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### 1. Summary

NetBrain Integrated Edition 8.03 (IEv8.03) introduces several new features and feature enhancements, including:

- <u>Function Portal</u><sup>New</sup> to enable network engineers to collaborate with cross-function teams who do not have NetBrain seat licenses.
- <u>Device Health Report</u> New to assist diagnosis with the visibility about the overall device-level health, such as live access status, topology connection status, key network data existence, etc.
- Enhancements to <u>Domain Health Report</u>, reporting cloud health and path calculation health.
- Enhancements to <u>CLI Automation</u>, including device qualification before CLI automation, etc.
- Enhancements to <u>Granular Data Comparison</u>, including comparing with instantly retrieved live data, comparing selected texts and table columns, and a few usability enhancements.
- Enhancements to SDN, including <u>Service Graph Support</u> and <u>Multi-Site Support</u>.
- Enhancements to Discovery, including <u>Bulk Select API Servers</u>, <u>View History Result</u>, <u>Toggle Additional</u>
   <u>Operations</u>, <u>Export Access Logs</u>.
- Enhancements to <u>External User Authentication</u>, including mapping user roles and privileges from TACACS+ to NetBrain, and syncing selected user data for LDAP/AD Authentication.
- New SSH fingerprint authentication to improve network security by obtaining and verifying the Fingerprint Key.
- Enhancements to <u>Service Monitor</u>, <u>Email Alerting</u>, etc.
- <u>New Tech Support</u>
- <u>Enhanced Platform Framework</u>, including custom interactive commands and command block in driver definition, etc.
- <u>Enhancements to Path Framework</u>, including replicate active path calculation with auto-saved data, L3 active path calculation with baseline data, etc.
- <u>New REST APIs</u>
- Enhancements to <u>Deployment and Installation</u>

## 2. New Features and Feature Enhancements

### 2.1. Collaborative Function Portal to Work with Maps and Paths

IEv8.03 introduces the Function Portal feature to enable network engineers to collaborate with their colleagues who do not have NetBrain seat licenses. This is one of the key approaches to achieve the goal of MAP EVERYWHERE and improve team productivity and collaboration. With Function Portal, external users from different teams (IT engineers, security engineers, etc.) can gain fast and free access to use selected IE functions and resources through a website, including dynamic mapping, A/B path calculation, and One-IP table query.



**Note:** Compared to Embedded Map, Function Portal does not require customer's effort to provide a hosting environment or write scripts for initial setup.

Note: Incident Portal Collaboration will be available in the next release to enhance the portfolio.

#### **Use Flow**



- 2. End Users or External Users Access the Portal
  - a. <u>View Dynamic Maps</u>
  - b. View A/B Path Result and Calculate Live Path

c. <u>Search One-IP Table and Map Devices</u>

The typical usage for Function Portal includes:

- Publish selected information (Maps/Paths) to different teams without seat licenses required.
- Create a set of portals for key technologies, application flows, sites, or security domains to aggregate network knowledge.
- Build dynamic mapping into existing documentation and collaboration flow to replace static Visio diagrams.

### 2.1.1.Set Up a Function Portal

Note: Only the users with the Function Portal Management privilege granted can create function portals.

#### 1. Define Basic Information

Senior network engineers can create a function portal by defining a portal name, a query string of URL,

NetBrain functions including Map, Path and One-IP Table, and enabling the access code login with an expiry date.

Edit Function Porta	al				×
Basic Settings		Content Settings	Data View Settings	Other Settings	
Name:	NetBrain Map Porta	l			
URL:	https://10.10.7.209/p	ortal/ nbmaps			
Description:	This is a portal for N	letBrain maps and paths.			
Select content Share N Share A Share C	ts to share through th Map Application Path Dne-IP Table	iis portal:			
Set Access (	Code: 123456	<mark>6</mark> 0			
🗹 Expired	after: 2020-07-16	12:00 ∨	AM 🗸		
Time	Zone: (UTC+08:0	0) Beijing, Chongqing, Hong	K V 🚹		
Copy Invitatio	n Information			Cancel Save	

<u>Note</u>: The **Set Access Code** check box must be selected to allow people who do not have NetBrain IE user accounts or portal user accounts to log in to the function portal.

**Note:** The query string of the URL is the identity of each portal, and must be unique in the system. The base URL is a system-level setting, which can be configured by the system administrator.

Site	Configuration	
	Website Base URL:	https://10.10.7.209/
	The Website Base U	RL is the url via which users access NetBrain. $oldsymbol{6}$
	Portal Base URL:	https://10.10.7.209/portal/
	The Portal Base URI	. is the url via which users access Portal. 🚯

#### 2. Select Maps and Paths

In the context of NetBrain functions (Map and Path) selected in the previous step, senior network engineers can continue to select multiple map files and application paths that they want to share with others through the portal.

Function Portal X					
	Content Settings	Data View Settings	Other Settings		
Мар			*		
Label: NetBrain Maps					
Map: 13 Selected + Select					
🔺 🗂 Map Files					
🕴 📹 Core Maps					
🖻 📶 BGP					
OSPF					
EIGRP					
Site Map: 15 Selected + Se	lect				
4 🔘 My Network			A		
🔺 🔘 NB1					
4 🔘 NB2					
▷ 💿 NB3					
NB4-ASA7					
North District					
A CO BJ2			•		
D BI3					
Application Path			^		
One-IP Table			^		
Copy Invitation Information			Cancel Save		

Note: For the selected paths, you can select to publish the first/last calculation result, or the golden one. By default, the last result is selected, and the Live Path Calculation is enabled. The prerequisite of calculating live paths through a portal is that

the Application Assurance Module has been purchased.

Applica	Application Path 🗸						
Label:	Label:						
2 Paths	and 2 Applications	+ Select					
No.	Application/Pa	ith					
1	📀 Main Paths	5					
2	😞 Untitled Ap	oplication / 💠 19.3 to 7	.254(1	72.25.19.3 to 172.25.7.254)			
3	📀 Untitled Ap	📀 Untitled Application / 💠 36.1 to 4.41(10.10.36.1 to 10.10.4.41)					
Share cached path result:		The Last One	~	✓ Enable Live Path Calculation			
		The First One					
One-IP	Table	The Last One			^		
		The Golden Path					

Note: The label setting is optional, which will be used as the area title to introduce the content.

NetBrain Map Portal					
Published by: Xu Zhao Email: xu.zhao@netbrain.com	Created: 06/16/2020 12:17:55 PM				
This is a portal for NetBrain maps and paths.         NetBrain Maps         Label	Description				
Q Browse or Search Maps (44 maps published)	×				
Search by map name/site name/device name/IP	٩				
<ul> <li>Map Files</li> <li>Core Maps</li> <li>BGP</li> <li>OSPF</li> <li>EIGRP</li> </ul>					

#### 3. Select Data Views

Senior network engineers can determine whether to publish all data views or only selected data views for

other users to toggle on the portal.

	Content Settings	Data View Settings	Other Settings	
<ul> <li>Allow users to switch</li> </ul>	Data Views			
🔿 All Data Views				
Selected Data View	/5			
Data View: 22 selec	tted <u>+ Select</u>			
🔺 🗾 Data View T	emplates			
🖌 📶 Built-in D	ata View Templates			
🖌 📶 Cisco A	ACI			
🔽 Fab	ric Health and Faults [Cisco ACI]			
🔽 Fab	ric Underlay Connections [Cisco ACI]			
🔽 Logi	ic Node View [Cisco ACI]			
🖌 📶 High A	vailability			
🔽 HSR	P Overview			
🖌 📶 Quality	y of Service			
🔽 Qos	Overview			
🖌 📶 Routin	g			
🔽 EIGF	RP Overview			
🚺 IP B	GP Overview			
🚺 IP B	GP Prefix Instance			
🔽 ISIS	Overview			
MPL	S L3VPN			
🔽 Mul	ticast Overview			
🔽 OSP	PF Overview			
🖌 📶 Securit	ty			
V Acce	ess List [Cisco IOS]			

<u>Note</u>: Similar to the qualification in the IE system, only qualified data views against devices on a map can be displayed in the Data View pane.

### 4. Define Page Style and Others

Before publishing the portal, senior network engineers can select to customize the page style, login interface, and add contact information.

Edit Function Portal X							
Basic Settings	Content Settings	Data View Setting	gs Other Settings				
Page Style:							
● Built-in Template: Tool Style Template ∨							
O Customize: Se	ettings						
Login Interface:							
Customize the formation: Customize the form	<ul> <li>Customize the logo image on the portal login page. JPG, JPEG, GIF or PNG. Max file size: 5MB.</li> <li>Change Logo</li> <li>Restore Defaults</li> <li>Inable Login Banner</li> <li>Insportal contains confidential and/or proprietary information of devices in it.</li> <li>This portal contains confidential and/or proprietary information of devices in it.</li> <li>This portal is intended solely for the use of the individual(s) to whom it is addressed.</li> <li>If you are not the designated recipient or have reason to believe you can access this portal, please notify the sender immediately, An</li> </ul>						
*Publisher:	Xu Zhao	*Email:	xu.zhao@netbrain.com				
Phone Number: 185-0136-2396							
Copy Invitation Inform	Copy Invitation Information Cancel Save						

After saving the definition, copy the invitation information from the following prompt and paste the invitation

in an email or instant message to share the portal with your colleagues.

Notification	
Successfully edited the portal	
Name: NetBrain Map Portal Description: This is a portal for NetBrain maps and paths.	
URL: https://10.10.7.209/portal/nbmaps	
Access Code: 123456	
Copy Invitation Information	
	ОК

#### 2.1.2. Access a Function Portal

The system offers two access methods for each function portal:

- Username/Password Login users with IE accounts or portal accounts can log in by using their usernames and passwords, or email addresses.
- Access Code both external users who do not have any accounts and IE/portal users can use an access code to access a portal.

**<u>Prerequisites:</u>** Access code login must have been enabled when senior network engineers set up the portal.

wetBrain Warning This portal contains confidential and/or	
proprietary information of devices in it. This	Log In
portal is intended solely for the use of the individual(s) to whom it is addressed. If you are not the designated recipient or have reason to believe you can access this portal, please notify the sender immediately, An unintended recipient's disclosure, copying, distribution, or use of this portal or any attachments hereto is expressly prohibited and may be unlawful.	access code,user name or email
Publisher: Xu Zhao Email: xu.zhao@netbrain.com Phone: 185-0136-2396	or log in with Single Sign On (SSO)
	NetBrain Powered By Netbrai

**Note:** By using an access code to log in, you will be recognized as an unknown user, and you can select to create a user profile for recognition. User profile is only a visual display of personal information associated with a specific user, but cannot be used for portal login.

🗐 Leave Suggestion 🛛 🛞 Unknown user 🗸	Authenticate User Profile	×
Authenticate User Profile	* Profile Name: User name or Email	
Copy Invitation Information		
Log Out	* Password:	
	Forgot Password	
	Create User Profile 1 Cancel Auth	enticate

### 2.1.3.View Dynamic Maps through Function Portal

Through the function portal, external users can expand the map tree to view the shared maps, including site maps, and double-click the target map to display it in the working area. Furthermore, they can select to apply a data view to the devices on the map. The data source for data views defaults to the current baseline (the latest data saved in the IE system).



Note: The shared maps and map contents are all view-only on the portal.

### 2.1.4.View A/B Path Result and Calculate Live Path

Besides mapping devices and sites, external users can mouse over the target A/B path and click the Draw Path button to view the result. Furthermore, they can re-calculate the path by using live data for a refresh.

Application Paths						Ap	pplica	ion Paths					
9. Browse or Sea	arch Application Paths	(5 paths published)			*		۹.	😤 Map1 > Page1 💌			🔕 10.10.36.1 →	10.10.4.41 🜒 Calculate Live Path	+ 80%
Search by path i	name/application nar	ne/source/destina			Q			Data View	Path Result	».			
Path	Application	Source ()	Destina	Actions			F	esult: Succeeded	WERE RECEIVED AND A				
SW1 to SW6	Main Paths	BJ_Acc_SW1	BJ_Acc_:				-	necast	This is unicast path		0		0
36.1 to 4.41	Main Paths	10.10.36.1	10.10.4	Draw Path				3 <u>9</u> 0 <b>1</b> 7 10.10.3	6.1				UI 2III
asa_core5	Need Everyd	ASA-AA/admi	BJ_L2_C				-		.1(IPV4)		10.10.36.		10.10.4.41
3550_pop1	North District	BJ_core_3550	BST,PO				-		10.		1	seenee	
sw4_sw6	North District	BJ_Acc_Sw4	BJ_Acc_					3 SI Sw-450 Out:Vian	0- <b>15.254</b> 20			10.10.4.0/22	
								10.10.4.0/	22			$\times //$	
e		_			*			10.10.4.4 3 <b>3 10.10.4</b>	41(IPv4) .41			sw-4500-15	
Application: 36.1 t The app <mark>lic</mark> ation co	to 4.41 ontains 2 paths which	are main flows of	f the company	y netwo <mark>r</mark> k.									

Note: The live path calculation function is only available when the Application Assurance Module has been purchased.

### 2.1.5.Search One-IP Table and Map Devices

One-IP table, generated based on ARP and MAC tables when the system builds the Layer 2 topology of a network, records the physical connections and can be used to troubleshoot IP/MAC connectivity issues.

With the One-IP table, external users can search for a device in the current domain by using an IP address as the search term, and click the Map button to map out the target device and its connected neighbors. Furthermore, they can select to apply a data view among those applicable ones to the devices on the map.



## 2.1.6.Feature Comparison Between Portal and IE

The following table lists the comparison of operations that a user can perform between Function Portal and IE.

Feature Category	Functions	Function Portal	IE
Мар	Move Devices	v	v
	<ul> <li>Apply/View DVT and Static DV with Baseline Data</li> </ul>		
	<ul> <li>Zoom In/Out</li> </ul>		
	Edit and Save Map		V
	<ul> <li>Export Map to Word/Visio/etc.</li> </ul>		
	Live Run DVT		
	Manage Map Data View		
	<ul> <li>View Data View with Historical Data</li> </ul>		
	<ul> <li>Play Runbook</li> </ul>		
	Device Context Menu		
	<ul> <li>Map Context Menu</li> </ul>		
Path	View Path Result	V	V
	Calculate Live Path		
	Edit and Save Path		V
	<ul> <li>View Path Log</li> </ul>		
	Set Golden Path		
	<ul> <li>View Path Historical Results</li> </ul>		
One-IP Table	Search	V	v
	• Мар		
	View		v
	Export		
	Resolve DNS		
	Delete		

#### 2.2. Diagnosis with Device Health Report and Logs

When working on a map, you may run into various anomalies of devices, such as a live access issue, a topology issue, or a path calculation failure across a device. The visibility of the overall health at the device level is critical to achieving map success.

By introducing the new feature Device Health Report, IEv8.03 visualizes a device's health from the following evaluation perspectives:

- Basic Information device driver and site assignment.
- Live Status Ping status, SNMP and CLI connection, hostname change status, etc.
- Data Existence in Current Baseline configuration file and data tables, etc.
- Topology connections for each topology type, such as the number of no neighbor interfaces, whether it is an isolated device, etc.
- Path Failure the failed calculation records for paths across the device, etc.

#### **Generate Device Health Report**

Typically, the health report for devices on a map can be accessed from the map context menu and generated on-demand.



	Search for devic	ce, configuration text		<mark>Q</mark> <	Path		•	🖕 🌲 🚨 majun 🛛	BVT_DB2DOM_cbo	cf 🥞 294 Nod	es 🥝 N	etBrain,
	Device	Health Report	:59 PM							Cre	ate Health Re	port
+	Device Scope:	My Network		/								
iles	Device Filters:	No Issues: 0 🕑 Una	assigned to Site: 2	296 🗹 Live Is	sues: 85 🗹	Path Issues: 0 🕑 T	Topo Issues: 296	Data saved in Current l	Baseline earlier than	2020-04-30		
55 twork ange	Total: 296 items	,∱, Export							Search hostname and	driver		Q
_	Hostname	Driver	Site	Ping	SNMP RO	SysObjectID	CLI Connection	CLI Non-Privilege Login .	CLI Privilege Logi	SNMP Hostna	Discovered b	y SI≡
sktop	ASA.Switch	Cisco IOS Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.9.1.1	Succeeded	Succeeded	Succeeded	ASA	N	<b>^</b>
	ASA5505	Cisco ASA Firewall	Unassigned	Succeeded	netbrain	1.3.6.1.4.1.9.1.7	Succeeded	Succeeded	Succeeded	ASA5505	Ν	
	ASA@Switch	Cisco IOS Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.9.1.1	Succeeded	Succeeded	Succeeded	ASA@Switch	Ν	
	ASA\Router	Cisco IOS Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.9.1.1	Succeeded	Succeeded	Succeeded	ASA\Router	Ν	
	BJ*POP	Cisco Router	Unassigned	Succeeded	nb	1.3.6.1.4.1.9.1.5	Succeeded	Succeeded	Succeeded	Unchanged	Ν	
	BJ-3750-1	Cisco IOS Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.9.1.5	Succeeded	Succeeded	Succeeded	BJ-3750-1	Ν	
	BJ-3750-2	Cisco IOS Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.9.1.5	Succeeded	Succeeded	Succeeded	BJ-3750-2	Ν	
	BJ-Arista-1	Arista Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.3006	Succeeded	Succeeded	Succeeded	BJ-Arista-1	Ν	
	BJ-Arista-2	Arista Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.3006	Succeeded	Succeeded	Succeeded	BJ-Arista-2	Ν	
	BJ-Avaya-1	Avaya Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.45.3	Succeeded	Failed		BJ-Avaya-1	Y - CLI Non-p	rivile
	BJ-Avaya-2	Avaya Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.45.3	Succeeded	Failed		BJ-Avaya-2	Y - CLI Non-p	rivile
	BJ-Cat-5000	Cisco Catalyst Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.9.5.7	Succeeded	Failed		BJ-Cat-5000	Y - CLI Non-p	rivile
	BJ-L2-Core-A	Cisco IOS Switch	Unassigned	Succeeded	nb	1.3.6.1.4.1.9.1.6	Succeeded	Succeeded	Succeeded	Unchanged	N	
	BJ-L2-coreB	Cisco IOS Switch	Unassigned	Succeeded	netbrain	1.3.6.1.4.1.9.1.6	Succeeded	Succeeded	Succeeded	BJ-L2-coreB	N	-
	4											+

Tip: The health report can also be accessed from the Start Menu, which targets all devices in the current domain, or from the device context menu, which targets the selected device only.

The report provides statistics for each issue category, which can also be used as filters to narrow down

problematic devices. From the	View Details Report		5101_Router Hea	Ith Report		×
device context menu on a map,	View Tune Log View Benchmark Log		Report Time: 4/	26/2020 10:10:54 AM		Check This Device Health
you can select to view the	Shared Devices Settings	Tune Up	Summary: Assigned Device	e in Site: No Live: 4 need	attention	View Log ∨   ↑ Export Topo: 2 need attention Failed Path on Device: 0
detailed report of a single	Add to Device Group		Basic Informatio	n:		× *
device, view execution logs, or	Remove from Domain		Attention	Index Driver Site		Value End System Unassigned
re-tune up.			Live:			~
			Attention	Index	Value	Execution Time
<u><b>Tip:</b></u> The attention ( <b>!</b> ) is a reminder				Ping	Succeeded	4/23/2020 10:32:33 AM
				SNMP RO	nb	4/23/2020 10:32:33 AM
to ask for your attention. If remedy				SysObjectID	1.3.6.1.4.1.	9.1.1 4/23/2020 10:32:33 AM
action is not necessary, you can			!	CLI Connection CLI Non-Privilege Login		4/23/2020 10:32:33 AM 4/23/2020 10:32:33 AM

action is not necessary, you can ignore it.

4/23/2020 11-12-51 AM

5101\_Router

Execution Time

Discovered by SNMP Only Y - Don't Support CLI

Ν

Ν

4/23/2020 10:32:33 AM

4/23/2020 10:32:33 AM

4/23/2020 10:32:32 AM

\*

Close

CLI Privilege Login SNMP Hostname

Missed Device

Data Saved in Current Baseline:

Attention ... Index

Hostname Changed

Configuration File

#### 2.3. Enhancements to Domain Health Report

IEv8.03 adds the health status of Clouds and path calculation to the Domain Health Report.

#### **Report Cloud Health**

The added Cloud Health area shows the key properties of the existing clouds in the current domain, for example, the count of the edge device and blank Network Control Table (NCT).

**Cloud Health:** 

Attention	Cloud Name	Cloud Type	Edge Device Count	Created Time	NCT Table (no data)	
1	MPLSCloud3356VRF1001	MPLS L3 VPN	13		1	<u>^</u>
1	MPLSCloud3356VRF1002	MPLS L3 VPN	13		1	
1	MPLSCloud3356VRF1003	MPLS L3 VPN	13		1	-
1.1	MPLSCloud3356VRF1004	MPLS L3 VPN	13		1	

Note: Blank NCT includes those tables with headers only. When the count of blank NCT exceeds 0, the attention mark (!) will display.

#### **Report Path Calculation Health**

The health status for path calculation shows the results (the latest ones of paths in Application Manager),

categorized by Succeeded and the causes of failure.

#### Path Calculation Health:

Total 2 paths, 0 succeeded, 0 not executed, 0 running, 2 failed										
Attention	Path Result Category	Count	Percentage							
	Succeeded	0	0%							
1	Lack of related information	1	50%							
1	Gateway Issue	1	50%							

#### 2.4. Enhancements to CLI Automation

In previous versions, the selected CLI commands are executed on all target devices without any qualification. That is, even if a CLI command is not applicable to a device, it will be executed anyway and get an invalid result, which consumes unnecessary resources. IEv8.03 allows you to define the applicable device types for each CLI command in the features that may task CLI command execution, such as, Runbook, Benchmark, and API-triggered diagnosis.

### 2.4.1.Qualify Devices for CLI Automation in Runbook

IEv8.03 allows you to define the applicable device types for each CLI command included in a CLI template. By loading a template to add CLI commands to a Runbook, you can leverage the predefined device types as qualifications to exclude the improper commands from the execution scope of target devices.

Execute CLI Commands			Description		Load Template		
4 Devices 🔽 🗿 Enter Command		Add Run	Simple CLI		Templates + New Template	BGP Command Template	
All Devices	0		L	pad CLI Templates	m Public	Command	Device Type
BJ*POP	0			(port	BGP Command Template	show ip bgp summary	Cisco IOS Switch:Cisco Router:Cisco Ne
Bj_core_3550	0				EIGRP Command Template     Generic Show Command Template	show ip route summary	Cisco Router;Cisco IOS Switch
EX2200-1	0				Multicasting Command Template	show ip bgp neighbors	Cisco IOS Switch: Cisco Router: Cisco Ne
QoS-Path-NXOS-1	0				OSPF Command Template	show ip bgp peer-group	Cisco IOS Switch;Cisco Router
					QoS Command Template	show bgp all all summary	Cisco IOS XR
parser used V Execution Log			G		Private	show bgp neighbors	Cisco IOS XR
					Committy Francisco	show bgp vpnv4 unicast summary	Cisco IOS XR:Cisco Nexus Switch
ecute CLI Commands			- Descript	ion 7		show bgp all summary	Cisco Nexus Switch
Devices 🔽 👩 Enter Command		Add Run	Simple CLI			show bgp neighbor	Juniper Router;Juniper EX Switch;Junip
All Devices	7	eu show ip bgp summary				Description	
BJ*POP	4	en show ip bgp neighbors				BGP Command Template	
BJ_core_3550	4	show bgp vpnv4 unicast summa	ry	and the second		BdP Command Template	
Z EX2200-1	1	show bgp all summary		Qualified			
QoS-Path-NXOS-1	4						
parser used V Execution Lo	g			6			
					The listed CLI commands only apply to the devi	es with the matched device types.	Cancel
					The listed CLI commands only apply to the devia	tes with the matched device types.	Cancel

**Note:** The device qualification is only available to the CLI commands added through a template. Those manually entered or imported commands will still be executed on all target devices.

#### <u>Tips:</u>

- Besides the Execute CLI Command node, this command qualification is also available to the Retrieve Live Data node in a Runbook and other features that task CLI automation through CLI templates.
- You can assign different device types to a single CLI command in different templates. If duplicate commands from multiple templates are selected, the device types defined in different templates will be combined.



• You can assign multiple commands to a single device type at one time.

C	I Template Proper	ties			
	* Template Name:	Generic Show Command Temp	late		
	* Enter Commands display version		30	Com Switch 🗸 Add	
			J	Device Type	
	show version			Cisco IOS Switch;Cisco Router;Cisco IOS XR;Cisco Nexu	Î
	show module			Cisco IOS Switch;Cisco Router;Cisco Nexus Switch 🔍	

## 2.4.2. Qualify Devices for CLI Automation in Other Features

### **Qualify Devices for CLI Automation in Benchmark**

You can select device types for each CLI command as device qualifications when defining a Benchmark task.

By doing this, unnecessary CLI execution will be ignored in the benchmark execution.

Edit Benchmark	Task		
Task Name:	Basic System Benchmark	Description: Default system benchmark task	
Frequency	Device Scope	Retrieve Live Data CLI Commands Additional Operations after Benchmar	k
Enter Com display in	imands iterface	3Com Switch	
Comma	nd	All Device Types     Som Switch	
show in	terface	<ul> <li>Scon sinch</li> <li>Scon sinch</li> <li>A10 Load Balancer</li> <li>IOS Switch;Cisco Router</li> <li>APC</li> <li>APC</li> <li>APC UPS</li> <li>ATT VPN Gateway</li> <li>AVI Controller</li> <li>AVI Service Engine</li> <li>Adtran</li> <li>Adtran</li> <li>Adva Optical</li> </ul>	

### Qualify Devices for CLI Automation in Drill-Down Action of DVT

You can call the execution of CLI templates when defining the input of a DVT's drill-down action. By doing this, the device qualification defined inside the CLI template will be applied to exclude the unnecessary CLI execution.



### Qualify Devices for CLI Automation in Triggered Diagnosis

You can select device types for each CLI command as device qualifications when defining an API-triggered task. By doing this, unnecessary CLI execution will be ignored in the diagnosis.

			Variable II	nput				* Requ
Stub Name: st	tub1		Туре		Variable Name		Default Value	
scription:			♦ API S	ervice Stub				
			⊅ Map	Creation				
gger Option: Re	eal-time Edit			ly Runbook Templates/Ret				Settings
Tas	sk will be run automatically when trigge	ered. Max wait time: 1 Hrs		CLI Command Settings - Co	ollect Additional Co	ommands		×
Map Davisa	a and its Noighbors			Enter Commands for al	l Devices on Map			
iviap Device		×		show ip bgp summary		Cisco IOS	Switch, Cisco Ro 🗸 🗸	Add
Minclude Dev	vice's Neighbors IPv4 L3 Topology	~		Command			🥑 Cisco MDS 👖 Cisco Meraki AP	-
							🭠 Cisco Meraki Cloud	
	Sinterface						Cisco Meraki Firewall	
		3					Cisco Nexus Switch	
	soevice						Cisco PIX Firewall	
						🗹 🤇	Gisco Router	
							Cisco TelePresence	
							Cisco UCS Fabric	_
							Cisco VDS Load C	LI Templates
Would you like	e to add a Runbook? (Optional)						Capital	OK
My Runbook 1	Templates/Retrieve Network 💼	Browse Runbooks					Cancer	OK
			2					

### 2.4.3.View Historical Execution Results and Search

When working with the CLI automation result, you can:

- toggle the data source to view historical execution results.
- click the search icon to search keywords (case-insensitive).



### 2.5. Enhancements to Granular Data Comparison

To highlight meaningful changes and eliminate noises, IEv8.03 introduces quite a few enchantments to data comparison through Runbook Automation.



In addition to comparing the full text of configuration file and CLI commands, IEv8.03 allows you to compare the values of selected parser variables in the configurations or CLI commands.

Compare Same Device      Input     Compare Same Device       Is Dataset @ Is D	× • •
Results     2 of 4 Devices changed, 16 of 23 Data changed       Returbere Live Da V     Retrieve Live Da V	v N D
Retrieve Live Da V Retrieve Live Da V View by: Device Data	10
A MAIDeas	
Hostname # Data I Retri A Retri Status Char	d
	· .
C Route Table Select Vuriables show interface X	
☑ A89 Table	
2 MAC Table OSPF Neighbors X O	
I NDP Table III d'of 4 ■ Interface (Cisco (IOS)	- 1
C STP Table 2 of 2 X C Status 4 III Interface (Cisco IOS)	- 1
A 🖸 NCT Tables 🖉 🖸 Sinput, rate, time 🖉 information of the state	
2 OSPF Neighbors 2 Soupput_rate_time	
✓ CL Commands	*
Abow interface     Show interface     Show interface     Show interface	
A baset     Intf status     Input_rete_ti     output_rete_ti	n
E \$throttles / Modified (3)	4
Ginput error     Denning (p)     Perturn	10
Since     Active Live Use An Arabitation and Arabitationa and Arabitation and Arabitatio and Arabitation and Arabitatio and Arabitation and Arabitation a	9
Retrieve Live Data - R FastEthernet0/0 up, line proto 5 minute 5 minute 2377121     Bisverrun	3
Retrieve Live Data - R FastEthernet0/1 up, line proto 5 minute 5 minute 345868	5
Compare the full text Cancel OF Retrieve Live Data - R FastEthernet0/1 up, line proto 5 minute 5 minute 3458741	2
Retrieve Live Data - R Serial0/1/0 up, line proto 5 minute 5 minute 2488342	
Retrieve Live Data - R Serial0/1/0 up, line proto 5 minute 5 minute 2488354	2
∠ Equal (10)	
Retrieve Live Data - R FastEthernet0, 3dministrative, 5 minute 0	

### 2.5.2.Compare Selected Columns of System Data Table

Noises sometimes distract you when you check the comparison result; for example, nobody cares about the frequent changes of the **Age** column in the system data table. To eliminate these noises, IEv8.03 allows you to select columns before starting the comparison. The number of selected columns and total columns is displayed for each table, for example, "8 of 9" means there are nine columns in the table, and eight columns have been selected for comparison.

Input	Compare	Same Device \vee			
4 Devices 💟		ପ୍ର Da Retrieve	ataset 🕕 Live Da 🗸	Comparison Settings for Route Table	×
All Devices	🔺 🗹 All Data		/	Select Comparison VRFs: 1	
<b>6</b> ВЈ*РОР	Configuration File	I 2	0	Select comparison columns below:	
💋 BJ_core_3550	🗹 Route Table	10 8 of 9	0	Alg.	
<i>📨</i> EX2200-1	ARP Table	1 4 of 4	0	Dest.Addr 🌇	
🥏 QoS-Path-MGMT	MAC Table	11 6 of 6	۲	Mask 🌐	
	NDP Table	111 4 of 4	۲	Distance	
	STP Table	111 2 of 2	×	Metric	
	🖌 🗹 NCT Tables			✓ Interface	
	SOSPF Neighbors		×	Next Hop IP	
	🔺 🗹 CLI Commands			Next Hop Device	
	🗹 show interface	🖂 1	۲	Age	
	🗹 show version	T	0		
				Cancel	ОК

#### 2.5.3.Compare Selected Sub Tables

In earlier versions, the system compares all the system data tables or NCTs by default. This may lead to potential performance risks, because some customers may have many VRF tables or subname NCTs.

IEv8.03 separates the sub tables for system data tables and NCTs. By default, only the "global" one is selected for comparison. You can select more sub-tables based on their needs. For example:

• When a route table has multiple VRF tables, you can select one or more to compare.

Comparison Settings for Route Table	× Select Comparison VRFs	
Select Comparison VRFs: 1 Select comparison columns below:	Search	٩
<ul> <li>Alg.</li> <li>Dest.Addr ()</li> <li>Mask ()</li> <li>Distance</li> <li>Distance</li> <li>Metric</li> <li>Interface</li> <li>Next Hop IP</li> <li>Next Hop Device</li> <li>Age</li> </ul>	Global" BJ Boston	
Cancel		Cancel OK

• When an NCT has multiple sub-name tables, you can select one or more to compare.



### 2.5.4.Set Maximum Size for Comparable Data Types

IEv8.03 allows you to limit the size of each data type for comparison to enhance performance. By default, the function is disabled. When enabled, only the data types, of which the size is less than or equal to the threshold, can be compared. These thresholds are configurable before starting the comparison.



### 2.5.5.Compare with Instantly Retrieved Live Data

IEv8.03 allows you to use the real-time data for comparison if there is no data existence for any selected source. Once selected, the Retrieve Live Data node will be added to the current Runbook, and all the selected devices will be auto-populated as target devices for the live data retrieval.

Select Action 🗸	G 23 ≡	Input	Compare S	ame Device	~		
Star	rt	4 Devices 🔽		t	G Dataset 🕦 rrent Baseline ∨	및 Dataset 😕 Default Live ∨	
		All Devices	A 🕅 All Data			Current Baselin	ine
		All Devices			-	😳 Default Live	
Compare		S BJ*POP	Configuration File		0	🕒 Historical Data	•
		BJ_core_3550	Route Table	8 of 9	0	Retrieve Data	
ċ		EX2200-1	ARP Table	1 4 of 4	0	×	
		QoS-Path-MGMT	MAC Table	6 of 6	0	×	
			NDP Table	111 4 of 4	ø	×	
			STP Table	2 of 2	0	×	
			🔺 🗹 NCT Tables				
			OSPF Neighbors		0	×	
			🔺 🗹 CLI Commands				
			Show interface	T	0	×	
			show ip ospf traffic	T	0	×	
			show version		0	×	
			show version]  show	T	0	×	
		«)					_
Intitled2 V		Retrieve Data for Cor	mpare			💬 Descri	iptio
elect Action ∨	G ⊠ ≡	4 Devices 🔽		Add	select data	Run	Ξ
Sta	irt	All Devices	11	Show inter	face		
		BJ*POP	11	show ip os	pf traffic		
		BJ_core_3550	11	🛃 show versi	on	ដែ	
Retrieve Data f	for Comp	a EX2200-1	11	show versi	on  show interface		
4		🥏 QoS-Path-MGMT	11	MAC Table	È.		
				ARP Table			
Compare		Results Exe	ecution Log		) Auto update all sel	ected data in Current Bas	iseli
		Please select a device	e and a data to see the results.				

### 2.5.6.Summarized Comparison Results

IEv8.03 allows you to gain quick access to the summarized comparison results, and provides two filters "changed" and "unchanged" for devices and their different data types.

Compare-Result 2	(06/10/20	020 03:24:21 PM)					💬 Descripti	on				
Input								~				
Results		2 of 4 Devices cha	ged, 16 of 23 [	Data cl	hanged	Result S	ummary					
View by: 🔘 Devic	e 🔿 Da	ta		Sear	ch							
Hostname	#	Data	0	Retri	🕗 Retri S	Compa	rison result	: between Retrieve Live Data - Resu	ult 2 and Retrieve	Live Data - Result 4		
😁 BJ*POP	4	De Configuration File		0	ø	Show:	Change	d v		Search	۹ ک	t, Export
<i>a</i> BJ_core_3550	12	Route Table		0	Ø	Devi	ce	Data	Changed	Value of Retriev	Value of Retriev	
		ARP Table		0	ø	BJ*P	OP	OSPF Neighbors	Yes			
		MAC Table		0	ø	BJ*P	OP	show interface	Yes			
		NDP Table		0	ø	BJ*P	OP	show interface - \$intfs_table	Yes			
		OSPF Neighbors		×	ø	BJ*P	OP	show version	Yes			
		≬ <mark>ա</mark> show interface		0	ø	BJ_c	ore_3550	Configuration File	Yes			
		Configur	ation File 🗹			BJ_c	ore_3550	Configuration File - \$ospf_config	g Yes			
Retrieve Live D	ata - Re	06/10/2020 03:07:30 PM	Retrieve Li	ve Data	a-Re 0	BJ_o	ore_3550	Configuration File - \$ospf_intfs	Yes			
	aco recin	50/10/2020 05/0//50 / M	Uncenere er			BJ_c	ore_3550	Route Table	Yes			
1 ! Info via SNMP	: sysoid=	1.3.6.1.4.1.9.1.576,vendor=Cis	! Info via SNMP:	sysoid	=1.3.6.1.4.1.9	BJ_c	ore_3550	ARP Table	Yes			
2 BJ*POP#show	run		BJ*POP#show r	un		BJ_c	ore_3550	MAC Table	Yes			-
3 Building config	uration		Building configu	uration.								

#### 2.6. Enhancements to Discovery

In the previous versions, the API discovery and SNMP/CLI discovery shares the same input bar, which caused lots of confusion. Also, the additional operations after discovery are mandatory, which could lead to a very long discovery time for a large network environment. Besides that, you can only view the last discovery history. In IEv8.03, the system provides a separate input bar for API discovery, which offers you the option to not run the additional operations for every discovery, and allows you to view all the discovery history. The UI for discovery and scheduled discovery has been redesigned accordingly.

omain Manager	nent	Tenant: Ini	itial Tenant	Domain: D1
Start Page Dis	cover ×			
Discovery	View Historical	Result: Select		
Discover Devices v Method:	ia SNMP/CLI Network Settings  Discover via Seed Routers Scan IP Range Access Mode: SNMP and SSH/Telnet  Discovery De	epth: 30		
IP/Hostname:			Import IP Li	st 🧹
Discover Devices v	ia API + Select API Servers		]	
API Servers:	Click 'Select API Servers' to add servers			
	Advanced Options 🗸 Start	t Discovery	4	

#### 2.6.1.Bulk Select API Servers

In IEv8.03, you can select the API server from the 'Select API Servers' window for the API discovery. To accommodate a large number of API servers, you can choose to select the server by filtering with server type or using the search bar. The selected server in the window will automatically synchronize with the server listed in the input bar. When you delete a server from the input bar, the server will be unchecked in the 'Select API Servers' window as well. You can clearly view all selected servers by checking the option 'Show Selected Items Only' in the 'Select API Servers' window. If a server has been removed from the domain after being selected, a warning message will pop up when you click 'start discovery' asking you to either modify the input or proceed to discovery without the deleted servers. The traditional devices will be discovered through SNMP/CLI first, then the API servers will be discovered via API.

	API Source Type	Server Name	EndPoints	Description	Usernam	ne .	Front Server / Fron	t Server Group	Device Co	ints
	with Source Type	Server Harne	Endromes	beschption					-	
	CheckPoint R80 API	tt	https://192.168.29.230		Admin'i	-	FS1(::1)		0	
	VMware vCenter	v	https://192.168.48.105		administ	rator@vs	FS1(::1)		0	
	VMware vCenter	48235	https://192.168.48.235		administ	rator@vs	FS1(::1)		0	
	Cisco ACI	501	https://192.168.50.1		admin		FS1(::1)		0	
כ	ACI MSO	5010	https://192.168.50.10		admin		FS1(::1)		0	
2	Cisco ACI	48135	https://192.168.48.135		admin		FS1(::1)		0	

#### 2.6.2.View History Result

In IEv8.03, you can view and select history result in the 'Select Historical Discovery Result' window. By default, it will show the discovery history in the past 30 days, and you can select which history to view. You can adjust the time range for the discovery history on the top of the window. After you make the selection, the discovered devices for the selected discovery will be automatically filled in the input bar so you can easily rediscover those devices. The discover logs will be loaded on the GUI as well.

otal Items: 10		From: 2020-0	04-28 🗰 To: 2020-05-28 📾 😋 Refresh
Start Time	User	Task Result	Duration
5/28/2020, 4:34:31 PM	admin	Succeeded	1 mins 15 secs
5/28/2020, 4:29:25 PM	grace.guan	Succeeded	2 mins 26 secs
5/28/2020, 4:26:30 PM	admin	Succeeded	6 mins 43 secs
5/28/2020, 4:21:16 PM	grace.guan	Manually Stopped	18 secs
5/28/2020, 3:56:57 PM	admin	Succeeded	46 secs
5/28/2020, 3:56:43 PM	admin	Succeeded	2 secs
5/28/2020, 3:42:28 PM	admin	Succeeded	3 mins 11 secs
5/28/2020, 3:41:28 PM	admin	Succeeded	58 secs
5/28/2020, 3:25:38 PM	AutoUser_Bvt_Fvt	Succeeded	1 mins 47 secs
5/28/2020, 3:12:23 PM	AutoUser_Bvt_Fvt	Succeeded	12 mins 58 secs
5/28/2020, 3:25:38 PM 5/28/2020, 3:12:23 PM	AutoUser_Bvt_Fvt AutoUser_Bvt_Fvt	Succeeded Succeeded	1 mins 47 secs 12 mins 58 secs

### 2.6.3.Toggle Additional Operations

You can choose to not run the additional operations for the discovery by unchecking this option in advanced options. When running the topology incrementally, it will not only run for devices in current discovery but also for devices in previous discovery if the topology has not been built for them. You can also choose to retrieve the device/module/interface information for certain discovery (for example, AWS discovery to merge the multi-source devices and Juniper discovery for complete MIB information).

covery Ontions via SNM	P/CLI
Retrieve device/module/in	terrace information
CLI forced timeout:	seconds
Discovery Methods via Seed	Routers
Use NDP to discover ne	eighbor devices
Find routing protocol n	eighbor via SNMP
Use CLI routing table to	o discover next-hops
After Discovery via Seed Rou	iters
Scan destination subne	ets
Scan all connected sub	nets
Minimum mask bits:	24

### 2.6.4.Export Access Logs

Access log is very important for troubleshooting, but there is no option to easily export them in the previous release. In IEv8.03, the export function in device logs will not only export the device logs but also export the access logs for each device.

### 2.6.5.Scheduled Discovery Enhancements

The following improvements have been introduced in IEv8.03 scheduled discovery:

- In 'discover all live network', it will discover all traditional devices in current domain via SNMP/CLI and SDN/cloud devices via API.
- In 'discover selected live network', it now offers the option to scan the IP range and select device for seed discovery.
- The advanced options and API discovery has been added in scheduled discovery according to the changes made in on-demand discovery.

Frequency		Network Settings	Discovery Seed	Plugins	Email Alerts	Summary
) Discover All Liv	ve Network 🕤	Discover Selected Live	Network 🔿 API Trigge	red Discovery		
Discover Device	s via SNMP/CL	Network Settings				
Method	d: 💿 Discover (	via Seed Routers 🚫 Scan IP R	ange Access Mode	SNMP and SSH/Telnet 👻	Discovery Depth: 30	
IP/Hostname	e.g: 10.10.1	0.1; NY_R1				Import IP List 🐱
	s via API	+ Select API Servers				
Discover Device						

In order to avoid discovering a large number of End Systems (using SNMP and CLI) when performing 'Rediscover All Live Network' via API, the backend logic of 'Schedule Discover' was modified as follows:

- When the option 'Discover all live network' is selected, API Discover (SDN/Cloud) still uses the API Server to discover and update relevant data,
- Legacy Discover does not perform 'CLI/SNMP Discover' for the devices that are configured to 'Discovered by API Only' nor does it classify these devices as missed devices.

ask Name:	Scheduled System [	Discovery Desc	ription: Default s	scheduled discovery task	ς			
Freque	ncy	Network Setting	gs	Discovery Seed		Plugins	Email Alerts	
Discove	r all live network	Discover the	following IPs	Scan the following	IPs			
Discovery	Options:							
Access Mo	ode: SNMP and	SSH/Tel 🔻	i Discovery De	epth: 3				
Advan	iced							

### 2.6.6.Do not Scan IP Based on Technology

Before IEv8.03, the Do-Not-Scan IP or Subnet function was ineffective for the Discover task via New Tech, due to the discovery of a large number of IP phones and unknown hosts through ACI to join the Domain.

In IEv8.03, you are allowed to add IP or Subnet to Do-Not-Scan and can specify the Technology Source through which you do not want the Discover to be performed.

tart Page Fine Tune X	List the IR address subsets or device to	Advanced Settings X	,				
	1 Items + Add		4 Selected Select All Clear	Search	Q 😋 Refri	esh	
	IP or Subnet Description	Source Technology	Device Type				
	192.168.10.0/24	Gisco ACI,VMware vCenter,VM V	3Com Switch			*	
		0	A10 Load Balancer				
			APC				
			APC UPS				
			ATT VPN Gateway				
			Adtran				
			Adva Optical				
			AeroHive Switch				
			Aerohive Wireless				
			AlaxalA				
			Alcatel Lucent Service Router				
			Alcatel OmniStack Switch				
			Alcatel OmniSwitch				
			Arista Switch				
			Arris Router				
			Aruba IAP				
			Aruba LWAP				
			<ul> <li>Aruba Switch</li> </ul>			*	

<u>Note:</u> The Device Type for SDN and Cloud is removed from the Device Type selection box to avoid the scenario where you accidentally select these Device Types, leading to SDN and Cloud function not working properly.

#### 2.7. SDN Enhancements

### 2.7.1.Service Graph Support

#### Supported Service Graph Deployment

IEv8.03 supports the following four deployment modes of Service Graph:

- GoThrough
- GoTo
- GoTo with PBR
- OneArm

### **Display Service Graph in Context Map**

The Contract configured with Service Graph will be displayed with a special Icon in the Logic Structure Context Map under Application Centric View, allowing you to view the deployed Service Graph in an intuitive manner.



### Calculate Path Across Service Graph Device

IEv8.03 supports path calculation in the four deployments modes (GoThrough/GoTo/GoTo with PBR/OneArm).



### 2.7.2.Multi-Site Support

#### **Discover ACI Multi-Site**

In v8.03 system, new API Source Type "ACI MSO" (Multi-Site Orchestrator) is added to discover ACI Multi Site. After adding MSO and APIC Server of each site to API Server Manager, you can select 'ACI MSO' as the preferred API Source Type when performing discovery. All sites in Multi Site will be discovered to Domain.

Edit External API Server	×.	omain Management					Tenant: NewTech Domain: ACI	Operations 🔔 admin	0 NetBrai
Server Name: MSO		Start Page API Server	Manager		D.				
Decodation	÷.	Total items: 10 + Add API	Server			All API Sour	search	Q _t Backup _t Res	store 🖸 Refresh
and a second		API Source Type	Server Name	EndPoints	Description	Username	Front Server / Front Server Group	Device Counts	
	-	Cisco ACI	192.168.48.135	https://192.168.48.135		QA	localhost(127.0.0.1)	161	
API Source Type: ACI MSO	v	VMware vCenter	192.168.48.235	https://192.168.48.235		administrator@vsphe	localhost(127.0.0.1)	0	
Endpoints: https://192.168.50.10		VMware vCenter	192.168.48.105	https://192.168.48.105		administrator@vsphe_	localhost(127.0.0.1)	0	
2 Holes and the second se		VMware NSX-V	192.168.48.106	https://192.168.48.106		admin	localhost(127.0.0.1)	0	
Username: admin Password:	4 1 1	CheckPoint R80 API	10.10.32.197	https://10.10.32.157		admin	localhost(127.0.0.1)	0.00	
Front Server/Front Server Group: localhost(127.0.0.1)		CheckPoint R80 API	192.168.0.55	https://192.168.0.55		admin	localhost(127.0.0.1)	0	
		Cisco Meraki	merak)	https://n174.meraki.com		platformdev@netbrai	localhost(127.0.0.1)	0.0	
Advanced 🗸	-	Cisco ACI	emu	http://158.20.0.2		nb	localhost(127.0.0.1)	0	
Managed Devices: 0		ACI MSO	460	https://192.168.50.10		admin	localhost(127.0.0.1)	0	10 L
		Cisco ACI	192.168.50.1	https://192.168.50.1		admin	localhost(127.0.0.1)	6	
	Discover Devices via SM Method: IP/Hostname:	IMP/CLI Network Settings Riscover via Seed Routers ( 10.10.10.7; NV_P1	5 ) Scan IP Range / /	ccess Mode: SNMP and SSH/Tr	einet • O Discovery Depth:	30 Import IP	b List ∽		
	Discover Devices via Al	H + Select API Servers	Unselect All						
	API Servers: MS	0							
	Discovery is completed.	For troubleshooting, pleas	e Contact NetBrain.	Activ	anced Options 🤟 Start Dis	covery			
	Discovered 3 IP addresses,	found 272 devices within 00:0	01:19. Duration spent in perfo	ming additional operations: 00:01:	28.				
	C Device Log 💋 Exec	ution Log 📄 Plugin Log	Report						
	Discovery Summary Lice	nse Details							
		APIC							

### **Display Multi-Site on Network Tree**

The ACI-related view has been adjusted in the Network Tree. Sites belonging to the same MSO can be placed under this MSO, which is convenient for you to view and use.

Multi-site structure is also available in the Application Centric View and Network Centric\Tenant View.



#### Map Multi-Site

IEv8.03 supports Site to ISN (Inter-Site Network) topology calculation and generating the map depicting Site to ISN to Site relationship.



### Calculate Path Across Multi-Site

IEv8.03 not only supports path calculation within the same site, but also supports across-site path calculation.



#### **Other Case Driven Features**

- ACI Stretched Fabric
  - Transit Leaf is used to connect to other Fabric to make multiple Fabric as a single POD.
  - If there are any DCI devices between Transit Leaf, topology calculation between DCI device and Transit Leaf is not supported. Only the direct connection between Transit Leaf will be displayed in the topology.
- VRF Route Leaking
  - Support route leaking between VRFs that are in the same tenant and different tenants within ACI Fabric.
  - Support route leaking into "Common Tenant" to communicate without network.
- vzAny
  - o Use of vzAny to effectively save TCAM resources in policy deployment.
- Preferred Group Under VRF
  - There's no contract policy check between EPGs within Preferred Group in the VRF.

#### 2.8. New SSH Fingerprint Authentication

To improve network security, you may choose Fingerprint for authentication when logging in to the device via SSH. After the SSH Fingerprint authentication function is enabled, NetBrain will obtain the Fingerprint Key from the Device and save it to the Device Setting during the first SSH device login.

In the future, every time you log in to the device through SSH, you will use the Fingerprint Key saved in Device Setting to verify with the Fingerprint Key on the Device. If they are consistent, you can log in to the Device to perform CLI operations; if the verification fails, the failed Device and the Fingerprint Key will be recorded in the SSH Fingerprint Check Failed Table.

	ce Timeout:	600	seco	nds		
	Check SSH Fing	erprint				
SSH Fir	ngerprint Key:	a123:	4345:abbc:dda	c:345a:1343:00aa:aa		
CLI Log	gin Script: (Sel Enable Mode	ect a mo	ode below to d	efine the corresponding expected pron	npts and commands.)	
1	Non-privilege	Mode	None	Disable	Disable	
2	Privilege Mod	le	None	Disable	Disable	
					Default	r
Apply	settings to devi	ce grou	PAll Devi	ces 💌		

From the table below, you can view the Fingerprint Key saved in the current Device Setting and the new Fingerprint Key obtained from the Device. After verifying the new Fingerprint Key, you can manually update it to the Device Setting for future login.

art Page Fine Tune K Discover K				
✓ Uve Access	Total: 5 Items			Apply New Fingerpri
Discovered by SNMP Dnly (52)	Hostname	Management IP	Current Fingerprint Key	New Fingerprint Key
Ping Failed, SNMP Failed (53)	172	172.25.37.9	04/5b/ear1cic4/37/afr79/25/19/bc/3cbc/3d/40/ca	c7:71:43:16:ed:6c:12:0c:ba:04:
Ping Succeeded, SNMP Failed [42]	BJ-L2-Core-A	172.24.101.2	04/5biea:1cic4/37/afi79/25/19/bc/3cbc/3d/40/ca	29:37:bd:ca:8c:21:93:a6:27:89:
Don't Support CU [0]	BI-L2-coreB	172.24.101.3	04/5biea/1cic4/37/afi/79/25/19/bc/3cibc/3di/40/ca	c7:71:43:16:ed:6c:12:0c:ba:04
CU Connection Failed [0]	BI-81	172.24.10.2	04/5brear1mc4/37/ab79/25/19/bm3mbm3d/40/ca	c7/71:43:16:ed:6c12:0cba:04
Dthers (0) Missed Devices (5) Unclassified Network Devices (1) Unclassified NMD SynObject(0 (1) Discovered Devices (225) SSH Fingerpoint Check Failed (5) * Network and Topology Duplicated P and Subnet Manager Topology Link Manager Goud Manager (0) Generic Device (0) Interret Cloud (0) * Other Hostname Change (0)				

### 2.9. Enhancements to Service Monitor

### 2.9.1. Quick Access and Auto-Login for System Administrators

To enable system administrators to access the service monitor page directly, IEv8.03 adds a drop-down menu of the System Management page. Through this quick access, the system administrators will be automatically logged in to the service monitor page with the current admin account.



## 2.9.2.Enable Email Alerts for Service Anomaly

In parallel to in-system alerts, IEv8.03 provides the email alerting function to push alerts when a server is disconnected, or service is stopped. By default, this email alerting function is disabled.

Alert Rules X
▲ □ When MongoDB disk usage reaches 80 % or only 20 GB free space, send emails.
When MongoDB disk usage reaches 90 % or only 10 GB free space, send emails and delete Data Engine data older than 3 months. 3
🛕 🗹 When MongoDB disk usage reaches 93 % or only 5 GB free space, send emails and disable write permission to MongoDB.
When a server is disconnected or a service is stopped, send email
Send Email To : Separate email addresses with a comma or semicolon Cc : Separate email addresses with a comma or semicolon
Send Email Frequency : 1 Hours
Help Cancel OK

### 2.9.3.Service Auto-Restart Settings By Server

For customers with a large scale of networks, especially with many Front Servers, IEv8.03 provides a more flexible service auto-restart mechanism for different servers. It allows you to customize multiple auto-restart rules for a single service on a few selected servers.

For example, the following figure shows three auto-restart rules have been applied to six Front Servers.

o.	Enable	Service Type	Applicable Servers	Auto-	estart Time and Frequency
1	<	NetBrain Front Server	▼ FS 19.53, FS 19.54	✓ Every 01:00	1 days, Start Time: 06/10/2020 AM
2		NetBrain Front Server	▼ FS 20.31, FS 20.32	✓ Every 09:00	1 days, Start Time: 06/10/2020 PM
3		NetBrain Front Server	▼ FS 163.2, FS 163.3	✓ Every 06:00	1 days, Start Time: 06/10/2020 AM

### 2.9.4.Enhanced Log Collection

To accelerate the debug process, IEv8.03 separates the log search process and log collection process to improve performance and introduces more enhancements to system log collection, including:

Allow you to collect different levels of logs for services on different servers.

				×
Settings:				
1 Items			Apply Chang	es
Server	IP	Set Log Level To	Status	
AutoWebServer-32-105	10.10.32.105	Debug 🗸		~
		 Warning Information Debug		
	Settings: 1 Items Server AutoWebServer-32-105	Settings:          1 Items         Server       IP         AutoWebServer-32:105       10.10.32.105	Settings:          1 Items         Server       IP       Set Log Level To         AutoWebServer-32:105       10.10.32.105       Debug               Warning Information       Debug         Debug	Settings:          1 Items       Apply Change         Server       IP       Set Log Level To       Status         AutoWebServer-32-105       10.10.32.105       Debug <ul> <li>Warning Information</li> <li>Debug</li> </ul>

Note: The log level setting is only available to Worker Server, Front Server, and Front Server Controller.

Server	All	Ŷ	Type	All	Y         From         2020-06-09 13:21         To         2020-06-10 13:21         III	Search			
Selecte	d Logs Sizer 0 B Coll	ect Log Download		All				Swirth Log Hur	- Q
0	Server.	IP .	Type	NetBrain Worker Server		Size	Stetus	Created Time	Last Updated Time
	AutoWebServer-32-105	10.10.32.105	Hour La	NetBrain Task Engine	og/fromserver_6256_20200609.tog	4.6 KB	0	2020-06-09 09:45:40 AM	2020-06-10 12:49:49 PM
	AutoWebServer-32-105	10.10.32.105	Hour Loj	NetBrain Front Server	og/F5controller_6076_20200609.log	31.7 KB	0	2020-06-09 09:38:41 AM	2020-06-10 01-00:04 PM
0	AutoWebServer-32-105	10.10.32.105	Hour Lo	Elesticsearch	ogisesk-engine.log	90.8 KB	0	2020-06-09 09:36:02 AM	2020-06-10 01:00:10 PM
	AutoWebServer-32-105	10.10.32.105	Hourto	MongoOB	ogʻask-enginesummary,888,20200609-1 Jog	06.4 KB	0	2020-06-09.09:36:02 AM	2020-06-09 11:00:10 PM
	AutoWebServer-32-105	10.10.32.105	Hour Lo	<ul> <li>RabbitMQ</li> </ul>	og/w3wp_1876_20200609.log	790.0 8		2020-06-09 09:41:38 AM	2020-06-09 05:00:10 PM
0	AutoWebServer-32-105	10.10.32.105	Hour Lo	Redis	• og/w3wp_1876_20200610.log	0.8		2020-06-10 01:41:39 AM	2020-06-10 01:41:39 AM
0	AutoWebServer-32-105	10.10.32.105	Hour Log	C/ProgramDetaInetbr	in/hourlog/WorkerShell_1000_20200609.log	0.8		2020-06-09 01:50:09 PM	2020-06-09 01:50:09 PM
	AutoWebServer-32-105	10.10.32.105	Hour Log	CriProgramDatalnetbr	in/hourlog/WorkerShell_10280_20200809.log	0.8		2020-06-09 01:50:21 PM	2020-06-09 01:50:21 PM
0	AutoWebServer-32-105	10.10.32.105	Hour Lag	C/ProgramDetalnetbr	in/hourlog/WorkerShell_10296_20200609.log	0.8		2020-06-09 01:49:43 PM	2020-06-09 01-49-43 PM
	AutoWebServer-32-105	10.10.32.105	Hour Log	C/ProgramData\netbr	am/hourlog/WorkerShell_10300_20200609.log	0.8		2020-06-09 01:45:58 PM	2020-06-09 01:45:58 PM
	AutoWebServer-32-105	10.10.32,105	Hour Log	C/ProgramDatalinetbr	en/hourlog/WorkerShell_10308_20200609.log	0 B		2020-05-09 04:20:34 PM	2020-06-09 04:20:34 PM
0	AutoWebServer-32-105	10.10.32.105	Hour Log	CriProgramData\netbr	in/hourlog/WorkerShell_10332_20200609.log	0.8	0	2020-06-09 04:20:40 PM	2020-06-09 04:20:40 PM
	AutoWebServer-32-105	10.10.32.105	Hour Log	C(ProgramData\netbr	em/hourlog/WorkerShell_10340_20200609.log	0.8		2020-06-09 01:49:42 PM	2020-06-09 01:49:42 PM
	AutoWebServer-32-105	10.10.32.105	Hourlag	C/IProgramDataInetbr	en/hourlog/WorkerShell_10355_20200609.log	0.8		2020-06-09 02:46:53 PM	2020-06-09 02:46:53 PM
0	AutoWebServer-32-105	10.10.32.105	Hour Log	C/ProgramDataInetbr	en/hourlog/WorkerShell_10376_20200609.log	0 B		2020-06-09 05:24:01 PM	2020-06-09 05-24-01 PM
0	AutoWebServer-32-105	10.10.32.105	Hour Log	C:(ProgramData\netbr	an'hourlog'WorkerShell_10460_20200609.log	0 B	0	2020-06-09 05:12:41 PM	2020-06-09 05-12:41 PM
0	AutoWebServer-32-105	10.10.32.105	Hour Log	C/IProgramDasalnetbr	in/hourlog/WorkerShell_10476_20200610.log	0.6		2020-06-10 10:24:31 AM	2020-06-10 10:24:31 AM
	AutoWebServer-32-105	10.10.32.105	HourLog	C1ProgramData\netbr	in/hourlog/WorkerShell_10488_20200509.log	0.8		2020-06-09 05:19:38 PM	2020-06-09 05:19:38 PM

Allow multi-selection of server/service types as filters.

Add log file name as one of the search terms.

NO	Brain? Ser	vice Moni	tor_	Suppor	t Log							Cog Level Settings	🙀 Alert Rules	A admin *
Server	All	Ý	Type	All	v]	From	2020-06-09 13:21	To 2020-06-10 13:21	Searc	•				
Selecto	d Logs Size: 0 B Collec	t Log Downica	ś									w3wp		×
0	Server	P	Type		Log •					Sce	Status	Created Time	Last Updated Time	é.
	AutoWebServer-32-105	10.10.32.105	Hour Lo	1	C1ProgramDataInetbrain\hourlog	w3mp_1976	,20200609.1eg			790.0 B		2020-06-09 09:41:38 AM	2020-06-09 05:00:1	0 PM
	AutoWebServer-32-105	10.10.32.105	Mour Lo	5	C/ProgramDataInetbrainThourlog	1876	,20200610.log			0.0		2020-06-10 01:41:39 AM	2020-06-10 01:41:3	19 AM

#### 2.10. More Feature Enhancements

#### 2.10.1. Map User Roles and Privileges from TACACS+ to NetBrain

The existing TACACS+ authentication method grants all the external user accounts with the same role (privileges), and the roles can be changed after your first-time login.

The IEv8.03 system provides a new TACACS+ authentication method to assign granular user roles and privileges by mapping roles from the TACACS+ server to NetBrain IE system. Thus, external user accounts can keep finer-grained roles and privileges in good shape before their first-time login to the IE system.

Note: The new TACACS+ authentication only applies to Cisco ISE and Cisco ACS 5.x.

#### **Use Flow**

For example, you have two TACACS profiles with two different roles defined in your ISE system, and you want to map them respectively to NetBrain IE roles "Power User" and "Engineer".

dentity Services Engine	Home  > Context Visibility  > Operations  > Po	icy > Administration - \	Work Centers			
Network Access     Guest Access	TrustSec + BYOD + Profiler + Posture - Dev	ce Administration • PassivelD				
Overview      Identities     User Ident	ity Groups Ext Id Sources • Network Resources •	olicy Elements Device Admin	Policy Sets Reports Settings			
Conditions  Network Conditions  Results Allowed Protocols TACACS Command Sets TACACS Profiles	TACACS Profiles > NetbrainDomainPrivilegies TACACS Profile Name Netbrain Description Task Attribute View Raw View Common Tasks Common Tasks	Engineer Profile1	TACACS Profile Name Description	Netbrain Power User	Profile2	
	Custom Attributes		Common Tasks			
	🕈 Add 📋 Trash 🕶 🕓 Edit					
	Type Name	Value	Custom Attributes			
	MANDATORY Role	Default View				
	L		🕈 Add 🍵 Trash 🕶 🕑 Edit			0.
			Type Na	me	Value	
			MANDATORY Role	5	Network Operator	C 🗎

1. When configuring TACACS authentication, add a role mapping from TACACS (**Role/Network Operator**) to NetBrain (**Power User**).

n unabhailt ann ser branch	<b>14</b>				×	Assign Pr	nvileges for BVT_DB2DOM_1914				
ttribute Name: Role		Attribut	e Value: Network	k Operator		Role:					+ A66
etBrain Privileges:							omain Admin	Power User			
System Admin						Er Er	igineer.	Guest			
) System Management							etwork Change Creator	🗌 Network Change Exec	utor		
) User Management						Func	tion Privileges	0	Show all function	privileges for	referen
Tenants, 1 Domains Sele	ected		Servit		Q S Refresh	Der	nain Management	Device Management			
Tenant Access	Tenant Admin	Allowed to Create Domain	Domain Access		Domain Privilege	<u> </u>	rad Paro, coa Managamant	Cre Management			
BVT_DBITEN_E	0	0					neu casul ce che ageneric	ene meneger ren			
			D BVT_DB1D	OM_3c558f		0.0	covery ( une mesivorix ulevice	schedule Benchmerk.			
. SVT_DB2TEN_1	0	0				Mer	røge Network Settings	Manage Device Settings			
			2 8VT_D8200	OM_1914a	Assign Privileges	Aco	ess to Live Network	Create Network Change			
			ULDOM			Ma	1 a ini t Mananamant	konsta Marsonis Pokon	•		
			🗌 le			Device	Access Policy:			Search .	
			🗍 search_ma	p_500		0	Device Access Policy Name	Privileges	Device Sco	pe	
AloneTenantDi	0	0				0	le .	View Network Data, Execute Network Change	le		
			DifferentTe	nantData		0	zj.	View Network Data, Execute Network Change	All Devices		
			🗆 ULM			2	AllDevices	View Network Data, Execute Network Change	All Devices		
			🗌 shaolihua			O I	aRI	View Network Data, Execute Network Change	All Devices		
			□ ¢¢¢								
AloneLiveDate	0	0			٣						

2. Repeat step 1 to add a role mapping from TACACS (**Role/Default View**) to NetBrain (**Engineer**), and save.

Add TACACS+ Authentication	on					×
Name: TACACS1		Description:				
⊖ Assign user role manua	ally <ul> <li>Map user role from TACACS+ tr</li> </ul>	o NetBrain				
Primary Server IP:	10.10.5.146	6	Assign NetBrain privilege + Add Mapping	s to attribute-value pairs:		
Secondary Server IP:	10.10.5.70	0	Attribute Name	Attribute Value	NetBrain Privileges	
			Role	Network Operator	1 Tenants, 1 Domains Selected	
Server Port:	49		Role	Default View	1 Tenants, 2 Domains Selected	
Secret Key:						
Login Mode:	Standard ASCII	- 0				
Authentication Timeout:	5	econds 🕦				
					Sav	e

When authenticating TACACS+ users' login, the NetBrain system checks the attribute name and value of their roles in the TACACS+ server. It assigns the corresponding roles and privileges of the IE system to them.

<u>Note:</u> Once external users have logged in to the IE system, their roles and privileges can be manually changed and locked. Locked user roles and privileges will not be synced with any changed authentication settings.

### 2.10.2. Allow Selection to Sync User Data for LDAP/AD Authentication

In earlier versions, the system synchronizes all the attributes of LDAP/AD user accounts by default when authenticating these external accounts. To meet specific security requirements, the IEv8.03 system allows you

to determine the user data that can be synced in the LDAP/AD authentication process.

Edit LDAP Authentication							×
Name: NetbrainAD_BJQ	A	Description:					
1.Connect				2.Set Tenant/Domain Acce	ess for Group		
Server Address:	10.10.10.7/dc=netbrain,dc=com	0	0 Groups			1 Groups Selected	ØValidate
Group Root:		0	Search		Q	QA	
User Root:		6					
Connect Type:	● Regular 🛛 Secure (SSL)						
Server Port:	389						
Connect Username:	netbrain/qaauto	0			>		
Connect Password:	***** change password						
Synchronize Items:	name	-					
	🕑 name						
	First Name						
	Last Name						Next
	🔲 Email						
	Description						
	Phone Number						

### 2.10.3. Direct Map Access from Alerting Email

In previous versions, alerting emails generated for Qapp/Data View Template, etc., did not provide a "View Map" link for you to quickly address the problematic map in the IE system. This was because the Worker Server cannot perceive the required information from the Web Server to compose the map URL under the infrastructure at that time.

In the context of the **Server Base URL** setting (**System Management > Advanced Settings > Site Configuration**) introduced in IEv8.02, the "View Map" link has been implemented and introduced in this IEv8.03 release to enhance the user journey. The following figure shows a sample email with the new "View Map" function added to each alert message:

Tenant: Initial Tenant Domain: PM\_Training

evice Level:						21
Object	Severity	Message	From Task	User	Time	View Map
app1/BST to BJ_Acc_SW1/172.24.10.250->BJ_Acc_SW1	Error	app1/BST to BJ_Acc_SW1/172.24.10.250->BJ_Acc_SW1: Calculate path failed.	AAM_test	admin	2019-06-02 19:45:29 -07:00	View Map
app1/BST to BJ_Acc_SW1/172.24.10.250->BJ_Acc_SW1	Error	app1/BST to BJ_Acc_SW1/172.24.10.250->BJ_Acc_SW1 has changed with Golden Path.	AAM_test	admin	2019-06-02 19:45:29 -07:00	View Map
app1/BST to BJ_Acc_SW1/172.24.10.250->BJ_Acc_SW1	Error	app1/BST to BJ_Acc_SW1/172.24.10.250->BJ_Acc_SW1 has changed with Previous Path.	AAM_test	admin	2019-06-02 19:45:29 -07:00	View Map

The following table lists the landing page after you click on the "View Map" link, which depends on different tasks.

Task	Landing Page after clicking on "View Map"
Qapp/Gapp	Target map page, with Runbook node (Qapp/Gapp) focused
Instant Qapp	Target map page, with the Instant Qapp panel opened
Schedule Qapp – Qapp Alert	<ul> <li>If the target device is a device group, path, unassigned site, or manually selected devices, then an on-demand map page will be created and opened.</li> </ul>
Schedule Qapp – Path Alert	<ul> <li>If the target device is a leaf site, then the leaf site map will be opened.</li> <li>If the target device is a container site, then the leaf site map where the problematic device belongs to will be opened.</li> </ul>
Data View Template	Target map page, with Runbook node (DVT) focused
AAM	On-demand map page will be created and opened (alerts are detected by scheduled Benchmark tasks).

### 2.10.4. Enable Email Signature for System Messaging

To email uniform information in an automated way, IEv8.03 allows system administrators to set up an email signature, which will be included at the bottom of the message sent by the NetBrain IE system.

Enable Email Server Sett	ings	Fetch Last Setting	
* SMTP Server:	10.10.10.8		
* SMTP Port:	587		
* Encryption:	No		
* Sender Email Address:	zhaojiefei@netbrain.com		
Password:			
* Sender Email Frequency:	5	Minutes 1	Test
Email Signature:	Normal <sup>+</sup> Sans Senf <sup>+</sup> <u>A</u> <sup>*</sup> <sup>*</sup> <sup>*</sup> B I <u>U</u> <sup>+</sup> <sup>*</sup>		です Zhao Jiefei 数件人 Zhao Jiefei Test Email Server Settings
	Cheers, Weicai Liu whu@netbrain.com   Beijing Ext. 842		Cheers, Weicai Liu wilu@netbrain.com   Beijing Ext. 842
	Test	Save	
L	Email Signature Setting		Email Instance

By default, the email signature is blank. To set up one, go to **System Management > Email Settings**.

#### 2.10.5. Allow Multiple User Accounts to Share One Email Address

To adapt to diverse customers' needs, the IEv8.03 system allows multiple user accounts to sign up using one email address. In other words, each email address can be registered to multiple user accounts in the system. Hence, the username is an identical attribute for these accounts and required as the login credential.

#### 2.10.6. Report Online Users and Portal Users in System Usage Statistics

To detail more helpful information for system usage statistics, IEv8.03 introduces the following enhancements:

Report online user accounts (the value of logout time is blank).

tem Management											Operations	🛓 admin	Log Out	Ø NETBRO
Home Page K License	X Tenants X User Acc	ounts 🔗 Pront Server C	ontrollers × Email	Settings X	kdvanced Settings									
Current Users Usage R	Report Audit Logs													
Tenant: All	Domain: All	Period: This Mon	th - From:	06/01/2020	Te: 06/10	2020				19	earch	Q	.t. Export	13 Refresh
-							Tana Cartas Tan		Lange Ball and	an familiana	Descrip			
Usemanie	a or cogins	PERIO	den rome	Laster	-good rime		Total Charge The	2	Login Failure of	ve to peak provide	Deters			
edmin	27	6/9/20	20, 9:43:24 AM	6/10/2	020, 9:56:01 AM		291h 34m 30s		0		Check D	etails		
yangdan@Function	6	KAON	20.947701.40	69/00	20.3.21.07 PM		or way the		1		Check D	etañs		
rmj3	4	a series a series of the series								2	Check D	etails		
jacrest	4	17 14444								1 Export 73 Befreet	Check D	etailt		
shy	3										Check D	ecails		
shouling	3	Client Type +	Login Time	Tenant Name	Domain Name	Machine Name.	IP Address	Logout Time	Duration	Login Feilure	Check D	etalls		
j2ctest1	3	IE	6/9/2020, 9:46:56 AM	Initial Tenant		yangdan-ga	10.10.4.3	6/9/2020, 9:52:05 AM	5m 9s	1	Check D	etalls		
kang	3	Æ	6/9/2020, 9:47:45 AM	Initial Tenant	domain1	yangdaniqa	10.10.4.3	6/9/2020, 9/52/05 AM	4m 20s		Check D	ecalls		
Test@Function	2	Æ	6/9/2020; 9:52:05 AM	Initial Tenant	domain1	yangdan-qa	10.10.4.3	6/9/2020, 9:58:35 AM	6m 30s		Check D	stalls		
weical	2	6	6/9/2020, 9:58:35 AM	Initial Tenant	domain1	yangdan-ga	10.10.4.3	6/9/2020, 10:13:52 AM	15m 17a		Check D	ecale		
		ie i	6/9/2020, 10:18:40 AM	Initial Tenant	domain1	yangdan-qa	10.10.4.3	6/9/2020, 11:08:20 AM	49m 40s		Owen	etalle		
		IE	6/9/2020, 11:08:20 AM	Initial Tenant	domain1	yangdan-ga	10.10.4.3	6/9/2020, 8:08:24 PM	9h 00m 4s		Chanto			
1		E	6/10/2020, 9:30:55 AM	Initial Tenant	domain1	HUCHINGSHI	10.10.0.17	6/10/2020, 9:54:12 AM	23m 17s		Checku	esana		
ringe			6/10/2020, 9-31-52 AM	Initial Tenant	br	HUCHINGSHI	10.10.0.17	6/10/2020, 9:54:12 AM	22m 20s		Check D	ecans.		
Jeny	2		6/10/2020 9:54-11 AM	Initial Tenant	bc.	huseneth	at		4h 12m 47s	_	Check D	ecalit		
rmj1	1	Estava	AUD/2020 0-12-24 AM				1010.42		70h 72m 24		Check D	esalis		
jenny.tong	10	d'admin	1012020, 94524 AM			Ja-Spaulda	101043		2011 2311 345	-	Check D	etails		
jactest2	1	It Admin	new Juru N644519 AM			IP/CIPILIPIOA	ni ni AJZ		228 228 4M		Check D	etails .		
portali1@Function	1.										Check D	ecols		
MyPortal@Function	1										Check D	etella.		

**Note:** A refresh is required to get the continuously increasing results of the total online time/duration for online users.

Report portal user accounts

		0.512020, 51151211 01			or 10/2020, 515010 f f m					
yangdan@Function	Usage Details - on	hvoortal								
rmj3		yportai								
jzctest	1 Items								,↑, Export 🕞 Refres	
shy		1	T	D N	M IF N	10.4.1.1	1 . T	0		
zhouling	Client Type	Login Time	Tenant Name	Domain Name	Machine Name	IP Address	Logout Time	Duration	Login Failure	
jzctest1	Portal	6/9/2020, 10:12:39 AM	Initial lenant	domain1	yangdan-qa	10.10.4.3	6/9/2020, 10:33:47 AM	21m 85		
kang										
Test@Function										
weicai										
lx										
11										
rmj2										
jerry										
rmj1										
jenny.tong										
jzctest2										
portalli1@Function										
MyPortal@Function										
onlyportal	1		6/9/2020, 10:12	2:39 AM	6/9/20	020, 10:33:47 AM	21m 8	s		

2.10.7. New Map-Based Search

IEv8.03 adds a new option **Search** to the drop-down of the map toolbar, which enables you to search for a specific device on the map by using "hostname" and "management IP" as the search term. When you click on a search result, the device will be focused and highlighted on the map instantly.



### 2.10.8. Optimized Categories of Logged-in User Accounts

Because of the introduction of the function portal in IEv8.03, the client types of logged-in user accounts have been expanded. The client types can be viewed and used as filters both in the System Management page and Domain Management page.

tem Management					
Home Page X License X	Tenants X User Accounts	Front Server Controllers	× Email Settings ×	Advanced Se	ttings ×
Current Users Usage Report	Audit Logs				
Total Seat Licenses in Use: 2 of 10000	Session Count: 8 Tenant: All Ten	ant 👻 Domain:	All Domain 👻	Client Type:	IE, IE Admin, Smart 💟
Username •	Tenant Name	Domain Name	ClientType	Ma	✓ IE
▲ 🖞 zhaoxu					Smart CLI
Session7	NBT	legacy_sdn	IE	ZH/	🕑 Embedded Map
⊿ ß rmj3					API
Session1	NBT	legacy_sdn	IE	ren	Portal

Note: Only the "IE" user accounts consume seat licenses.

#### 2.10.9. Enhanced L2 Topology Accuracy

In IEv8.03, the existing L2 topology calculation algorithm is optimized to support the scenario where duplicate IP addresses with different VRFs configured on the device (as shown in the figure below).



#### 2.10.10. Enhanced Performance to Build L3 Topology for Unknown End Systems

In previous versions, the system added the option as one of the domain's advanced settings to build L3 topology links for unknown end systems, which brought benefits to L3 path calculation. On the contrary, it also brought potential performance risks to process such a huge amount of data.

To balance system performance and required functionality, IEv8.03 removes the option of building L3 topology links for unknown end systems, but introduces an alternative solution, including:

- When finding the next hop is an unknown end system, the system processes the path script to ensure the unknown end system can be mapped out along the path.
- The system will not delete L3 links for unknown end systems when autoupdating maps.
- The system will not automatically extend unknown end systems as L3 neighbors.

	Start Page	Advanced Settings $~ imes~$
		Network Security
		Remove the following constitue data from the device configurations and Illy
		Remove the following sensitive data from the device comparations and or.
		1. Line and console passwords
		2. Local user passwords
		3. Enable passwords
		4. Enable Secret
or		5. SNMP community string
		6. TACACS and Radius keys
		7. VPN Keys and/or Certs
		8. SSH Private keys (these may show up on CSS devices)
	_	Build L3 Topology Option
		Build unknown end system L3 topology ()

Use the main class mask to calculate L3 topology for an IP without mask

Automatically create zones and assign VRF interface based on VRF names

## 3.1. New Tech Support

IEv8.03 introduces multiple new techs to enable more topology related functionalities.

New Tech Name	Description
VeloCloud SD-WAN <sup>New</sup>	Support discovery, L3 topology build and path calculation for Velocloud edge and gateway.
AVI SDN <sup>New</sup>	Support discovering AVI Controller Service Engine by API, logical topology between Service Engines.
CloudGenix ION SD-WAN <sup>New</sup>	Support discovering CloudGenix ION SD-WAN devices by both API and CLI, logical topology between SD-WAN devices.
Citrix (Netscaler) SD-WAN <sup>New</sup>	Support discovering Citrix (Netscaler) SD-WAN devices by CLI.
Segment Routing - Cisco IOS XR	Support SRGB NCT table, SR Pfx Parsing, multiple IGP control plane, segment routing only deployment, SR co-existence with LDP (without sr-prefer configured/ with sr-prefer configured), multiple SR segments pushed at ingress PE.
Cisco VXLAN	Support BGP EVPN VXLAN.
Cumulus VXLAN <sup>New</sup>	Support VXLAN Peer Table, L3VNI VRF configuration, and L2 VNI path calculation.
NAT-Traversal	Support the mapping of topology and aligned devices along two-way paths.

### 3.1.1.NAT-Traversal Support

IEv8.03 adds the support for NAT-T (traversal), by mapping its topology and aligned devices along the two-way paths. Here is a sample screenshot:



The logic for NAT-T technology support includes:

- 1. When generating interfaces for IPSec VPN, the system checks all the neighbors for each hop device to determine whether any neighbor has been configured with NAT by using its GDR property hasNATConfig.
  - (a) If yes, the system will obtain the NAT-related information, and then check whether the local IP address of the current interface has been translated to an outside global address in the NAT table.
    - (i) If yes, the system will save the information of the outside global address to the GDR property NAT outside global of the interface.
  - (b) Repeat (a) until all devices have been checked.
- 2. During the Qapp automation for IPsec VPN topology calculation, the system will link two interfaces (**A** and **B**) when the following two conditions are met:
  - The VPN local IP address of **A** equals to the remote IP address of an interface **B**.
  - The remote IP address of **A** equals to the NAT outside global address of **B**.

#### 3.2. Enhanced Platform Framework

#### 3.2.1.Customize Interactive Commands in Driver for Live Data Retrieval

When the system attempts to access devices in a live network, some devices may return particular CLI prompts and pause the process until getting a valid response. In earlier versions, the system has already built the support of custom driver definition for the following two interactive cases:

- Respond "Y" to resume when "Yes/No" is returned in the prompt.
- Respond a whitespace when a page break appears in the returned prompt.

To adapt to more diverse CLI interactive scenarios, IEv8.03 allows you to customize interactive commands depending on the different CLI characteristics of different devices from both global and individual perspectives.

#### Define Generic Interactive Commands for Devices Applying the Same Driver

IEv8.03 introduces the "Interactive Commands for Live Data Retrieval" settings in driver definition for you to define the generic interactive commands for devices that use the same driver. Besides the exiting two pairs of

expected prompt and responsive command, you can add more pairs.

#### Notes:

- The built-in two pairs cannot be deleted, but can be modified.
- Use "||" to separate multiple expected prompts, and use "regex:" as suffix for regular expressions.
- Use "[]" to include a keyboard key or a key combination. For example, [Ctrl + q].

Device Driver Pr	roperties									
Driver name:	F5 Load Balancer									
Device type:	: F5 Load Balancer									
Author:	NetBrain									
Live Acce	ss Config	le Table Advanced								
	SNMP port:	61								
	Telnet port:	3								
	SSH port:	2								
Device	CPU Usage OID:	1.3.6.1.4.1.3375.1.1.83.0								
Device Men	nory Usage OID:	1.3.6.1.4.1.3375.1.1.77.0+100.0/\$1.3.6.1.4.1.3375.1.1.78.0								
The co	ommand to exit:	uit  exit  q								
Interval to p	ause before ente	ng password: 0 ms								
Invalid Retu	rn: less than 18	chars and containing bash  Syntax Error:  parsing error  Unexpected Error:  BlGpij								
Interactive + Add	Commands for L	e Data Retrieval	1							
Expected	Prompt	Send Command	L							
less  (EN	ID)	[space]								
'Yes' or 'N	10'  Yes or NO	N   Yes/NO  (y/n) y								
Щ		-								
		Cancel OK								

### Define Interactive Commands for Individual Device

IEv8.03 introduces the customized interactive commands for each device in the Shared Device Settings, which takes priority over those defined in drivers. That is, once the interactive commands are defined and enabled the Shared Device Settings of a device, the system will not apply those defined in its associated driver to the device.

By default, the customization of interactive commands in the Shared Device Settings is disabled, indicating that those commands predefined in its device drivers will be applied.

Shared Device Settings of BJ_Acc_SW2			
Shared Device Settings: Unlock Loc Management IP: 172.24.101.22 Live Status: Up Front Server/Front Server Group: F51(10.10.3	2.105) V Ping		
CLI SNMP API		Interactive Commands	×
Access Mode: Telnet	✓ Port: 23	Enable	
Username: netbrain	Available Username 🗸	Expected Prompt	Send Command
Password: *****		-more-	[space]
Privilege Username:	Available Username 🗸	'Yes' or 'NO'   Yes or NO   Y/N  Yes/NO	У
Privilege Password: *****			
Jumpbox for FS: N/A			
Jumpbox for CLI: N/A			
Interactive Command	Prompt Settings Advanced		Cancel
Apply above Settings to device group:All D	evices 💌		
Tune	Cancel Submit		

#### 3.2.2. Define Command Block in Driver for Live Data Retrieval

As per customer cases, the CLI command method to retrieve route table cannot be applied to the route tables with multiple VRF instances, and different commands are required to enter different modes before issuing the show ip route command. For example:

```
BR-K6-Albright-G27(su)->su secure
BR-K6-Albright-G27(su-secure)->show ip route
BR-K6-Albright-G27(su)->su student
BR-K6-Albright-G27(su-student)->show ip route
```

With this context, IEv8.03 introduces a new format rule to enable and standardize the use of command blocks to retrieve live data in the driver definition. For example: CommandBlock::[["su \$vrfName", ["BR-K6-Albright-G27(su-secure)>", "show ip route"], ["regex:\s\S+>", "Y"], ["regex:\s\S+>", ""]]]

The following table explains the format of a command block in detail:

Command Block Element	Explanation
CommandBlock::[[ ]]	Precursor string, indicating the following content is a command block (JSON array).
"su \$vrfName"	The first command in a command block, which is also the only one that will be issued without any conditions.
["BR-K6-Albright- C27(gu goguro)>" "ghow	Command pairs, including the expected prompt and responsive command. Multiple
ip route"]	string pairs can be attached in a command block.
<pre>["regex:\s\S+&gt;", "Y"]</pre>	<b>Tips:</b> Regular expression can be used to define an expected prompt. The <b>Ctrl + C</b> keys and <b>whitespace</b> can be used to define a responsive command.
<pre>["regex:\s\S+&gt;", ""]</pre>	

#### 3.2.3.MPLS Inter-AS Support

In IEv8.03, the MPLS Cloud has been expanded to support two deployment methods: option A (Back to Back VRF) and option B (Multiprotocol EBGP for VPNv4) in MPLS inter-AS. You can add the CE device and CE interface to the MPLS Cloud through static addition or dynamic search via BGP AS to support topology and path calculation.



<u>Note:</u> If the CE device deployed by option B is included in the MPLS Cloud, you need to select the BGP All VPNv4 Advertised Route Table NCT table in the server benchmark task to complete the calculation of the MPLS Cloud virtual route table.

### 3.2.4.Internet Cloud Adjustment

In IEv8.03, the internet cloud is integrated into the new cloud framework (offered in v8.02) as a new cloud type. Starting from this version, NetBrain will use this new cloud framework to simulate various types of inaccessible networks in the customer's environment. According to the network deployment methods of different customers, the platform team is responsible for maintaining the existing cloud types and adding new cloud types.

tart Page Fine Tune		Cloud Definitio	'n						
Live Access     Discovered by SNMP Only (0)     Unknown IP (0)     Ping Failed, SNMP Failed (0)     Ping Succeeded, SNMP Failed (0)     Don't Support CLI (0)	Define you     + Add     Cloud Name	Name: Cloud Type: Description:	ISP Network	oud					
CLI Connection Failed (0) CLI Non-privilege Login Failed (0) CLI Privilege Login Failed (0) CLI Configuration Retrieve Failed (0) CLI Configuration Update Failed (0)		+ Static Int	erface +	Dynamic Search Interface + Boundary Device	+ Exclude + Boundary Interf	Search	IP address	٩	₹.
SNMP Configuration Update Failed (0) Others (0) Missed Devices (0) Unclassified Network Devices (0) Unknown SNMP SysObjectID (0)		J Static Boun Boun	(2) dary 1 dary 2	Bos-WAN LA-WAN	Serial0/0 Serial0/0		192.168.1.1 172.16.1.1		
Discovered Devices (0) SSH Fingerprint Check Falled (0) A Network and Topology Duplicated IP and Subnet Manager Topology Unk Manager		Edge Device (	Count: 2						
Cloud Manager (0) Generic Device (0) 4 Other		Нер					Can	cel	ОК

#### Notes:

- 1. The definition entrance of Internet cloud is different from the previous version. It is now located in the cloud manager interface.
- 2. Compared with the previous version, an additional cloud interface is required for static addition. Cloud interface has no format requirements, it can be defined according to your specific needs.
- 3. In addition to static addition, automatic addition is also provided through advanced search.

#### 3.3. Enhancements to Path Framework

#### 3.3.1.Replicate Active Path Calculation with Auto-Saved Data

In earlier versions, it was usually difficult for the Platform Team to debug Active Paths for customers. This was because the data retrieved for the Active Path Calculation cannot be saved and reused in another system environment.

To enhance the supportability, IEv8.03 automatically saves the specific commands when calculating an Active Path and also the returned results to the current baseline for future reuse.

#### 3.3.2.Calculate L3 Active Path with Baseline Data

Customers may encounter path calculation failure when Juniper devices are involved. This is because some data tables are too large to be retrieved. For example, the file size of a VPNv4 table is 8GB.

In parallel with the backend optimization of data acquisition, transmission, and storage, IEv8.03 also adds two options when using baseline data to calculate A/B path. That is, the system allows you to calculate L3 Active Path as well, and also use CLI commands with arguments, such as show ip route 1.1.1.1, to narrow down the data processing scope.

#### Limitations:

- This function of using CLI command with arguments only applies to most device types, but not all.
- Whether the data can be retrieved by specific CLI commands depending on both the data existence and data

Path S	ettings		ĸ
	Protocol:	IPv4 -	
	Data Source:	Current Baseline	
		Calculate L3 Active Path ——— New Option Use CLI command with arguments <b>()</b> —— New Option	
⊳ Ao	dvanced ———		
		Cancel OK	

matching. With these conditions, the path scripts can determine whether to use CLI commands with arguments.

### 3.3.3.Optimized Conditions to Determine Next-hop Device

When it comes to path calculation logic, the system always looks up the source IP address in the ARP table, for example, the ARP table of a VXLAN anycast gateway or HSRP device, to determine the next hop. If there is a matching one in the ARP table, that device will be identified as the next hop; otherwise, the calculation will fail. However, the fact that the first hop of a path is not a VXLAN or HSRP device may happen, and cannot be supported due to the lookup limitation.

To support this case, IEv8.03 adds a supplementary condition when the above condition cannot be met — the system will look up the outgoing interface IP of the device, which can be calculated and confirmed along a path, in the ARP table of VXLAN anycast gateway or HSRP device. If there is a matching one in the ARP table, that device will be identified as the next hop; otherwise, the calculation will fail.

#### 3.4. New REST APIs

IEv8.03 introduces the following new REST APIs:

API	Description
<u>Get Audit Logs</u>	Call this API to get the overall system license node information.
Get Shared Device Settings	Call this API to get shared device settings in current domain.
Update Device CLI Settings	Call this API to update device CLI settings in current domain.

### 3.5. Enhancements to Deployment and Installation

- Add Support for RHEL/CentOS v7.8
- Allow customized installation path for Linux Front Server
- Unify the installation/upgrade log path to C:\NBIEInstall\ for all Windows components
- Upgrade third-party dependencies to the latest
  - Upgrade Redis from 5.0.4 to 6.0.4
  - Upgrade IPWorks SSH from 2016 to 2020

o Upgrade Jquery from 3.4.1 to 3.5.1