

DATACENTER INFRASTRUCTURE MANAGEMENT NETBOX REVISED

Audience:

- General

Prepared by:

- Feng Xia

(fengxia41103@gmail.com)

Last updated on:

- 08/2018

Also available: [PDF](#)

TABLE OF CONTENTS

1. Problems to solve
2. Demo
3. Dashboard
4. Rack
5. Device
 1. Device type
 2. Device role
 3. Interfaces
 4. Bay device
 5. Inventory items
 6. Remote management
 7. Cable connections
6. Logical grouping

PROBLEMS TO SOLVE

Datacenter devop headaches:

1. I'm using Excel to track hardware inventory and networks, but it has too many conflicting errors now to be useful anymore.

Diagnosis: Only having a data model built with accurate domain knowledge of data center components and operation, can one be sure erroneous inputs stand no chance to pollute your data.

1. Logging server information such as UUID is tedious and error prone. But without being fully accurate, these information have little value as reference.

Diagnosis: If these information can be collected from device directly, machine can do it better than human operator.

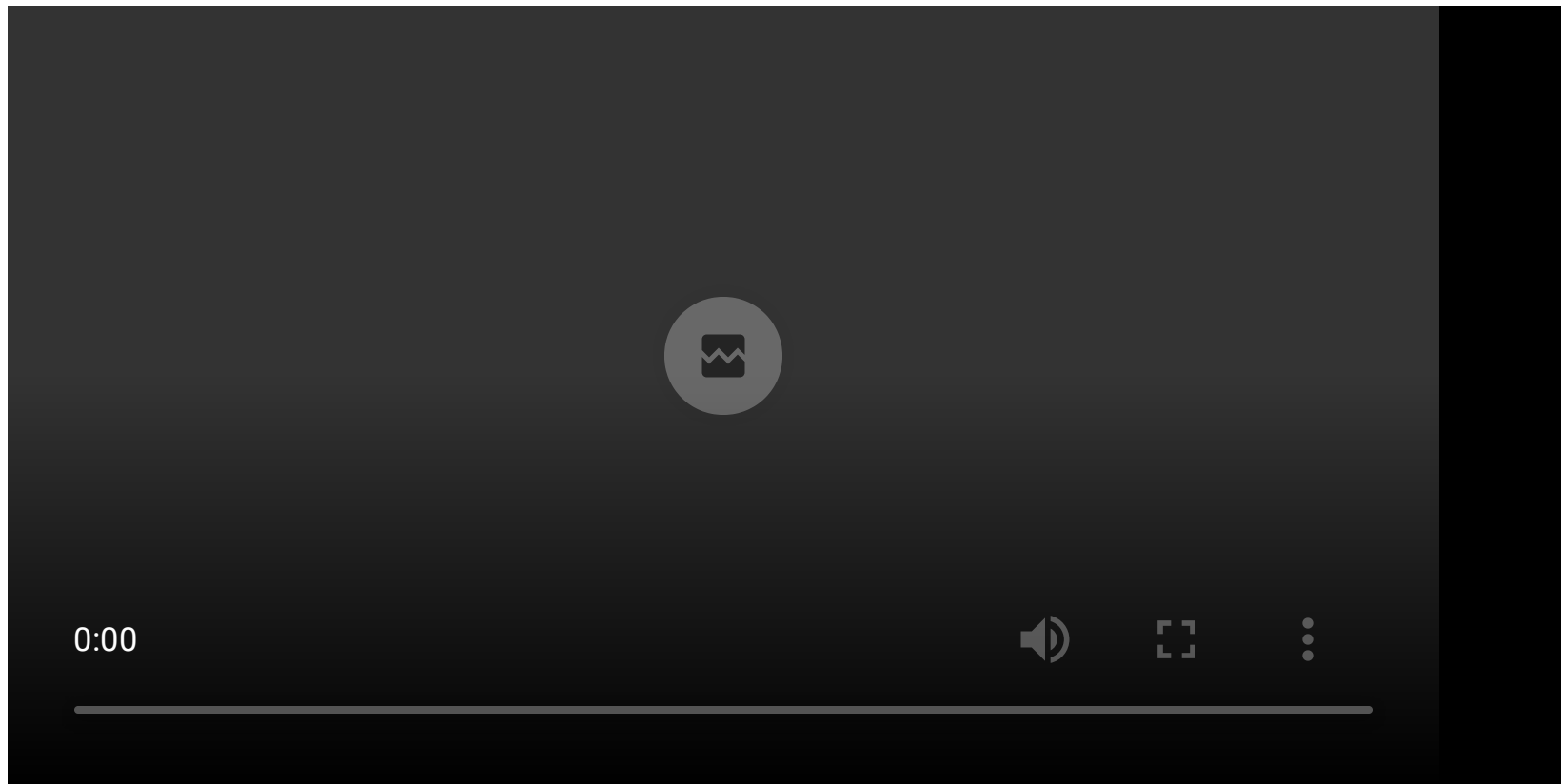
1. There is a jungle of cables on the back of my rack. Detecting a loose connection or a cable plugged into a wrong port is nearly impossible.

Diagnosis: Visualizing physical connection was limited to you looking at the cable jungle. Not anymore. Smart tool can figure this out by tracing MAC through the entire infrastructure.

1. I need to run sever and network report by geo location, by tenants, and by networks. But creating them is time consuming.

Diagnosis: There are unlimited ways to view and aggregate your infrastructure components. Netbox created a cohesive data model that can be reported and aggregated. Let the computer to compile that report for you.

DEMO



DASHBOARD

Organization	
Sites Geographic locations	2
Tenants Customers or departments	6
DCIM	
Racks Equipment racks, optionally organized by group	7
Devices Rack-mounted network equipment, servers, and other devices	160
Connections	
Interfaces	13
Console	0
Power	0
Virtualization	
Clusters Clusters of physical hosts in which VMs reside	3
Virtual Machines Virtual compute instances running inside clusters	0
IPAM	
VRFs Virtual routing and forwarding tables	0
Aggregates Top-level IP allocations	3
Prefixes IPv4 and IPv6 network assignments	0
IP Addresses Individual IPv4 and IPv6 addresses	490
VLANs Layer two domains, identified by VLAN ID	97
Circuits	
Providers Organizations which provide circuit connectivity	0
Circuits Communication links for Internet transit, peering, and other services	0
Secrets	
Secrets Sensitive data (such as passwords) which has been stored securely	117

1. Covers all data points a datacenter management needs.
2. At glance of all inventory and their use.
3. Initiate a drill down from any view point.
4. Inter-linked data model guarantees information consistency.

RACK

<input type="checkbox"/>	Name	Site	Group	Facility ID	Tenant	Role	Height	Devices	Utilization
<input type="checkbox"/>	rack1	LCTC Lab	IBB project	—	Brain 1	Lab	42U	38	<div><div>71%</div></div>
<input type="checkbox"/>	rack 2	LCTC Lab	—	—	—	Lab	42U	33	<div><div>76%</div></div>
<input type="checkbox"/>	rack 3	LCTC Lab	—	—	—	Lab	42U	30	<div><div>88%</div></div>
<input type="checkbox"/>	rack 4	LCTC Lab	—	—	—	Lab	42U	27	<div><div>50%</div></div>
<input type="checkbox"/>	rack 5	LCTC Lab	—	—	—	Lab	42U	6	<div><div>26%</div></div>
<input type="checkbox"/>	LCTC SH Rack 1 (N3-11)	LCTC SH Lab	IBB project	—	SH IBB Brain	Lab	42U	17	<div><div>40%</div></div>
<input type="checkbox"/>	LCTC SH Rack 1 (N3-12)	LCTC SH Lab	—	—	SH IBB Brain	Lab	42U	9	<div><div>21%</div></div>

Edit Selected

Delete Selected

Showing 1-7 of 7

Q Search

Search

Q

Site

LCTC Lab (5)
LCTC SH Lab (2)

Rack group

-- None --
IBB project (2)

Tenant

-- None --
Brain 1 (1)
Brain 2 (0)
Brain 3 (0)
Brain 4 (0)
SH IBB Brain (2)
SH IBB Brain (0)

Role

-- None --
Lab (7)

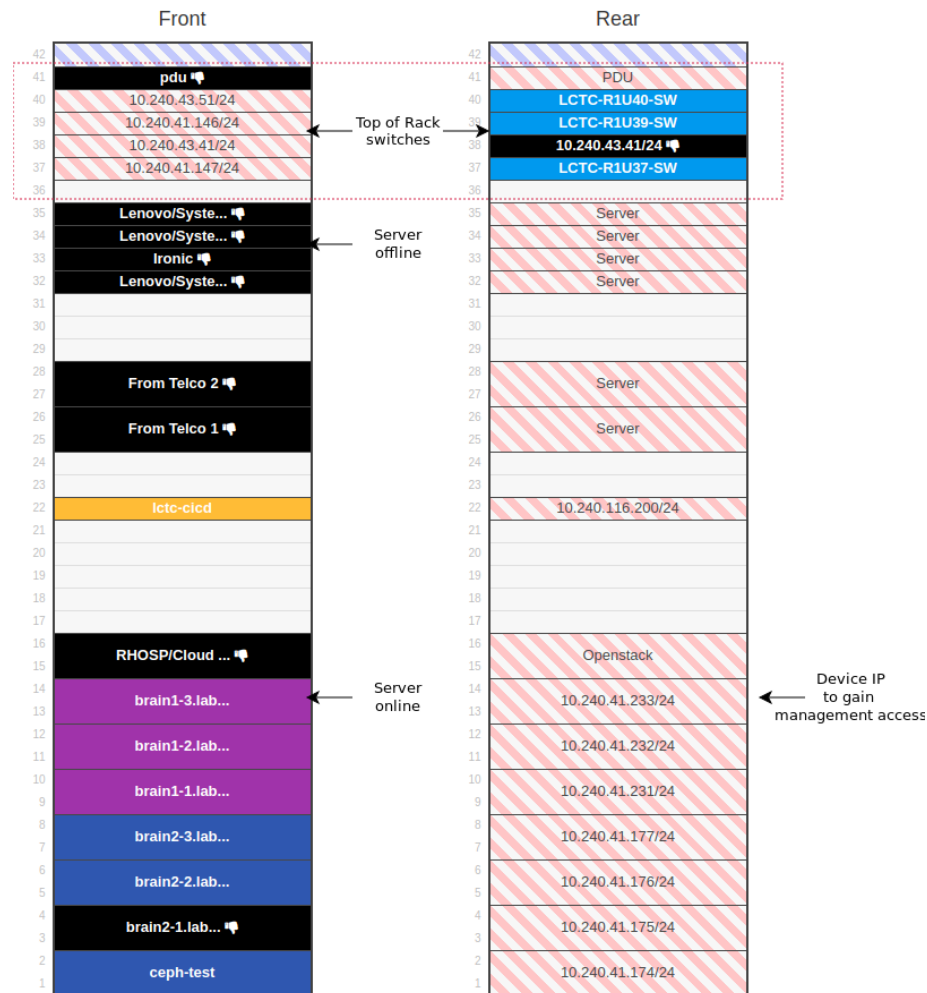
Q Apply

✕ Clear

1. Multiple filters
2. Utilization

RACK: DEVICE LAYOUT

© 2018 Lenovo Internal. All rights reserved.



1. Front & Rear view handles half-depth device and different mount orientation.
2. View access information, eg. server's IP address.
3. Can make reservation, thus allowing infrastructure planning ahead of time.
4. Color code to group device by its purpose.
5. Flag if device is not accessible (in black)
 - ← powered off, or credential needs an update. In both cases, it highlights a need of admin attention.

RACK: DEVICE LIST

<input type="checkbox"/>	Name	Position (U)	Status	Tenant	Site	Rack	Role	Type	IP Address
<input type="checkbox"/>	10.240.43.107/24	—	Offline	—	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.107
<input type="checkbox"/>	10.240.43.139/24	—	Offline	Brain 1	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.139
<input type="checkbox"/>	10.240.43.150/24	—	Offline	Brain 2	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.150
<input type="checkbox"/>	10.240.43.172/24	—	Offline	Brain 1	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.172
<input type="checkbox"/>	10.240.43.188/24	—	Offline	Brain 1	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.188
<input type="checkbox"/>	10.240.43.230/24	—	Offline	—	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.230
<input type="checkbox"/>	10.240.43.238/24	—	Offline	—	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.238
<input type="checkbox"/>	10.240.43.249/24	—	Offline	Brain 1	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.249
<input type="checkbox"/>	10.240.43.254/24	—	Offline	Brain 1	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.254
<input type="checkbox"/>	10.240.43.41/24	38	Offline	Brain 1	LCTC Lab	rack1	Access Switch	Lenovo.G8272	10.240.43.41
<input type="checkbox"/>	10.240.43.90/24	—	Offline	Brain 1	LCTC Lab	rack1	BMC	Lenovo.BMC	10.240.43.90
<input type="checkbox"/>	brain1-1.labs.lenovo.com	9	Active	Brain 1	LCTC Lab	rack1	RHV	Lenovo.System x3650 M5	10.240.41.231
<input type="checkbox"/>	brain1-2.labs.lenovo.com	11	Active	Brain 1	LCTC Lab	rack1	RHV	Lenovo.System x3650 M5	10.240.41.232
<input type="checkbox"/>	brain1-3.labs.lenovo.com	13	Active	Brain 1	LCTC Lab	rack1	RHV	Lenovo.System x3650 M5	10.240.41.233

Q Search

Site

LCTC Lab (134)
LCTC SH Lab (26)

Rack group

IBB project (55)

Rack

-- None --
rack1 (38)
rack 2 (33)
rack 3 (30)
rack 4 (27)
rack 5 (6)
LCTC SH Lab (26)

1. Easy to sort by any header.
2. Can be exported as report.
3. All associated data is a link.

DEVICE

Device

Site	RTP > LCTC Lab
Rack	rack 3
Position	U11 / Front
Tenant	None
Device Type	Lenovo.ThinkServer RS140 (1U)
Serial Number	MJ0397QB
Asset Tag	N/A

Management

Role	Server
Platform	Linux
Status	Offline
Primary IPv4	10.240.43.165
Primary IPv6	N/A

Console / Power

+ Add console port

+ Add power port

Secrets

Management	root	*****	<div>Unlock</div>
<div>+ Add secret</div>			

Services

None

+ Assign service

Images

None

+ Attach an image

- 1. The center piece of Netbox models is the Device, representing a physical device such as server and switch. This makes sense as the primary physical asset of a data center are certainly these devices.
- 2. Device can be assigned `role` and a `type`.

DEVICE: TYPE

Chassis	
Manufacturer	Intel
Model Name	49Y7960
Part Number	00JY855
Height (U)	0
Full Depth	✓
Interface Ordering	Slot/position
Instances	0















Function	
✗	Console Server This device does not have console server ports
✗	PDU This device does not have power outlets
✗	Network Device This device does not have network interfaces
Child	Parent/Child This device can only be mounted in a parent device

Console Ports	
<input type="checkbox"/>	Name
— None —	
+ Add Console Ports	

Power Ports	
<input type="checkbox"/>	Name
— None —	
+ Add Power Ports	










































- 1. Inventory manufacturer, part number, and such.
- 2. Setup rules to allows network interface (is Network Device), console port, etc..

DEVICE: ROLE

<input type="checkbox"/> Name	Devices	VMs	Label	VM Role	Slug	
<input type="checkbox"/> Access Switch	15	0	Access Switch	✓	access-switch	
<input type="checkbox"/> BMC	60	0	BMC	✗	bmc	
<input type="checkbox"/> Ceph	8	0	Ceph	✓	ceph	
<input type="checkbox"/> Console Server	0	0	Console Server	✓	console-server	
<input type="checkbox"/> Core Switch	0	0	Core Switch	✓	core-switch	
<input type="checkbox"/> Distribution Switch	0	0	Distribution Switch	✓	distribution-switch	
<input type="checkbox"/> Firewall	0	0	Firewall	✓	firewall	
<input type="checkbox"/> Management Switch	2	0	Management Switch	✓	management-switch	
<input type="checkbox"/> Openstack	1	0	Openstack	✓	openstack	
<input type="checkbox"/> PDU	3	0	PDU	✓	pdu	
<input type="checkbox"/> RHV	3	0	RHV	✓	rhv	
<input type="checkbox"/> Router	0	0	Router	✓	router	
<input type="checkbox"/> Server	65	0	Server	✓	server	
<input type="checkbox"/> Storage	3	0	Storage	✓	storage	

1. Flexible for your environment to logically group and manage devices.
2. Color code.

DEVICE: INTERFACE

<input type="checkbox"/>	Name	LAG	Description	MAC Address	Untagged VLAN	Allowed VLANs	Connection	
<input type="checkbox"/>	mgmt0			A4:8C:DB:9B:01:00			Not connected	  
	10.240.43.29/24	Primary	Active	Global				 
<input type="checkbox"/>	MGT			A4:8C:DB:9B:01:FE	4095	4095	Not connected	  
<input type="checkbox"/>	1			A4:8C:DB:9B:01:00	598	1-19,100-108,200-209,300-309,400-409,500-509,591-700	rack 4.10.240.43.28/24.39 XGE4	  
<input type="checkbox"/>	10			A4:8C:DB:9B:01:00	1	1	Not connected	  
<input type="checkbox"/>	11			A4:8C:DB:9B:01:00	598	1-19,100-108,200-209,300-309,400-409,500-509,591-700	Not connected	  
<input type="checkbox"/>	12			A4:8C:DB:9B:01:00	598	1-19,100-108,200-209,300-309,400-409,500-509,591-700	Not connected	  
<input type="checkbox"/>	13			A4:8C:DB:9B:01:00	598	1-19,100-108,200-209,300-309,400-409,500-509,591-700	Not connected	  
<input type="checkbox"/>	14			A4:8C:DB:9B:01:00	1	1	Not connected	  
<input type="checkbox"/>	15			A4:8C:DB:9B:01:00	1	1	Not connected	  
<input type="checkbox"/>	16			A4:8C:DB:9B:01:00	1	1	Not connected	  
<input type="checkbox"/>	17			A4:8C:DB:9B:01:00	1	1	Not connected	  
<input type="checkbox"/>	18			A4:8C:DB:9B:01:00	1	1	Not connected	  
<input type="checkbox"/>	19			A4:8C:DB:9B:01:00	1	1	Not connected	  

1. Best way to manage dynamic list such as interface list through **automation**.
2. Diagnose network issue by seeing exactly which interface serves the IP you know.
3. The **only tool on the market to show cable connections**. In the example above, it shows a switch port **1** is connected to port **XGE4** of another switch with IP **10.240.43.28** and is on in slot 39 on rack 4.

DEVICE: INVENTORY ITEM

Hardware 5

Lenovo/5719	ob-1
Intel/49Y7960	slot-1 slot-2
IBM/M1215	slot-4
IBM/M5210	slot-9

ob-1

Discovered


Device Type

Manufacturer

Part Number

Serial Number

Asset Tag

 Lenovo/5719

Lenovo

N/A

N/A

000000000000000000000000894EF304EB8

Broadcom NetXtreme Gigabit Ethernet Controller 20

00

03

UUID

000000000000000000000000894EF304EB8

Manufacturer

Lenovo

Serial No.

N/A

Part No.

N/A

Model

5719

Fru No.

N/A

Fod Uid

11SBCM957190123456789

Max Data Width

4

Package Type

Onboard

Bus No.

32

- 1. Build inventory of sub-components inside a server.
- 2. Never again to type in serial number of a device by hand.
- 3. View its configuration and state.

DEVICE: REMOTE MANAGEMENT

LCTC Lab / Racks / rack1 / rack1.brain1-3.labs.lenovo.com.13

Power

On Off Cycle

On UEFI

abs.lenovo.com.13

minutes ago

Port 18

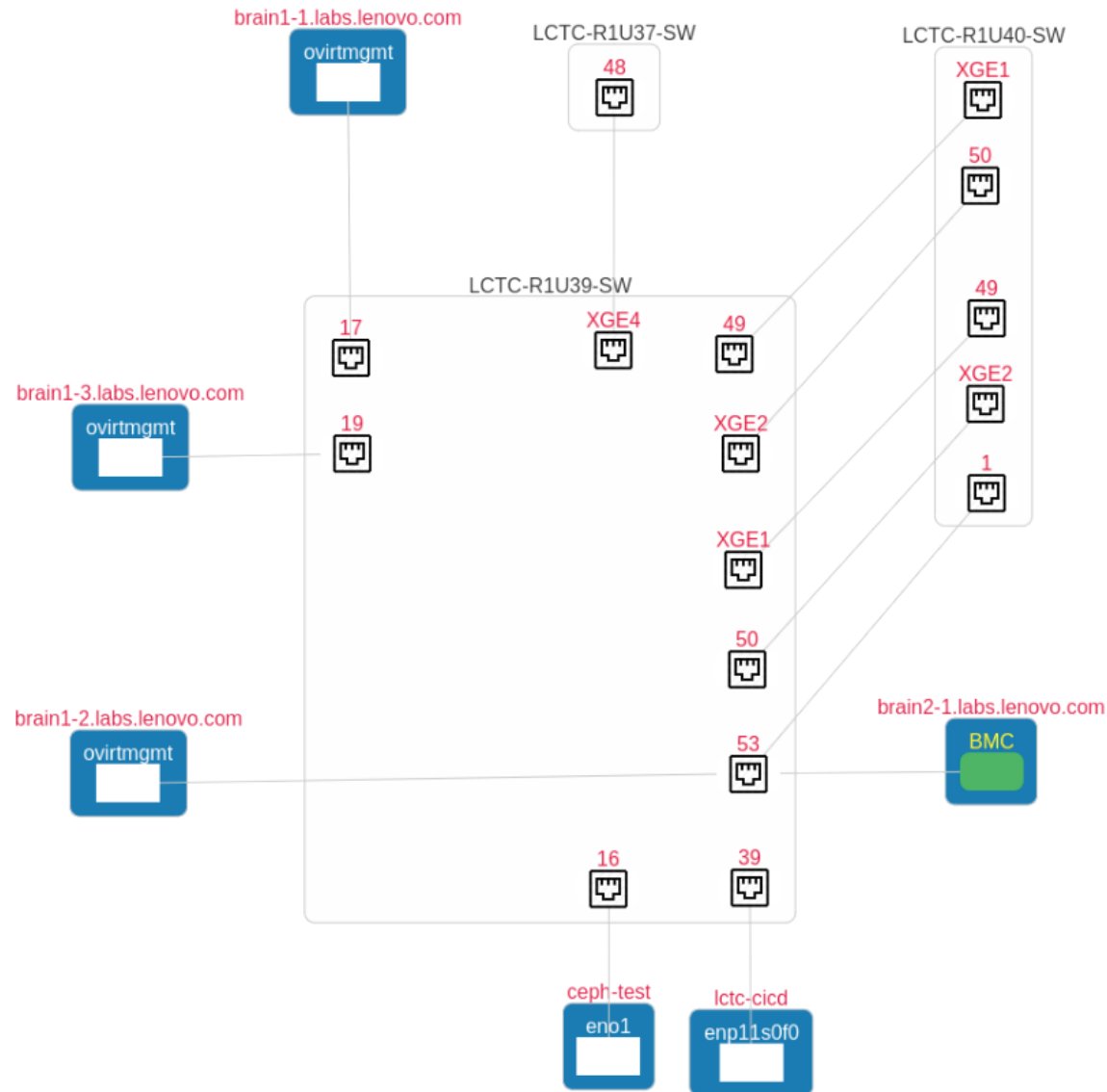
Created Aug. 2, 2018 · Updated 14 hours, 32 minutes ago

Set config	
Interface	
Rack	rack1
Device	LCTC-R1U39-SW
Virtual Machine	
MAC Address	A4:8C:DB:94:42:00
Type	Switch port
Form Factor	SFP+ (10GE)
Enabled	False
Mode	Tagged
VLAN	
Native/Untagged VLAN	1
Allowed VLANs	1-19,100-109,200-209,300-309,400-409,500-509,600-609,700-709,3999-4000,4002
Is Trunk	True

1. Power cycle server and choose a **boot mode**, eg. UEFI, PXE.
2. Manage switch config at **port level**.

DEVICE: NETWORKING CABLE CONNECTIONS

© 2018 Lenovo Internal. All rights reserved.



1. Unique feature in the market.
2. Visualize networking cable connections including inter-switch and server-switch down to the switch port level.
3. Easy to drill down by simply clicking on port and interface.

LOGICAL GROUPING

Site	
Status	Active
Region	RTP
Tenant	None
Facility	N/A
AS Number	N/A
Time Zone	America/New_York (UTC -0400) Site time: 2018-08-02 15:49
Description	N/A

Contact Info	
Physical Address	N/A
Shipping Address	N/A
Contact Name	N/A
Contact Phone	N/A
Contact E-Mail	N/A

Comments	
LCTC lab	

Stats

5
Racks

134
Devices

0
Prefixes

0
VLANs

0
Circuits

0
Virtual Machines

Rack Groups

IBB project 2

Images

None

+ Attach an image

Topology Maps

network

1. Map infrastructure to your business hierarchy.
2. Data model supports flexible many ways of reporting and information aggregation.
 1. By region , site and tenant .
 2. By device type , device role , platform .
 3. By rack group , tenant group .
 4. By cluster
 5. Ultimately, by any device attribute.

THE END
