue     Started      Progress      Encryp
<ul> <li>INSTANCES         <ul> <li>Instances</li> <li>Spot Requests</li> <li>Reserved Instances</li> <li>Dedicated Hosts</li> </ul> </li> <li>IMAGES         <ul> <li>AMIS</li> <li>Bundle Tasks</li> </ul> </li> </ul>	<ul> <li>VX9K-584 snap-81842</li> <li>Delete</li> <li>Create Volume</li> <li>Create Image</li> <li>Copy</li> <li>Modify Permissions</li> <li>Add/Edit Tags</li> </ul>
ELASTIC BLOCK STORE     Volumes     Snapshots	Snapshot: snap-81842e6a (VX9K-584)

17. Give a name to this new AMI Image, set Virtualization type to Hardware-assisted virtualization, provision IOPS for the disk performance as required:

Name	VX9K-Image		Descripti	on		
Architecture (j)	x86_64	T	Virtualization type	i Hardwar	e-assisted virtual	ization 🔻
Root device name (j) RAM disk ID (j)	/dev/sda1 Use default	¥	Kernel ID	i Use defa	ault	*
lock Device Mappings						
plume Device	Snapshot () ((	ize GiB) Volume Typ (j)	e () IOPS ()	Throughput (MB/s) (i	Delete on Termination (i)	Encrypted
oot /dev/sda1	snap-81842e6a 3	0 General Pu	rpose 🤄 100 / 3000	N/A	<b>v</b>	Not Encrypted
del Merri Velume						

18. Once AMI image is created highlight it and select Launch.

T AWS 🗸 🗄	ervices v Edit v TMEAdmins v Frankfurt v Support v	
EC2 Dashboard Events	Launch Actions V 😌 🌩	0
Tags	Owned by me ♥ Q search : ami-b9ed1dd6 ⊗ Add filter @ K < 1 to 1 of 1 > >	1
Reports Limits	Name      AMI Name      AMI ID      Source      Owner      Visibility      Status	-   -
INSTANCES	VX9K-Image ami-b9ed1dd <mark>: Launch 3</mark> 175650 Private available	,
Instances	Spot Request	
Spot Requests	Deregister	
Reserved Instances	Register New AMI	
Dedicated Hosts	Copy AMI	Þ
	Image: ami-b9ed1dd6     Add/Edit Tags       Modify Boot Volume Setting	^
Bundle Tasks	Details Permissions Tags	_

19. Select Instance type – minimum supported instance type for HVM mode is m3.large.

Ũ	AWS - Services	▪ Edit ✓				TMEAdmins 🕶	Frankfurt 👻 Support 👻					
1. Choo	1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Instance 6. Configure Security Group 7. Review											
Step	2: Choose an Ir	nstance Ty	ре									
	General purpose	t2.small	1	2	EBS only	-	Low to Moderate					
	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate					
	General purpose	t2.large	2	8	EBS only	-	Low to Moderate					
	General purpose	m4.large	2	8	EBS only	Yes	Moderate					
	General purpose	m4.xlarge	4	16	EBS only	Yes	High					
	General purpose	m4.2xlarge	8	32	EBS only	Yes	High					
	General purpose	m4.4xlarge	16	64	EBS only	Yes	High					
	General purpose	m4.10xlarge	40	160	EBS only	Yes	10 Gigabit					
	General purpose	m3.medium	1	3.75	1 x 4 (SSD)	-	Moderate					
				Cancel	Previous Review a	nd Launch Next: Co	onfigure Instance Details					

20. During network configuration it is recommended to assign a specific internal IP address to the VX instance. Select desired subnet in the availability zone and then specify desired IP address under Network Interfaces section.

1. Choose AMI 2. Choose Instance Type	3. Cor	figure Instance 4. Add 5	Storage 5. Tag I	istance 6	. Configure S	ecurity Group	7. Review		
Step 3: Configure Instan Configure the instance to suit your requi pricing, assign an access management	role to the	etails You can launch multiple in instance, and more.	istances from the	same AMI, r	equest Spo	ot instances to	take advanta	ge of the lower	^
Number of instances	(j)	1	Launch i	nto Auto Sca	ling Group	()			
Purchasing option	()	Request Spot instance	es						L
Network	(i)	vpc-a1be72c8 (172.31.0	0.0/16) (default)	•	C Cre	ate new VPC			
Subnet	i	subnet-e0d30289(172.3 4085 IP Addresses availa	31.16.0/20)   Defa able	ılt in eu-c∈ ▼	Cre	ate new subn	et		
Auto-assign Public IP	i	Use subnet setting (Ena	ible)	T					
Placement group	(j)	No placement group		٣					
IAM role	()	None		•	C Cre	ate new IAM r	ole		L
Shutdown behavior	()	Stop		٣					
Enable termination protection	i	Protect against accide	ental termination						
Monitoring	()	Enable CloudWatch de Additional charges apply	etailed monitoring						L
EBS-optimized instance	i	✓ Launch as EBS-optim	ized instance						
Tenancy	(j)	Shared - Run a shared Additional charges will a	hardware instance pply for dedicated	tenancy.					L
▼ Network interfaces ①									
Device Network Interface	Subnet	Primary IP	Seco	ndary IP ad	dresses				С.
eth0 New network interfac∈ ▼	subnet-e0	0d3028! • 172.31.16.	85 Add I	P					•
				Cancel	Previous	Review ar	nd Launch	Next: Add Stora	ge

22. On the Storage configuration you may specify desired IOPS (if instance will be running NSight or Captive Portal), otherwise leave default values:

1. Choose AMI	2. Choose I	nstance Type 3. Co	onfigure Instance	4. Add Storage	5. Tag Instance	6. Configure Secur	ity Group 7. Re	eview	
Step 4: Add Storage Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. Learn more about storage options in Amazon EC2.									
Volume Type (j)	Device (j)	Snapshot (j)	Size (GiB) V (i)	olume Type  i)	IOPS ()	Throughput (MB/s) (j)	Delete on Termination (i)	Encrypted ()	
Root	/dev/sda1	snap-81842e6a	30	General Purpose 🕻 🔻	100 / 3000	N/A		Not Encrypted	
Root       /dev/sda1       snap-81842e6a       30       General Purpose (* 100 / 3000       N/A       M       Not Encrypted         Add New Volume       Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. Learn more about free usage tier eligibility and usage restrictions.       Image: Not Encrypted									
					Cancel	Previous	Review and Lau	nch Next: Tag Instance	

23. Optionally add tags to the instance as required.

1. Choose AMI	2. Choose Instance Type	3. Configure Instance	4. Add Storage	5. Tag I	nstance	6. Configure Security Group	7. Review	
Step 5: Ta A tag consists of EC2 resources.	ag Instance a case-sensitive key-value	e pair. For example, you	I could define a f	tag with ke	ey = Name	and value = Webserver. Le	arn more abou	t tagging your Amazon
Key (127 ch	naracters maximum)			Value	(255 chara	acters maximum)		
Name				#VX-WIN	G5			8
Create Tag	(Up to 50 tags maximum	n)						
			Ca	ncel F	Previous	Review and Launch	Next: Config	ure Security Group

24. Under **Security Group** configuration open necessary ports for management, i.e. SSH and HTTPS, optionally SNMP. Open other ports based on the requirements (for example MINT 24576 UDP to allow AP adoption)

1. Choose AMI	2. Choose Instance Type	3. Configure Instance	4. Add Storage	5. Tag Instance	6. Configure Security Group	7. Review	
Step 6: Co	onfigure Securi new security group or s	ty Group elect from an existing on	e below. Learn m	ore about Amazoi	n EC2 security groups.		
	Assign a security gr	oup:  Oreate a new set of the	ecurity group				
		Select an existi	ng security group				
	Security group na	me: launch-wizard-	8			]	
	Descript	on: launch-wizard-	8 created 2016-08	3-26T10:51:46.79	0+02:00	]	
Туре (і)	Pro	tocol (j)	Port Range	i) !	Source (j)		
SSH	▼ TC	P	22		Anywhere  0.0.0.0/0		⊗
HTTPS	▼ TC	P	443		Anywhere • 0.0.0.0/0		⊗
Custom UDP R	ule 🔻 UD	P	24576		Anywhere • 0.0.0.0/0		⊗
Add Rule							
A Warr	ing						
Rules IP add	with source of 0.0.0.0/0 Iresses only.	allow all IP addresses to	access your insta	ince. We recomm	end setting security group rule	es to allow access from kn	own
					Cancel	Previous Review and	Launch

26. Launch instance and select "Proceed without a key pair" when prompted. Default username and password admin/admin123 will be used to login to the VX 9000.

1. Choose	AMI 2. Choose Instance Type	3. Configure Instance	4. Add Storage	5. Tag Instance	6. Configure Security Group	7. Review	
Step 7 Please rev launch pro	E Review Instance ew your instance launch detail less.	Launch s. You can go back to ed	it changes for ea	ch section. Click <b>L</b>	<b>.aunch</b> to assign a key pair to	o your instance and co	mplete the
<b>A</b>	Improve your instances' Your instances may be access addresses only. You can also open additional p servers. Edit security groups	security. Your secu ible from any IP address ports in your security grou	rity group, lau . We recommend up to facilitate acc	nch-wizard-8, I that you update y cess to the applica	is open to the world. your security group rules to al ation or service you're running	llow access from knowr g, e.g., HTTP (80) for w	n IP /eb
	Your instance configural To launch an instance that's el more about free usage tier eli	ion is not eligible fo igible for the free usage gibility and usage restric	r the free usay tier, check your A tions.	<mark>ge tier</mark> MI selection, insta	ance type, configuration optio	ns, or storage devices.	× Learn
						Don't show me t	nis again
▼ AMI I	Details						Edit AMI
۵	VX9K-Image - ami-b9ed Root Device Type: ebs Virtual	1dd6 zation type: hvm					
						Cancel Previous	Launch

Select an existing key pair or create a new key pair ×
A key pair consists of a <b>public key</b> that AWS stores, and a <b>private key file</b> that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.
Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about removing existing key pairs from a public AMI.
<ul> <li>Proceed without a key pair</li> <li>✓</li> <li>✓ I acknowledge that I will not be able to connect to this instance unless I already know the password built into this AMI.</li> </ul>
Cancel Launch Instances

## Licensing and Elastic IP addresses on EC2

VX 9000 licenses are bound to the **Serial Number** of the VX 9000 instance. Serial Number is automatically generated using a combination of **Base MAC address** (shown in "**show version**") and **current IP address** of the management VLAN interface (VLAN 1 by default):

```
NSIGHT-PRIMARY#show version
VX9000 version 5.8.2.0-025R
Copyright (c) 2004-2015 Symbol Technologies, Inc. All rights reserved.
Booted from primary
NSIGHT-PRIMARY uptime is 1 days, 04 hours 28 minutes
CPU is Intel(R) Xeon(R) CPU E5-2676 v3 @ 2.40GHz
Base ethernet MAC address is 06-71-B1-5D-77-51
System serial number is 5C4E917EF1158BED
Model number is VX-9000
```

Amazon EC2 default behavior is to assign an IPv4 address to each instance via DHCP from a private IP range (RFC1918), and then perform NAT to a dynamically assigned public IPv4 address that will be shown under EC2 Instances Tab, for example:

🧊 AWS - S	ervices	👻 Edit 🗸													TMEAdmins 👻 🛛 F	rankfurt 🗸	Support +	
EC2 Dashboard Events		aunch Instance.	Connect	Actio	ns 👻												e •	0
Tags		<b>Q</b> Filter by tags an	nd attributes or se	arch by	keyword										0 K	< 1 to 12	of 12 🔿	>
Reports Limits		Name		¥	Instance ID 👻	Instance Type 👻	Availability Zone –	Instance State 👻	Status Checks 👻	Alarm Statu	IS	Public DNS	- Public IP	- Key Name	- Monitoring		ich Time	
INSTANCES		#VX-9000-TES	ST		i-a373891e	m3.large	eu-central-1a	running	2/2 checks	None	7	ec2-52-28-228-7.eu-cen	52.28.228.7		disabled	Dece	mber 12, 201	15 at
Instances		#NSIGHT-ARE	BITER		i-9c309b20	m4.large	eu-central-1b	stopped		None	20	ec2-52-29-67-169.eu-ce	52.29.67.169		disabled	Nove	mber 27, 201	15 at
Spot Requests		#NSIGHT-SEC	CONDARY		i-9a309b26	m4.2xlarge	eu-central-1b	stopped		None	20	ec2-52-29-42-40.eu-cen	52.29.42.40		disabled	Nove	mber 27, 201	15 at

This automatically assigned public IPv4 address is only reassigned in case the instance is stopped or rebooted from EC2 console (you can safely reboot the VX from WiNG without losing your assigned public IP or licenses).

In a situation where VX instance needs to be stopped for a period of time, it is important to remember that instance will get a different internal IPv4 address upon next boot, **thus all the licenses assigned previously will be lost**. To prevent this from happening it is possible to assign a static DHCP binding to always receive the same internal IPv4 address for the VX instance (this should be done at Instance Launch phase - see step #17of the previous chapter):

Step 3: Configure Instar Configure the instance to suit your requi	nce D	etails You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.
Number of instances	( <b>i</b> )	1 Launch into Auto Scaling Group (
Purchasing option	()	Request Spot instances
Network	()	vpc-a1be72c8 (172.31.0.0/16) (default)  Create new VPC
Subnet	(j)	subnet-e0d30289(172.31.16.0/20)   Default in eu-o •     Create new subnet       4089 IP Addresses available     Create new subnet
Auto-assign Public IP	(i)	Use subnet setting (Enable)
IAM role	(i)	None   Create new IAM role
Shutdown behavior	i	Stop •
Enable termination protection	(i)	Protect against accidental termination
Monitoring	(j)	Enable CloudWatch detailed monitoring Additional charges apply.
Tenancy	(j)	Shared - Run a shared hardware instance   Additional charges will apply for dedicated tenancy.

▼ Netw	ork interfaces 🛈			
Device	Network Interface	Subnet	Primary IP	Secondary IP addresses
eth0	New network interfac 🔻	subnet-e0d3028 🔻	172.31.16.30	Add IP

Additionally it is possible to retain the same public IPv4 address assigned in case the instance is stopped for a period of time. Amazon provides Elastic IP feature that accomplishes that goal:

👔 AWS 🗸 Serv	vices 🗸 Edit 🗸		TMEAdmins 🗸	Frankfurt 🗸 Support 🗸
EC2 Dashboard	Allocate New Address Actions	5 ¥		<del>ତ</del> ବ ଡ
Tags	<b>Q</b> Filter by attributes or search by ke	eyword	0	$ \langle \langle 1 \text{ to 5 of 5} \rangle \rangle $
Reports		Alle setting ID	le sterres	Delivery ID Address
Limits	Elastic IP	Allocation ID -	Instance	Private IP Address -
INSTANCES	52.28.64.246	eipalloc-321df25b	i-46966187	172.31.20.10
Instances	52.29.20.233	eipalloc-c779b8ae	i-03309bbf (#NSIGHT-PRIM	172.31.0.49
Spot Requests	52.29.42.40	eipalloc-d979b8b0	i-9a309b26 (#NSIGHT-SEC	172.31.2.248
Reserved Instances	52.29.67.169	eipalloc-c679b8af	i-9c309b20 (#NSIGHT-ARBI	172.31.5.121
Dedicated Hosts	52.29.194.51	eipalloc-eb6cad82		
IMAGES	4			•
AMIs	Select an address above	c	2.0.0	
Bundle Tasks	Select all address above			
ELASTIC BLOCK STORE				
Volumes				
Snapshots				
NETWORK & SECURITY				
Security Groups				
Elastic IPs				
Placement Groups				
Key Pairs				

	Instance Networ <mark> Interface</mark>	<u>\VX-</u> i-a373891e (#\VX-9000-TEST) (n	unning)	
	Private IP Address	172.31.16.30* - 52.28.228.7	• (i) (i)	
A	Warning If you associate an Elastic IP address public IP addresses.	s with your instance, your current publ	ic IP address is released. Learn more about	