NetBrain Licensing functionality overview for:

XXXX

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NETBRAIN [Company address]

Contents

NetBrain Functionality and workflow overview

NetBrain is a unique network automation platform designed to automate network management tasks, regardless of technology and complexity, *using live data and without the need to be a coding expert*.

There are four key use cases for NetBrain's automation platform:

- End-to-end visibility via Dynamic Map
- Map-Based manual Problem Diagnosis
- Intent-Based automated Problem Diagnosis
- Automate Network Change and Application Assurance

There are thousands of distinctive features of the NetBrain product, which can be grouped into the following categories:

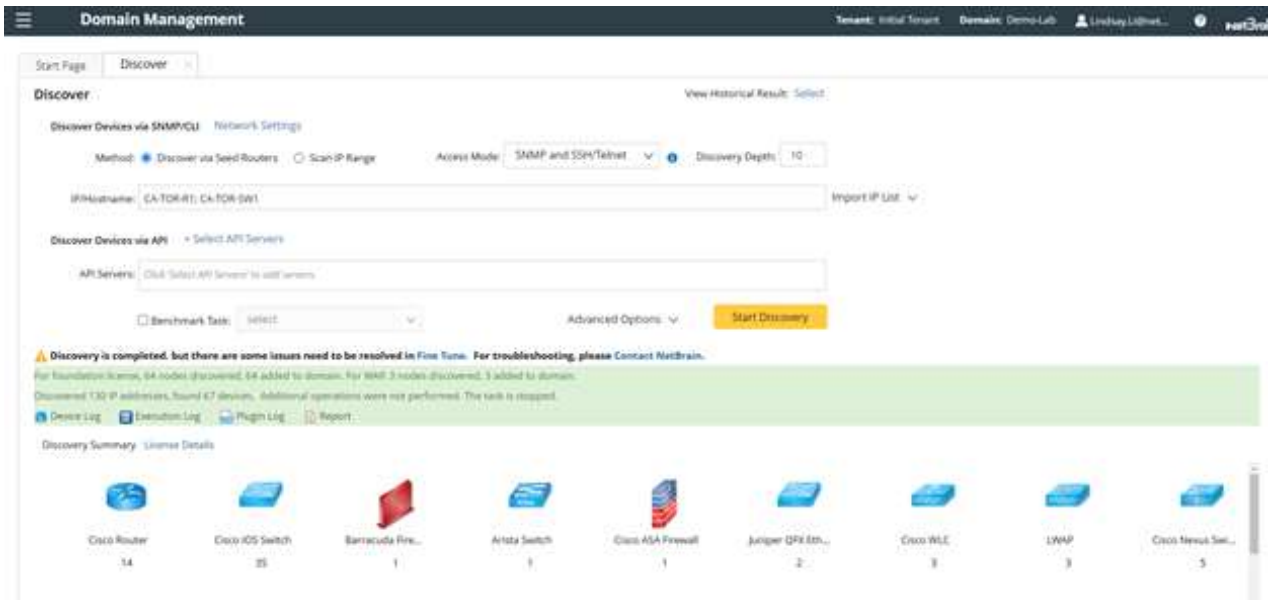
1. Digital Twin: NetBrain discovers your whole network and builds a mathematic data model ("digital twin") to mirror your network. The model is automatically updated by the scheduled discovery and benchmark tasks. The digital twin covers the traditional network, SDN, SD-WAN, and public clouds.
2. Dynamic Map: NetBrain dynamic map provides end-to-end visibility of your network and is the GUI for any network management task. With Data View Template (DVT), it provides a Single Pane of Glass (SPOG).
3. Executable Runbook: Runbooks automates standard manual network tasks at scale and codifies the troubleshooting best practice. Dynamic Map and Runbook are cornerstones of the interactive problem diagnosis.
4. Network Intent (NI) and Network Intent Cluster (NIC): NI automates the network design documentation and the Triggered and Preventive Problem Diagnosis.
5. Change Management: The Network Change (CM) module automates the network changes and verifies the change's effect.
6. Application Assurance: The Application Assurance Module (AAM) documents application paths, verify the applications against any change, and monitor the operational statistics and abnormalities along the path.

   In practice, NetBrain functions as an Operating System of your total network.

UNIVERSAL NODE LICENSE OVERVIEW

Universal Node License- NETWORK DISCOVERY AND DIGITAL TWIN

Using the Universal Node license, NetBrain discovers your entire hybrid network, including traditional components, software-defined Network (SDN) and WAN (SD-WAN), and the public cloud, making all its information about configuration, operational statistics (Condition, state), and flow of traffic easily accessible to any operator or engineer as part of our visual management and automation console. The result is an exact "digital twin" of the end-to-end network, which contains all the topology data and baseline configuration, and operational status.



NetBrain's auto-discovery engine supports all mainstream network technologies, using live data collected via API, CLI, and SNMP. For example, traditional IP networks, SDN, SD-WAN, and public cloud have different discovery methods, and the results are knitted together to build a consistent view of the entire network. This comprehensive view enables the network operator to manage their heterogeneous network in one platform. Through auto-discovery, everything about a running network and its condition (including inventory, multi-tiered topology, network design and network baseline) is modeled and ready to be used with all automation features, such as the Dynamic Map, Executable Runbook and Network Intent.

After the discovery, NetBrain runs a benchmark task to keep the digital twin updated to the current network status. The digital twin dynamic data model enables NetBrain to interact with the infrastructure as needed, interactively, or by applying automated tasks.

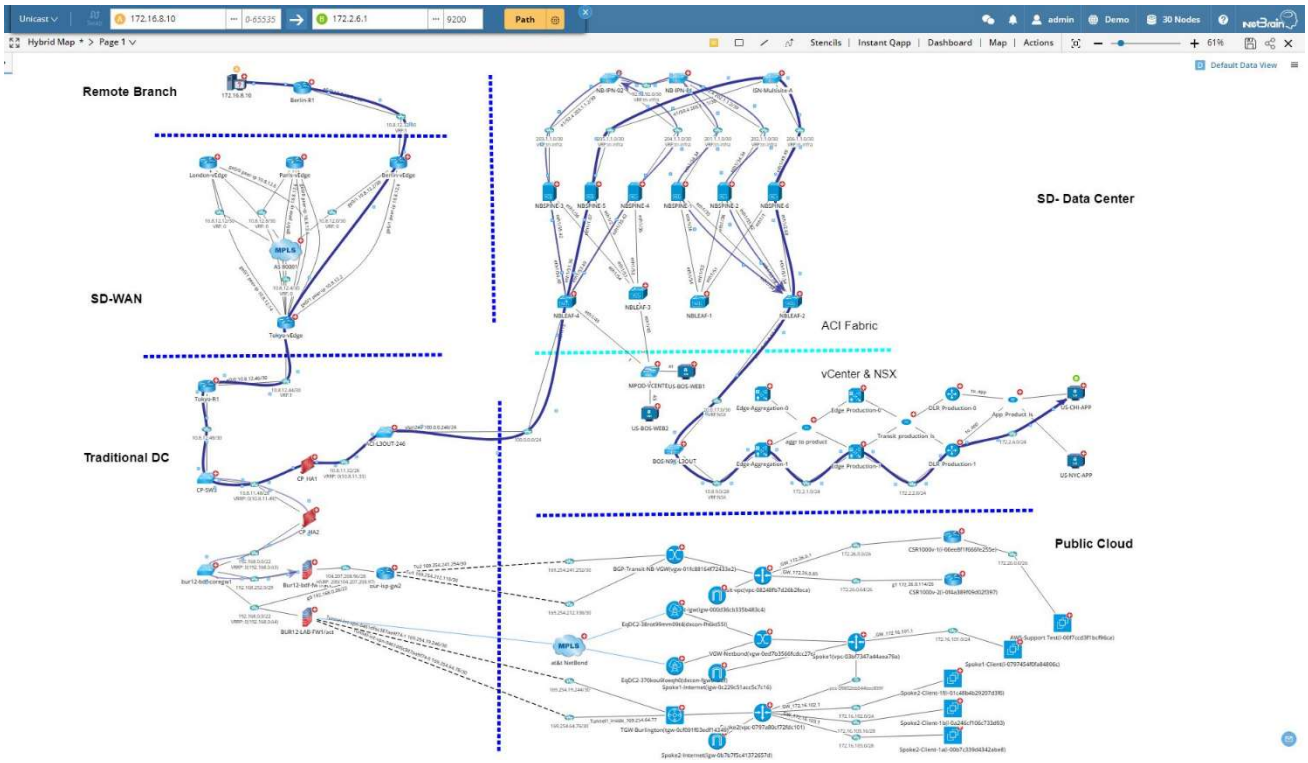
Universal Node License - Dynamic Mapping

The Dynamic Map can be created in advance to document your network, for example, mapping all sites and your core network, or can be created on-demand to help define the scope of a network problem. Dynamic Map can help you to understand a network design and ensure you always have accurate, up-to-date network documentation. Everything about a network can be discovered and continuously documented through NetBrain's interactive media. This data includes:

- Network inventory

- Network topology (L2, L3, MPLS, IPSEC, SDN)
- Network design
- Network baseline and changes
- Data and functionality in 3rd party toolsets (via API)

A sample map showing the traditional DC, SD-WAN, ACI, public cloud and their connections:

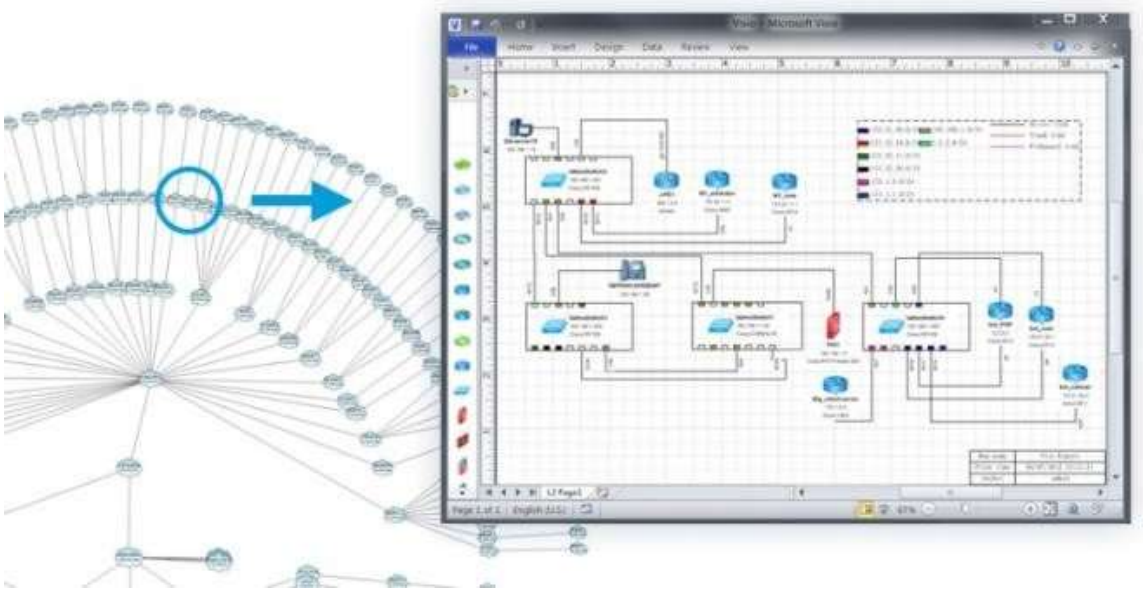


Unlike static diagrams, Dynamic Maps can be created on-demand, updated automatically, and shared with full data structures intact, ensuring that your documentation is always effective and relevant.

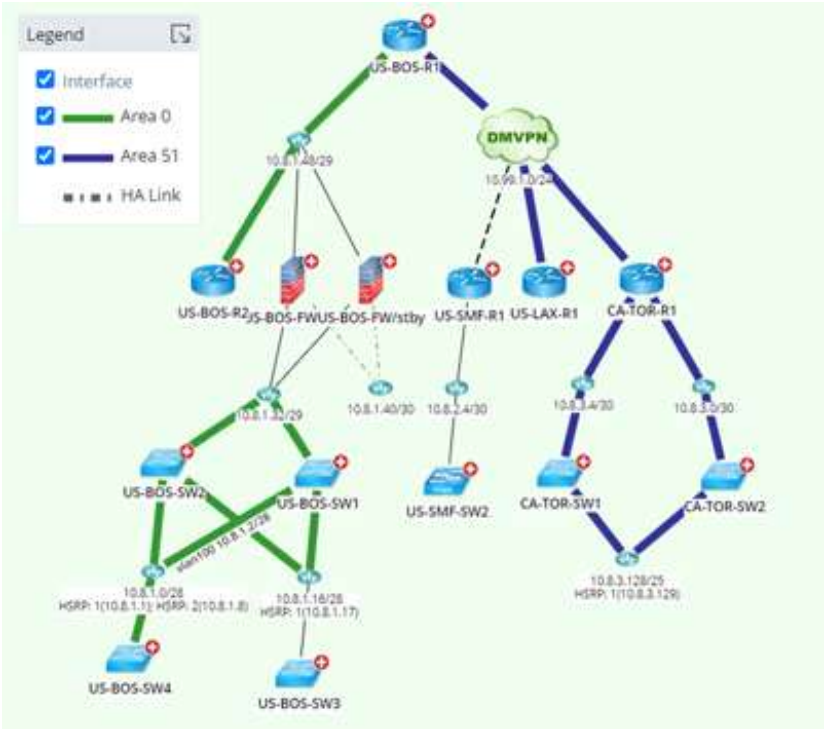
Universal Node License - Documenting the network using Dynamic mapping

NetBrain can create site specific maps automatically. Once NetBrain has discovered and created a digital twin of your network, it can automatically identify different geographic sites within your environment.

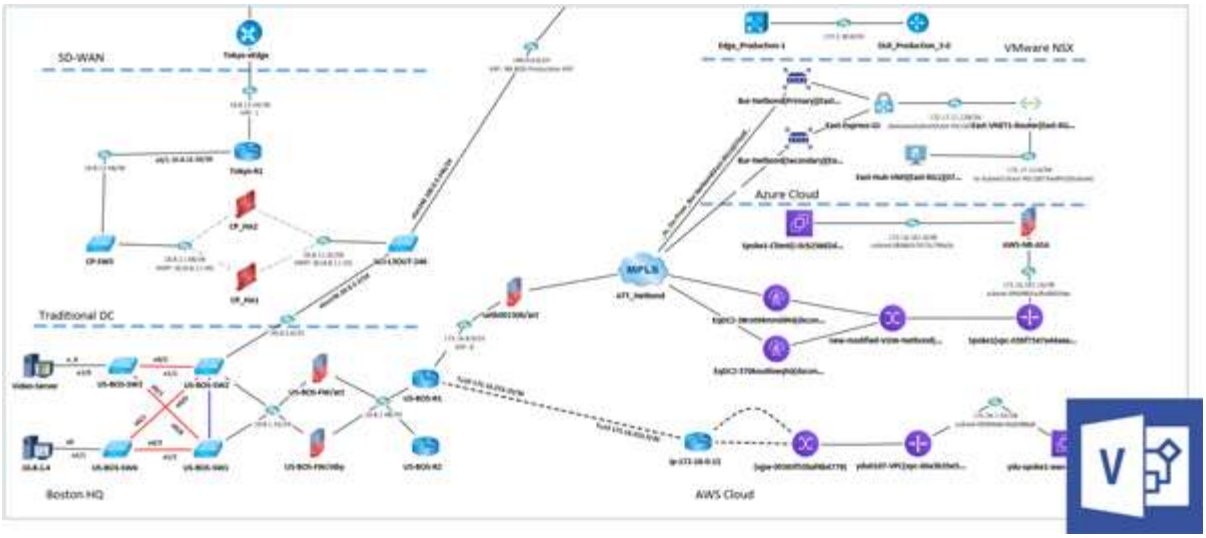
The logical relationships between sites can be visualized from a single overview map and users can then take advantage of specific functions within NetBrain's network mapping tool to drill into any site to see the L2 or L3 relationships of devices within that Site.

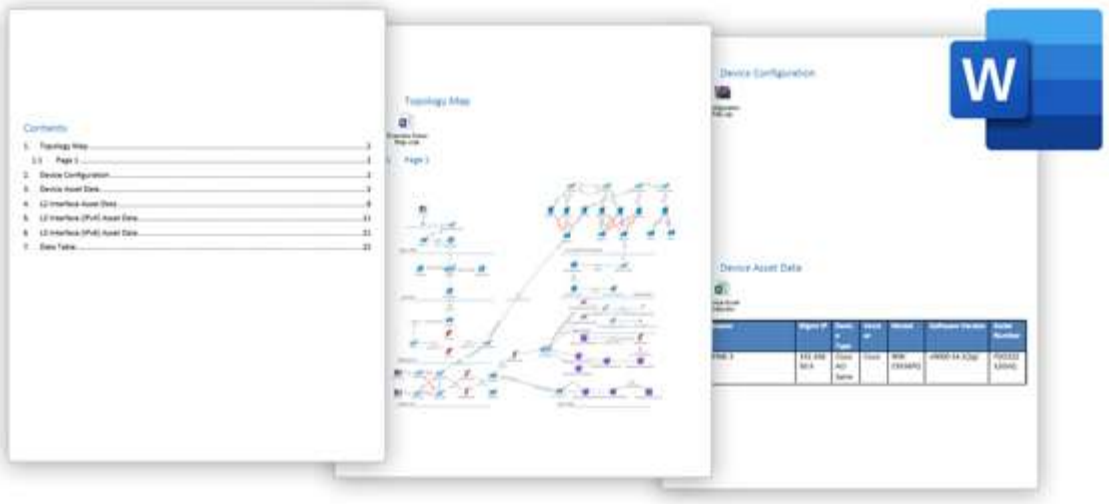


Besides Site, a Device Group is a collection of devices configured with the same routing protocol or categorized by other logical conditions. Device groups can better organize network devices, which is critically important for operations at scale.



Users can also save their existing Dynamic Map and export it into Microsoft Visio or Word Documents with one click. The amount of detail on the Map at the time of the export is reflected in the resulting file.





Universal Node License - Creating on-demand maps for any operational task

With NetBrain, a Dynamic Map is the primary user interface to the network. Each unique task may require a unique map to provide the foundation for visibility and automation. Each Map is typically created on-demand through one of several methods:

- **Search and Map**

  The Search bar in NetBrain acts like a Google search for any data within your network. Search helps you leverage the power of big data to ensure you can quickly find and visualize any relevant network information. Simply entering a free text string into the bar will run a search across your domain for matching any data element. For example:

  - Enter a Hostname or IP address to locate a device and map its neighbors.
  - Type IOS 15.5. to see all devices that currently run this firmware.
  - Search “Area 0” to discover all area border routers.

- Searching for an identified SDN Application will return all overlay and underlay dependencies.

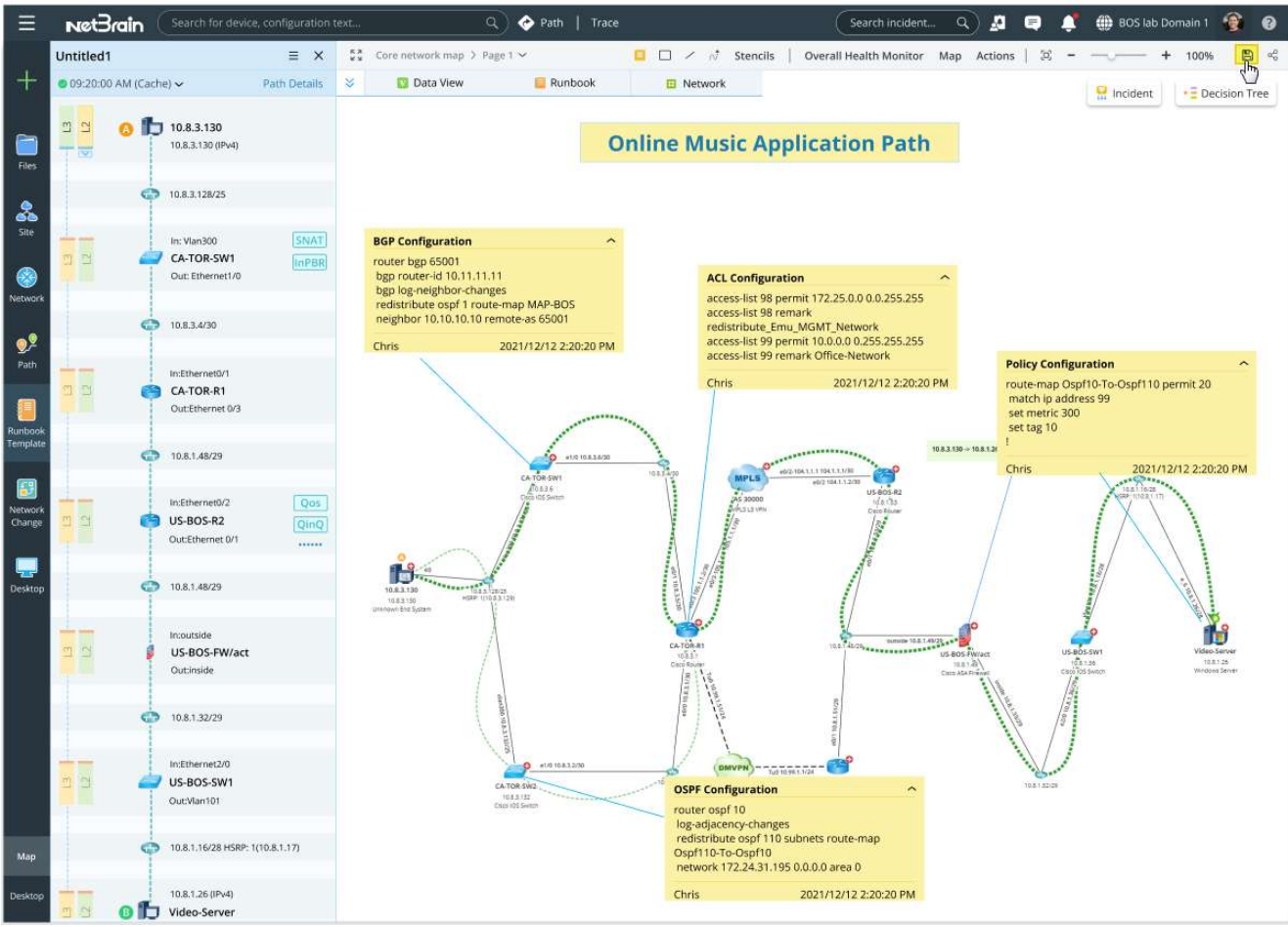
Once the search bar identifies a device, you can create a map of it and its immediate neighbors.

To expand the field of view on the resulting Map, use the red (+) sign on each device to add its neighbours to the Map.

- **Map An Application Path**

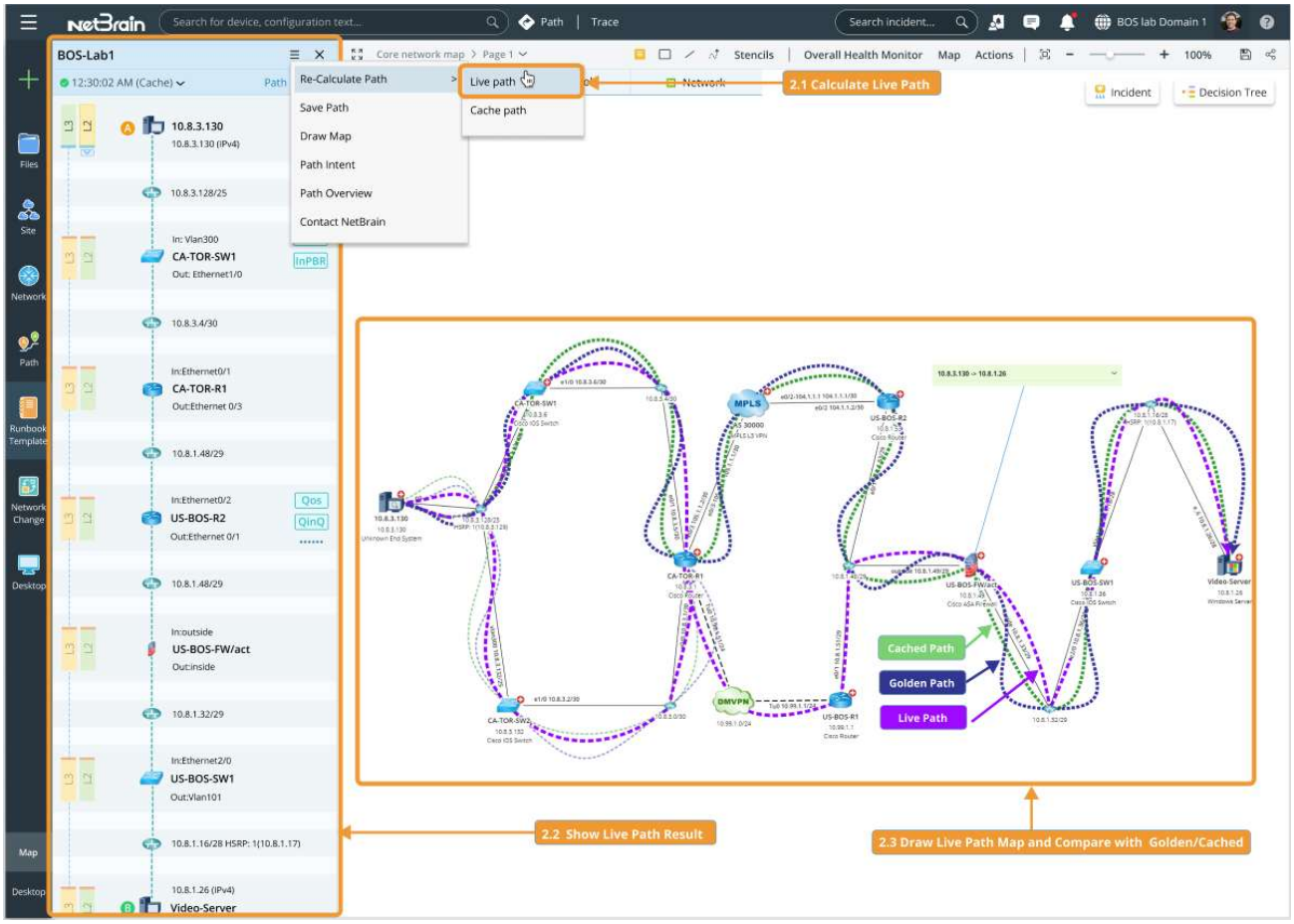
NetBrain path feature emulates the real packet forwarding process and provides end-to-end visibility across any network path. In addition to looking up route tables to find the next hop, it can also investigate PBR, NAT, ACL, firewall policy, and other traffic control technologies to ensure the correctness of a path. And it understands that forward and reverses paths can be different because its data model for visualization is based on the actual device tables between the two points.

Mapping a traffic path is as simple as entering two endpoints (via IP or hostname). A hybrid L2/L3 traffic flow map is automatically calculated and drawn in real-time. In addition, NetBrain's enhanced path framework will automatically calculate based on the topology dependency of the outbound interface at each hop and calculate path types such as L2, L3, IPsec VPN, VPLS, OTV or VXLAN.



This feature can be utilized to isolate the critical network components to investigate network or application problems, as part of design review projects, or to assure application availability proactively.

NetBrain provides a historic view of traffic paths so that users can visually compare the traffic flow patterns over time. Further, any path can be saved as the Golden Path for future comparison.



- **Map an Incident or Ticket**

  An effective map is essential when a network problem or change occurs. NetBrain can autonomously create a Dynamic Map of the problem area at the time of the Incident via API integration with existing tools, which is referred to as triggered automation, where any incident, ticket, or alarm can trigger an API call into NetBrain. Its input parameters are used to trigger map creation.

  Triggered Dynamic Maps enrich each ticket with a contextual map and collected diagnostics, significantly reducing the time spent troubleshooting and improving organizational MTTR.

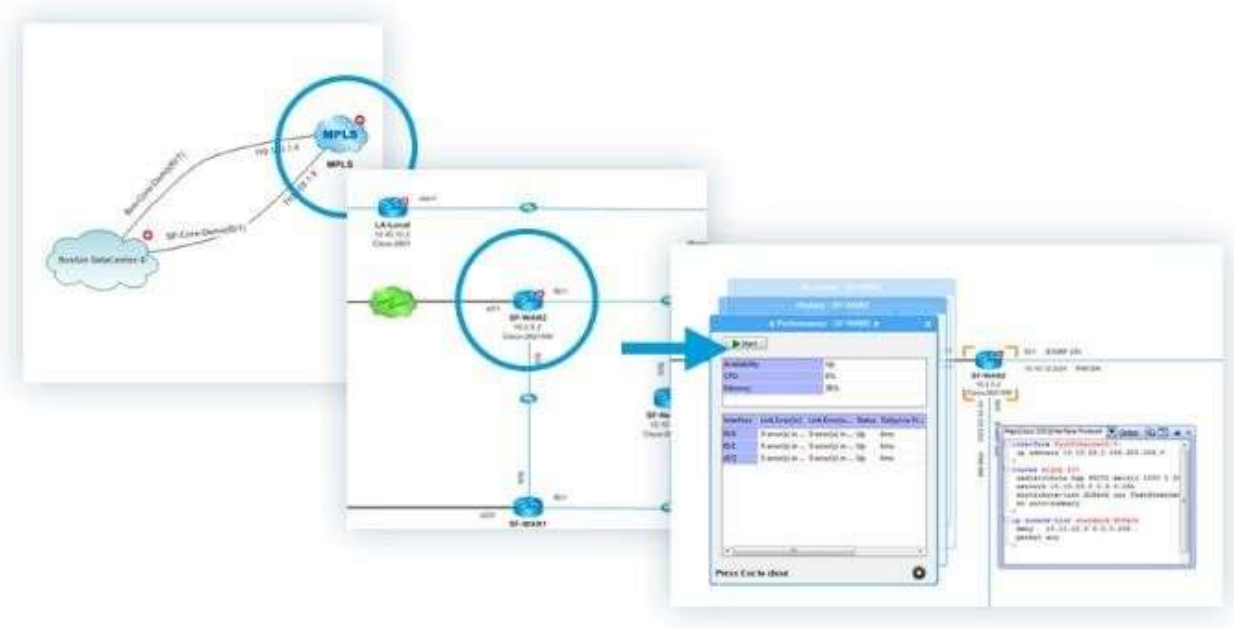
  Typical events which may trigger a map creation include:

  - Network Alarms (e.g., from Spectrum)
  - Incident Tickets (e.g., from ServiceFirst)
  - Security Event (e.g., from Splunk)
  - Device Changes for compliance assurance

Universal Node License – Using the Dynamic maps as a Single Pane of Glass

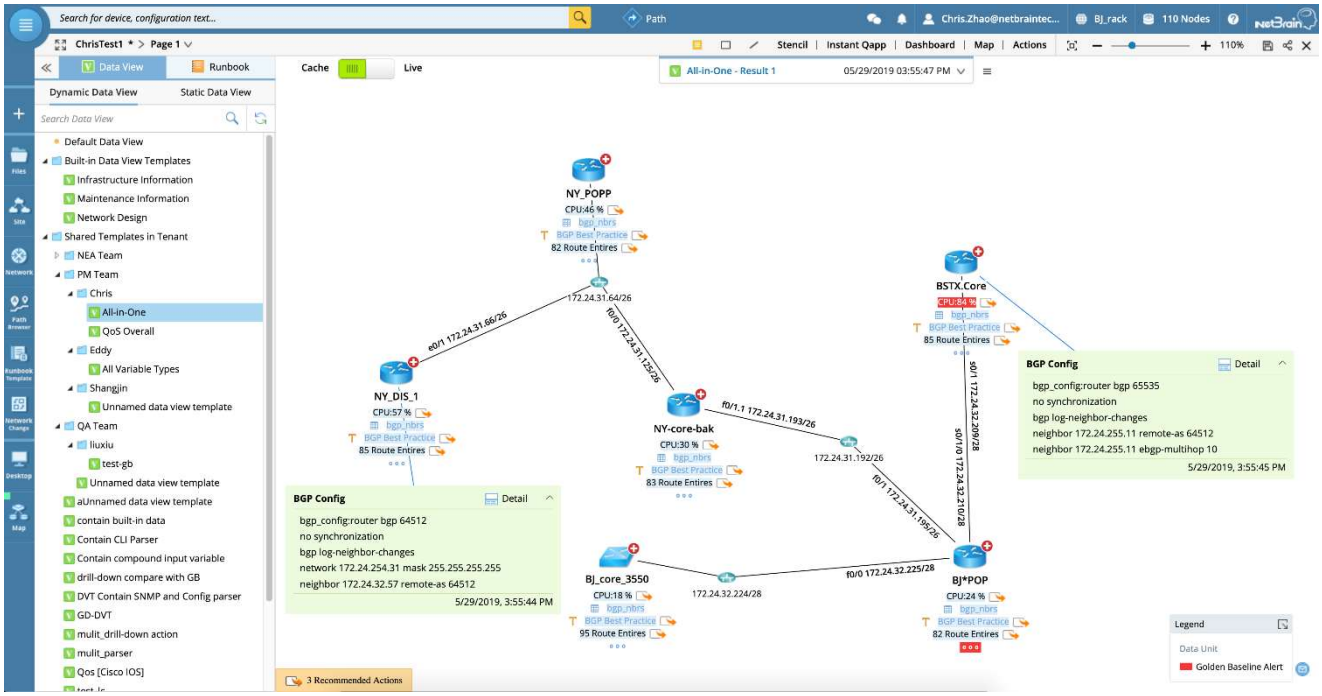
One element that makes NetBrain maps dynamic is the amount of detail present on each device. Each icon on a map is a smart object with potentially thousands of associated attributes. As a user zooms in on the Map, more data will be presented to the user beneath the device and on the links.

If a user hovers over the network element, a configlet will appear with the corresponding section of the device's configuration file, explaining where the link information comes from.



In addition to the default data, users can visualize any network data on a Dynamic Map with Dynamic Data Views (DVT), a customisable data container, which can serve as an engineer's primary tool for scaling diagnostics across an entire map, network, or Site.

For example, using DVT users could highlight all routing protocols and create alerts wherever BGP is not configured. A user could also overlay QoS policies per device and drill down to each interface to see what traffic is being matched and where. A frequently used built-in DVT is the General Health Monitoring, which shows the performance data of a device such as CPU and memory and the link utilization.



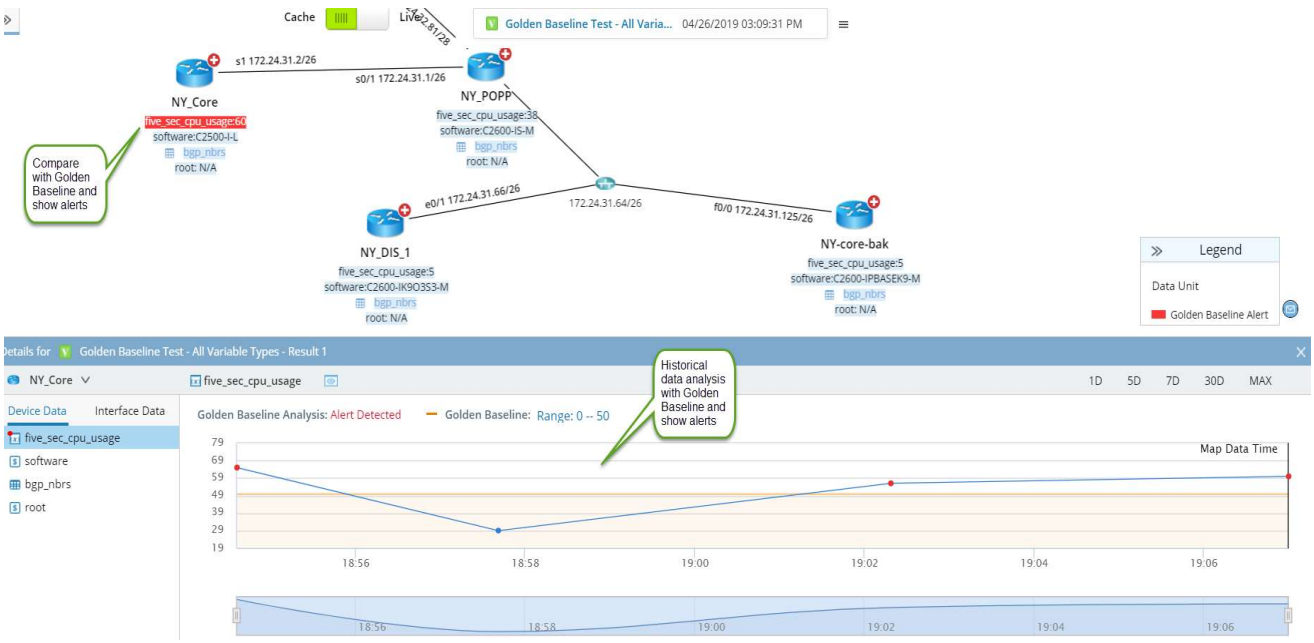
DVT represent codified operational expertise that can be written once and manually executed anywhere, providing the collaborative framework to ensure that documented operational handoff occurs with any new technology or design implementation.

In addition to the data from the live network, DVT can be configured to interact with your third-party IT tools via API, which enables you to pull any relevant data onto a Dynamic Map, minimising the need to log into multiple tools to find the right information. With NetBrain, you can map and visualise any data. In this sense, NetBrain turns its Dynamic Map into a Single Pane of Glass (SPOG), acting as the primary user interface for accessing any data from the network or any 3rd party tool.

Each DVT can also utilise NetBrain's Golden Baseline, serving as the reference standard of the health status for various types of data. It can be auto-calculated based on historical statistics or manually

defined. DVT can quickly reveal anomalies in network conditions related to the variables within the Data View. When discrepancies are found, users will not only be given the live variable information but also historical data for the variable counter.

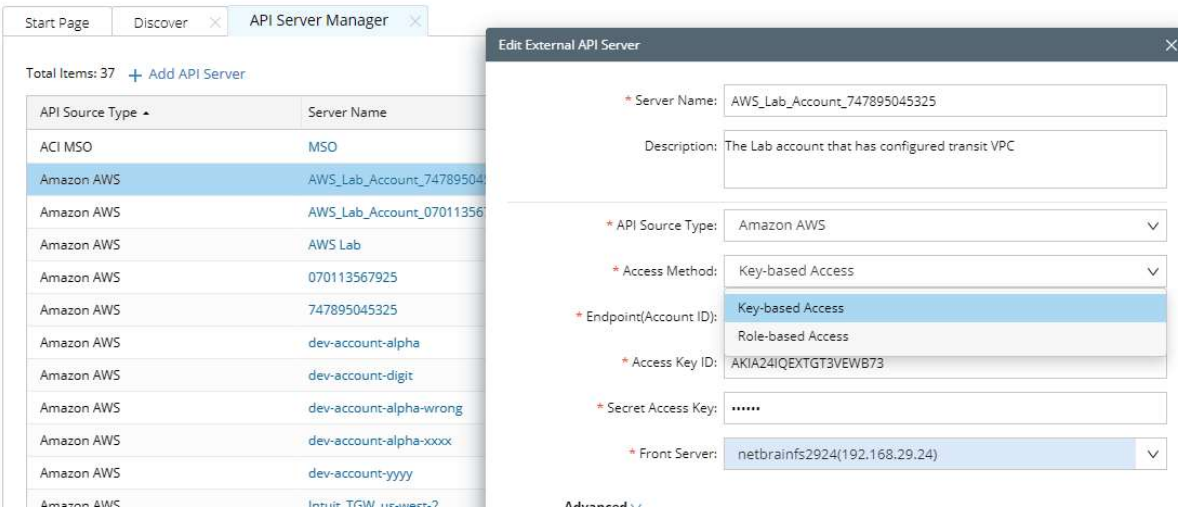
Golden Baseline assures that you will always know of any network deviation from healthy or nominal conditions. Over time, it is recommended to add more and more data variables to the golden baseline (e.g., after lessons learned in troubleshooting).



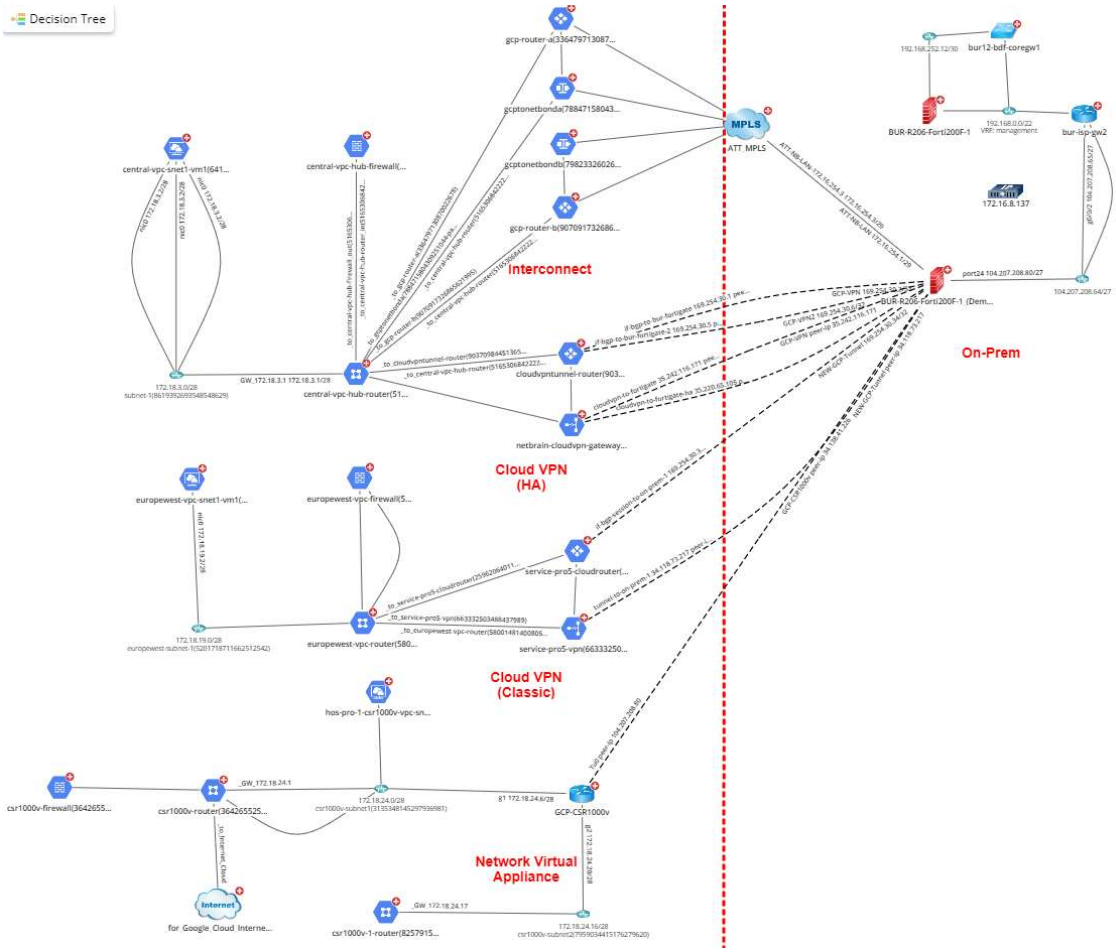
Universal Node License – Visibility into Public cloud and SDN environment

Alongside the traditional network, NetBrain supports end-end visibility for many new technologies, such as the public cloud and SDN. NetBrain supports AWS, Azure, Google Cloud, ACI, and VMWare NSX for myriad Customers as well as commonly being able to write drivers for new technologies in <3 weeks.

- **Auto Discovery**: NetBrain can discover public cloud and SDN resources and update the data periodically by leveraging the benchmark function with the auto-discovery function.

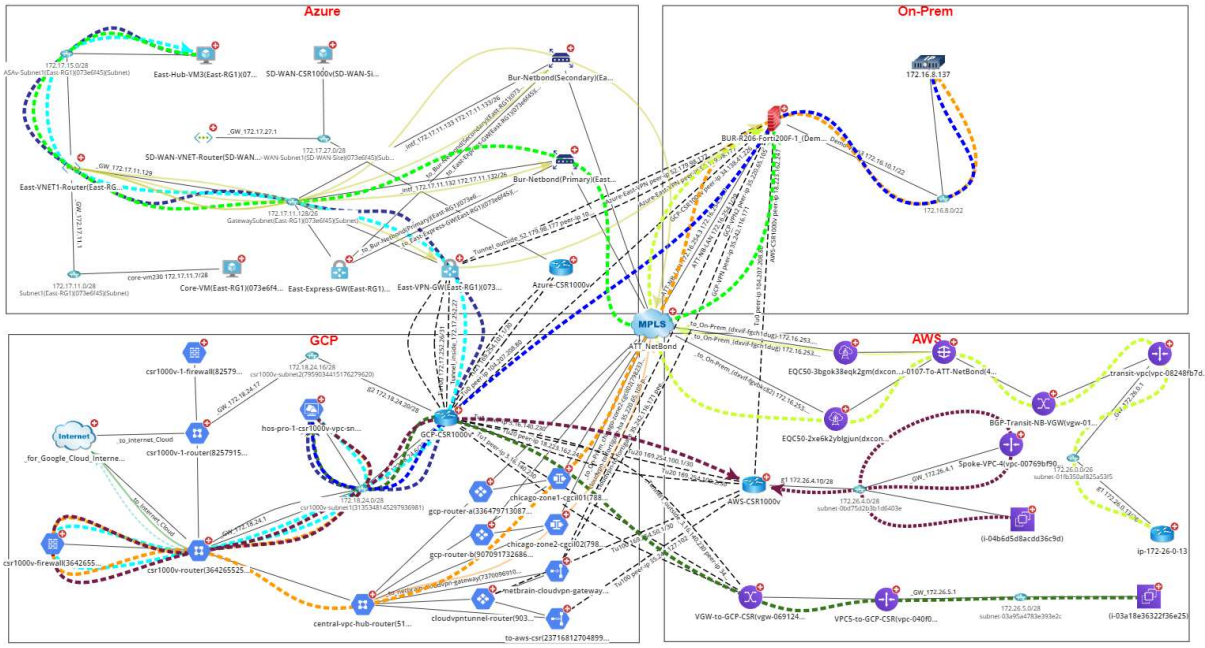


- **Review network topology, data and config with dynamic mapping**: NetBrain uses API to access the public cloud environment and SDN controller and provides the data model to build the Map based on the data model. The system can periodically retrieve the data from public cloud providers and update data accordingly.

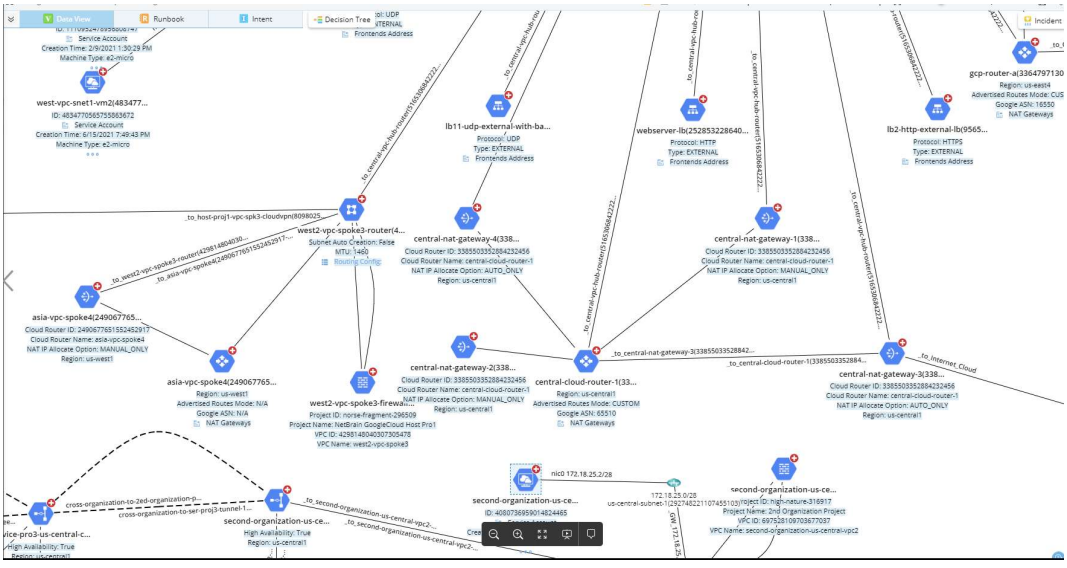


- **Map application dependency across the end-to-end network**: with the ability to build the data model for the public cloud, SDN, SD-WAN, and the traditional network, NetBrain can provide you with the path analysis function across the entire network. NetBrain can check

the routing table/security group/network ACL for all the networking objects along the path and display the checking result details.



- **SPOG access through cloud-native and 3rd party cloud management tools**: NetBrain can use Data View Template (DVT) to display the cloud infrastructure data from the native cloud API, display the cloud monitoring data from the native cloud monitoring, and we can integrate with any of your cloud monitoring tools such as Datadog, SplunLDk, and Dynatrace. The following DVT example shows GCP basic information.

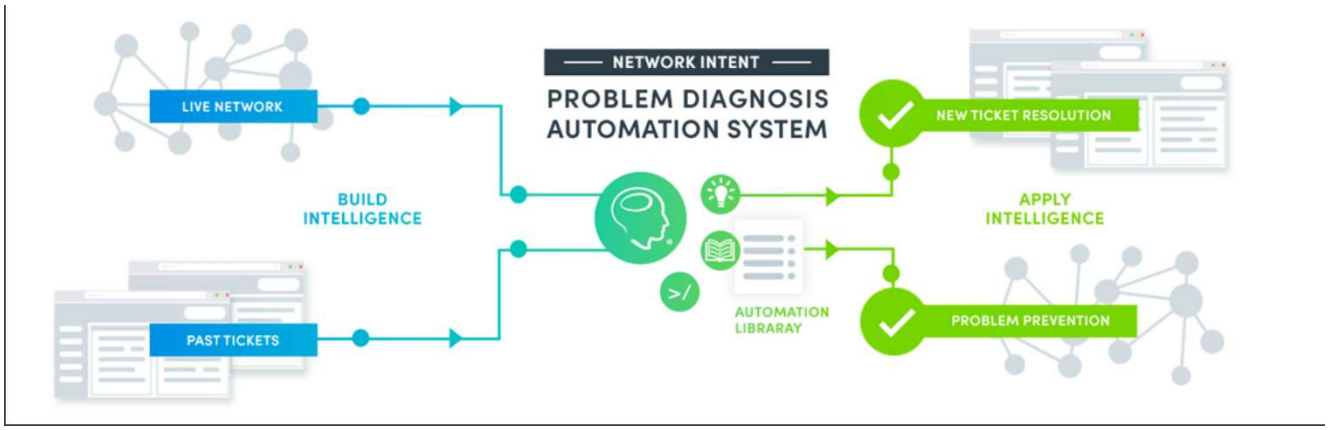


Optional- PREVENTATIVE AUTOMATION LICENSES

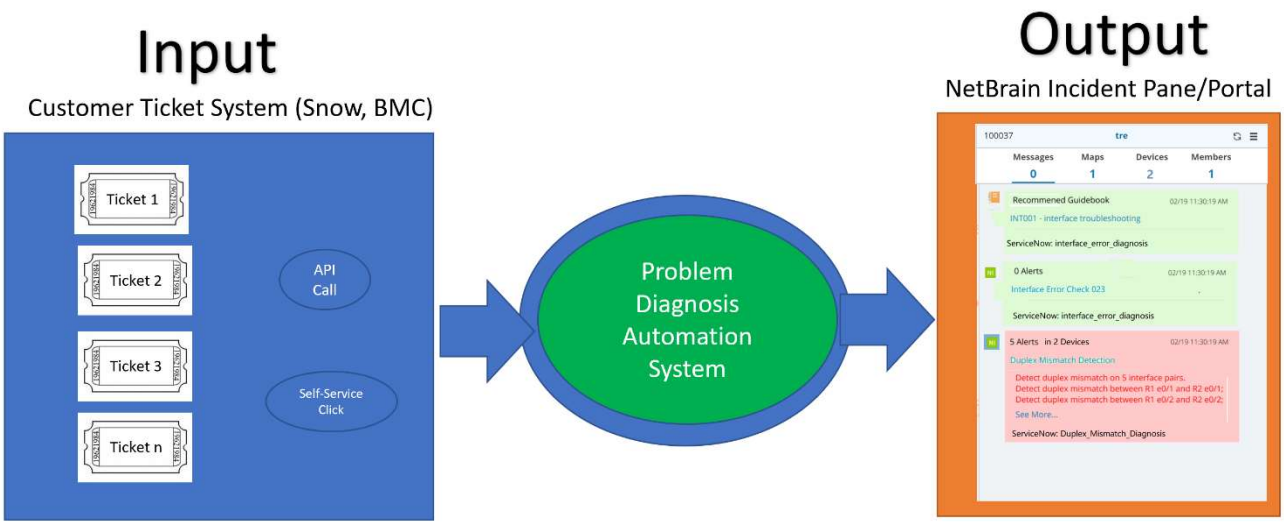
Preventative Automation licenses – Intent based automation

NetBrain has analysed incident ticket data for our most complex customers. We have identified that on average circa 95% of network problems are repeat incidents and over 50% of problems are preventable, caused by misconfiguration, performance degradation or security violation. This has been validated as reflecting reality in discussions with The User's operations team. In The User and myriad other large enterprises, the business lacks the automation to avoid having to troubleshoot device by device in every incident nor to enforce the design rules, best practice, or security policy to prevent these problems from happening in the first place. The resource simply is not available.

NetBrain Preventative Automation (also known as Problem Diagnosis Automation System) is the intent-based hybrid network automation platform that leverages the data set described in the Universal Nodes section of this document and applies logic based automation to address both problems by automating the diagnosis of the repetitive problems and enforcing the preventive measures across the entire network.



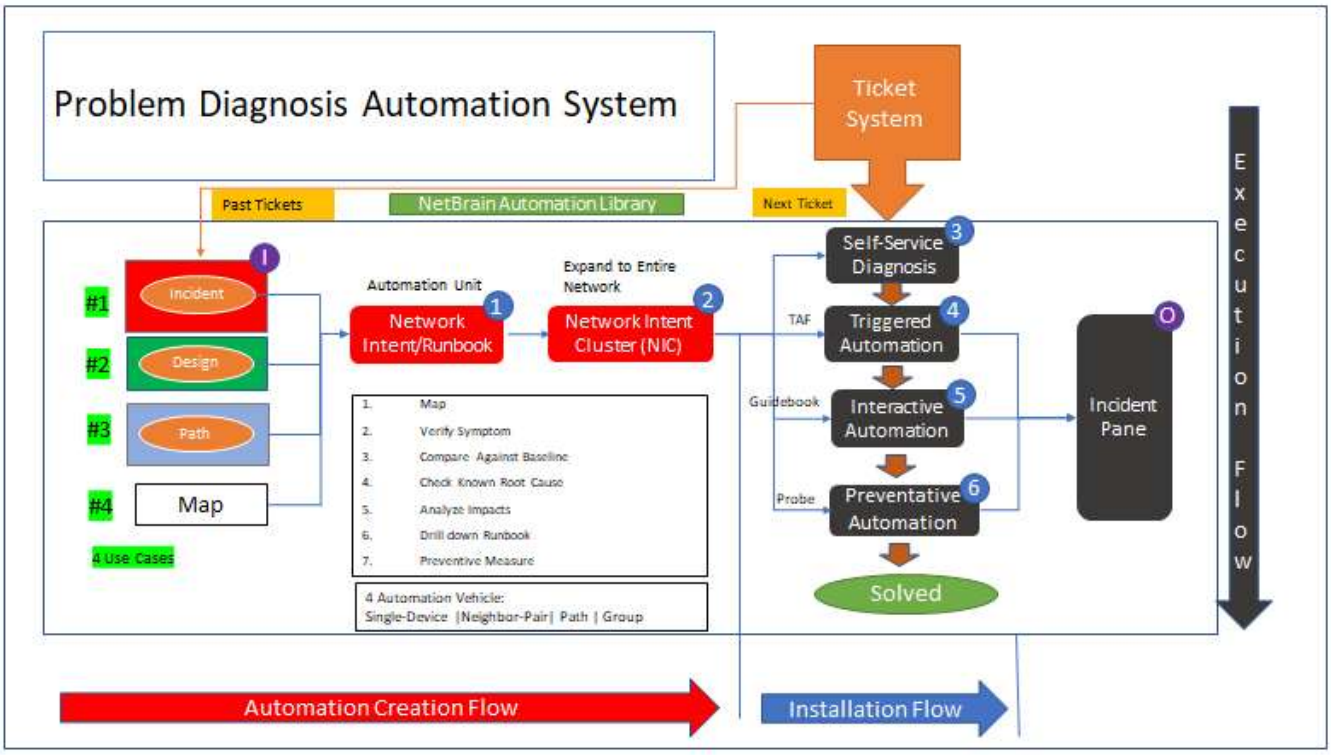
From the end user's perspective, the output of Preventative Automation is NetBrain Incident Pane/Portal, a central collaboration platform for troubleshooting and data sharing for each problem.



Input and Output of Problem Diagnosis Automation System (PDAS)

The underlying system has three essential flows, as shown in the following system architecture diagram:

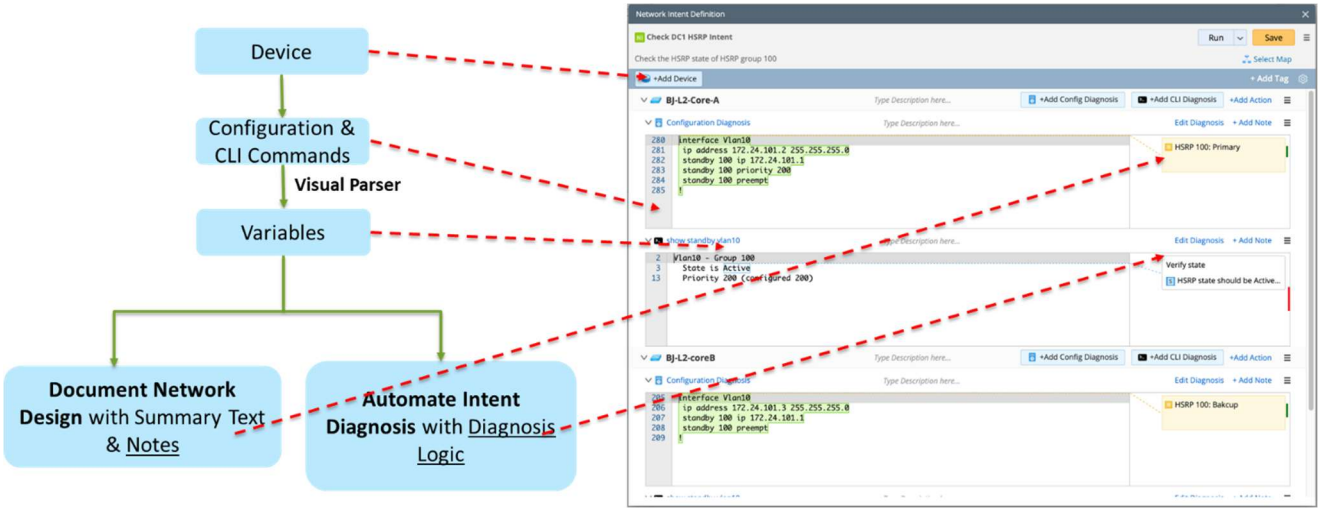
- **Automation Creation Flow**: where diagnosis know-how is turned into automation assets across the entire network in the form of Network Intent (NI) or Executable Runbook (RB) inside the no-code platform.
- **Automation Installation Flow**: where various automation assets are connected to future problem diagnosis through Triggers from the ticketing system (Service First), human interaction, or NetBrain's adaptive monitoring system.
- **Automation Execution Flow**: where automation is executed in response to an external symptom in three successive methods, namely triggered, interactive, and preventive. All execution output is organised inside the NetBrain incident pane for each distinctive Incident.



Preventative Automation Licenses- Network Intents (NI) and the Network Intent Cluster (NIC)

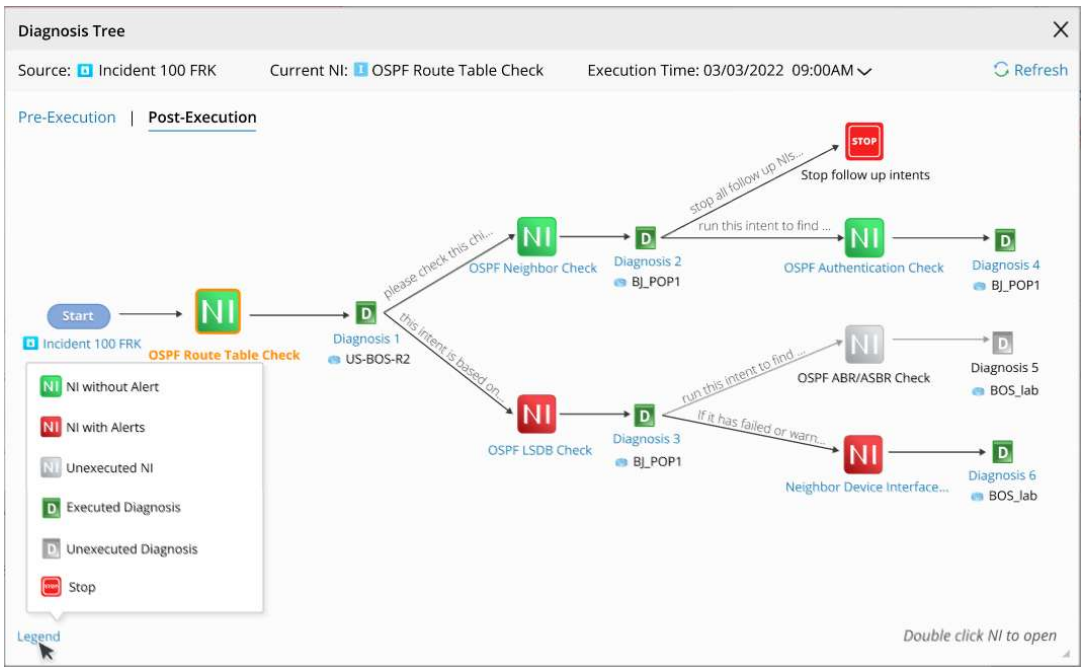
The core automation unit of Preventative Automation is Network Intent (NI), device-specific automation. NI describes a network design for a specific network device, what these design baselines are, and how to verify that the design works as intended. When a network problem occurs, one or multiple NIs are violated. By analysing past tickets, users can create NIs to document the problems. The next time a similar situation occurs, users execute these previously built NIs to diagnose the problem automatically, thus reducing ticket volumes and driving continuous service improvement.

NI takes the device configurations and CLI commands as the input and leverages Visual Parser, a UI-based no-code parser, to define the variables and the diagnosis logic for these variables.

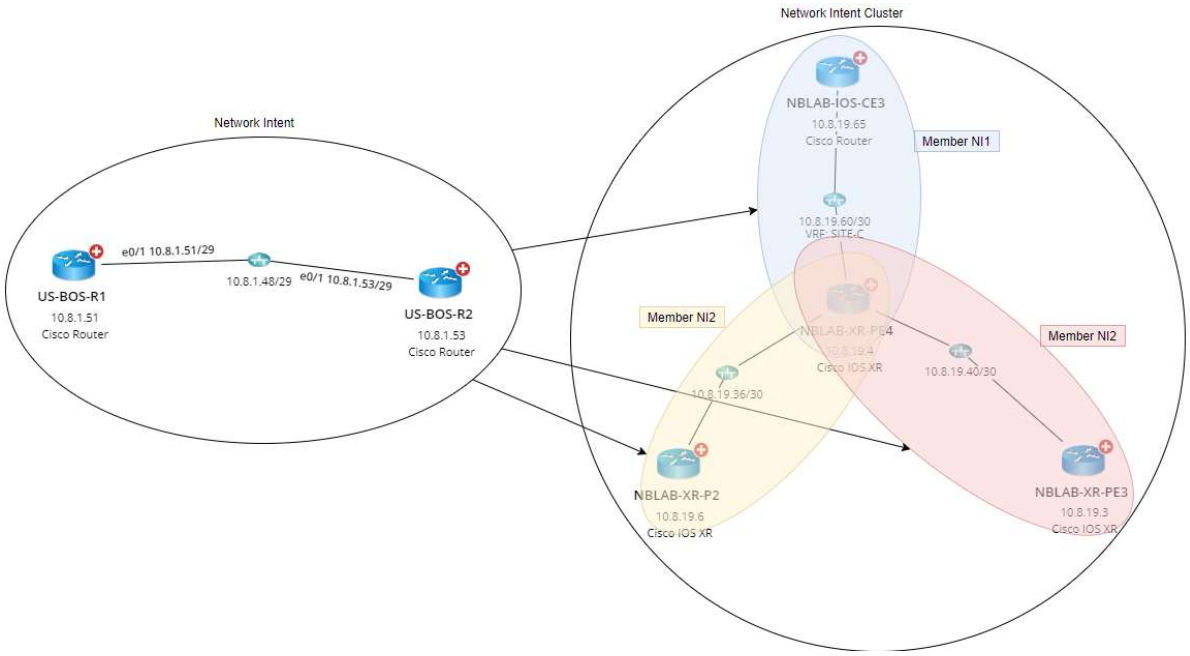


Multiple NIs can be grouped as a family NI to form a diagnosis flow. Users can define follow-up NIs in the Diagnosis so that these NIs can be executed under certain conditions. For example, users can add Check duplicate router ID and Check EIGRP neighbors as the follow-up NI if the EIGRP routes change.

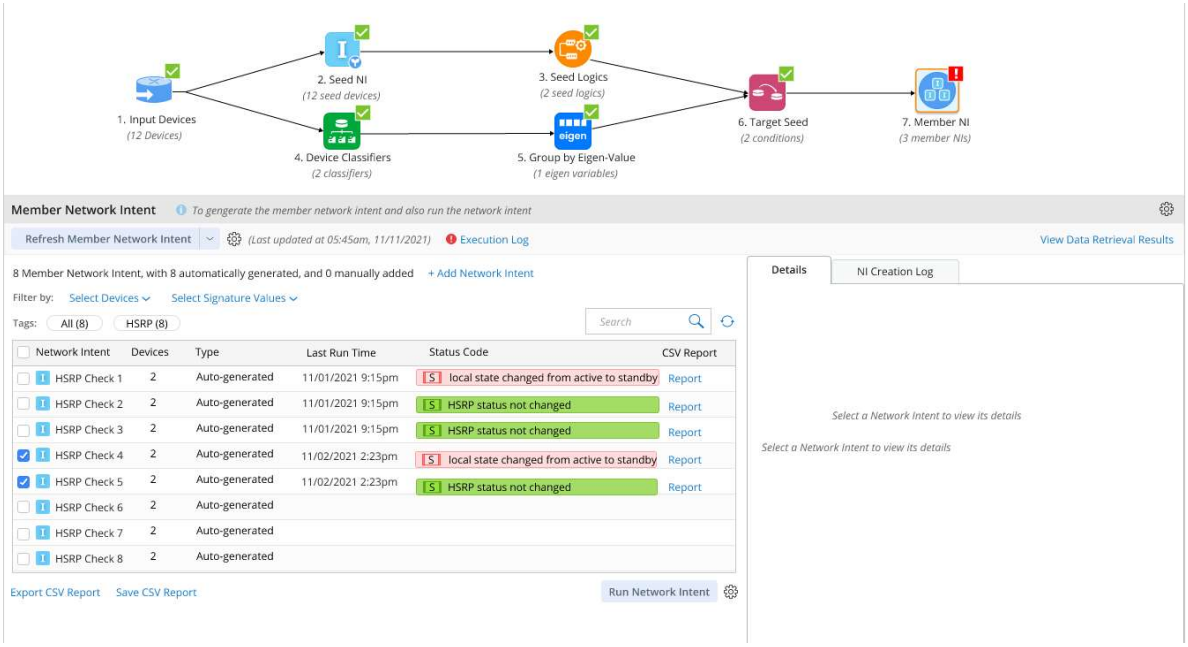
The execution results of a parent NI and its follow-up NIs are displayed in a diagnosis tree.



Network Intent Cluster (NIC) expands the logic of a NI (seed NI) from one or a set of devices to the whole network. This is essential in the User's environment due to size and complexity of the estate. NIC requires no coding skills and has an intuitive user interface for creating and debugging.



The following diagram is a sample NIC to clone a seed NI to check the HSRP running status for a network site. By creating a NIC to achieve this, you can expand the Diagnosis of one Site to your entire network. Each Member NI has its tag and signature variable, the ***virtual IP address*** of HSRP.

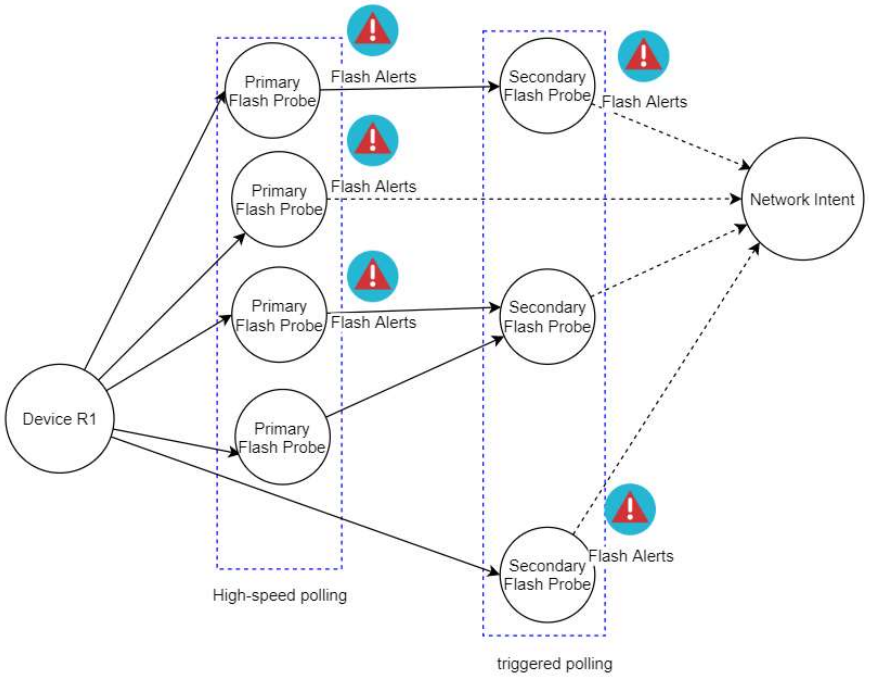


Preventative Automation Licences – The automation framework

NetBrain Preventive Automation Framework (PAF) is designed to capture network problems before users or applications are aware of them. Sample network issues captured by PAF are:

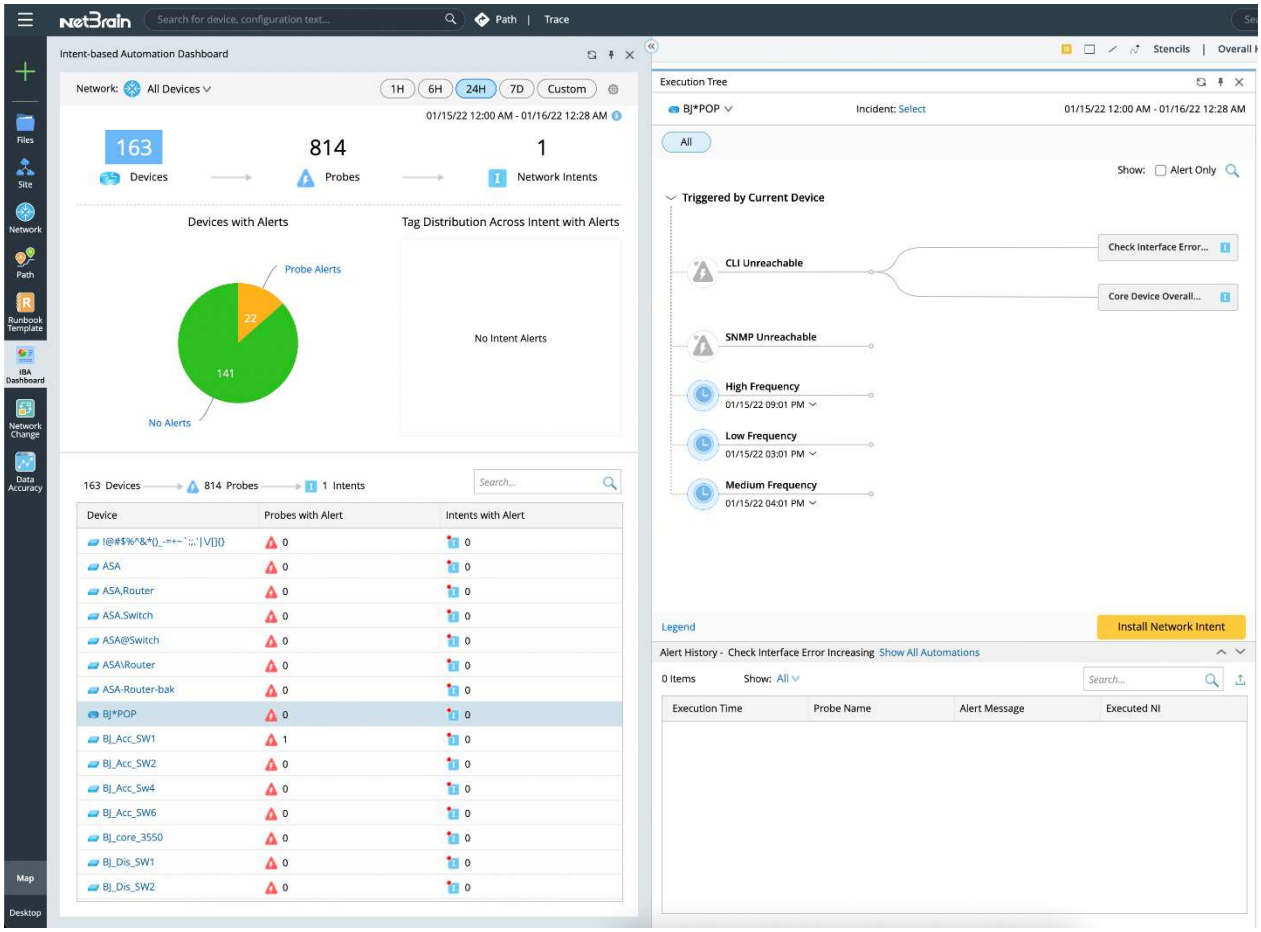
- Transient Problems: link utilization spikes, routing flapping, STP oscillation, etc.
- First Occurrence Issue: config change, failover, etc.

PAF leverages the flash probes as monitoring units to detect the data anomaly that occurred on devices via SNMP and CLI data polling and advanced anomaly analysis algorithms. As soon as an anomaly is detected, the system will take immediate action to execute the pre-defined NIs. The results will provide critical references to the root cause analysis and speed up the troubleshooting process.



PAF is designed to continuously enforce policy and rules across the network, such that preventable outages are caught before it harms the network. The system can handle massive automation resources by executing device-level automation (triggered by the flash probe) making it hugely scalable. Since the automation is fully executed in the system back-end, users can create their automation resources and upload them to the back-end system.

The automation results can be viewed across the entire company via PA Dashboard, which shows how many alerts are created across the whole network. The users can select a device and see the detailed results in the Execution Tree.



Preventative Automation Licenses – Installation and Execution of Automation at scale

Operational efficiency is primarily driven through the use of triggered automation through integrations. Using the PA module, automation can now be triggered either by an incident ticket (triggered automation) or manually (self-service).

- **Ticketing System**: PA will allow you to Integrate NetBrain's Problem Diagnosis automation with a ticket system such as ServiceNow/ServiceFirst or BMC Remedy, which enables any future repeat tickets to be diagnosed by an automation engine.

  Integration between NetBrain and the ticket system could be done through two methods:

  - Purposely built integration App, such as ServiceNow App, Splunk App.
  - Rest API library for BMC Remedy

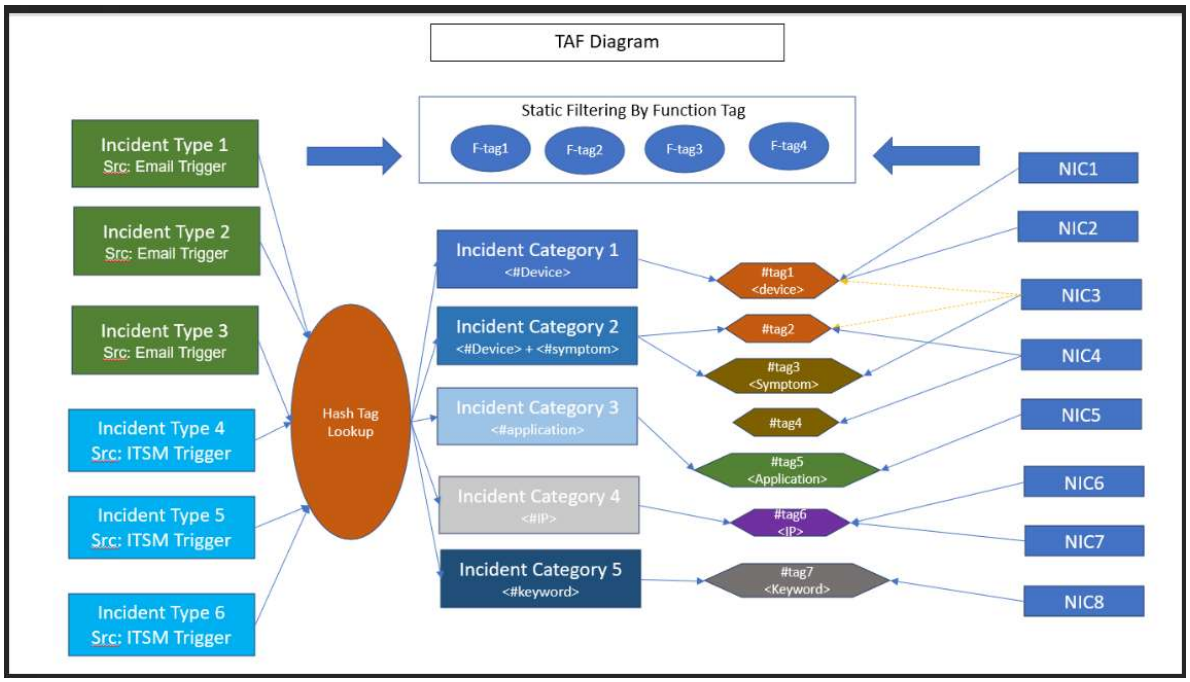
  The integration with the ticket system needs only to happen once, and customization of triggered diagnosis can occur inside NetBrain Triggered Diagnosis Framework (TAF) continuously.

- **Self-service Automation**: Self-service automation resides inside the incident-based collaboration system, including Incident Portal, ServiceNow App 3.0, and Incident Pane. It serves two purposes:

- For a non-structured ticket that may be created manually, the automated trigger rule didn't get fired, and users can manually launch diagnosis, which has a similar effect to the automated Trigger.
- For Sr. network engineers to share automated diagnosis function to junior network engineers, or non-network engineers, while resolving an IT problem, without login to NetBrain system.

- **Triggered Automation**: After ticket system integration, a new ticket that has fields matching the trigger rules will send an API call to NetBrain with a pre-defined payload; NetBrain will then launch the following actions:
  a. The Incoming API call will be classified into a pre-defined "incident type".
  b. Incoming Incident will be merged into an existing NetBrain incident or a newly created one.
  c. Dynamic Map is created or opened for the Incident
  d. Matched diagnosis executed

An incoming incident type can match the automation (NI/NIT or NIC) with an Incident type, which can be set up manually, or dynamically with pre-defined hash tags (by the virtual incident type).

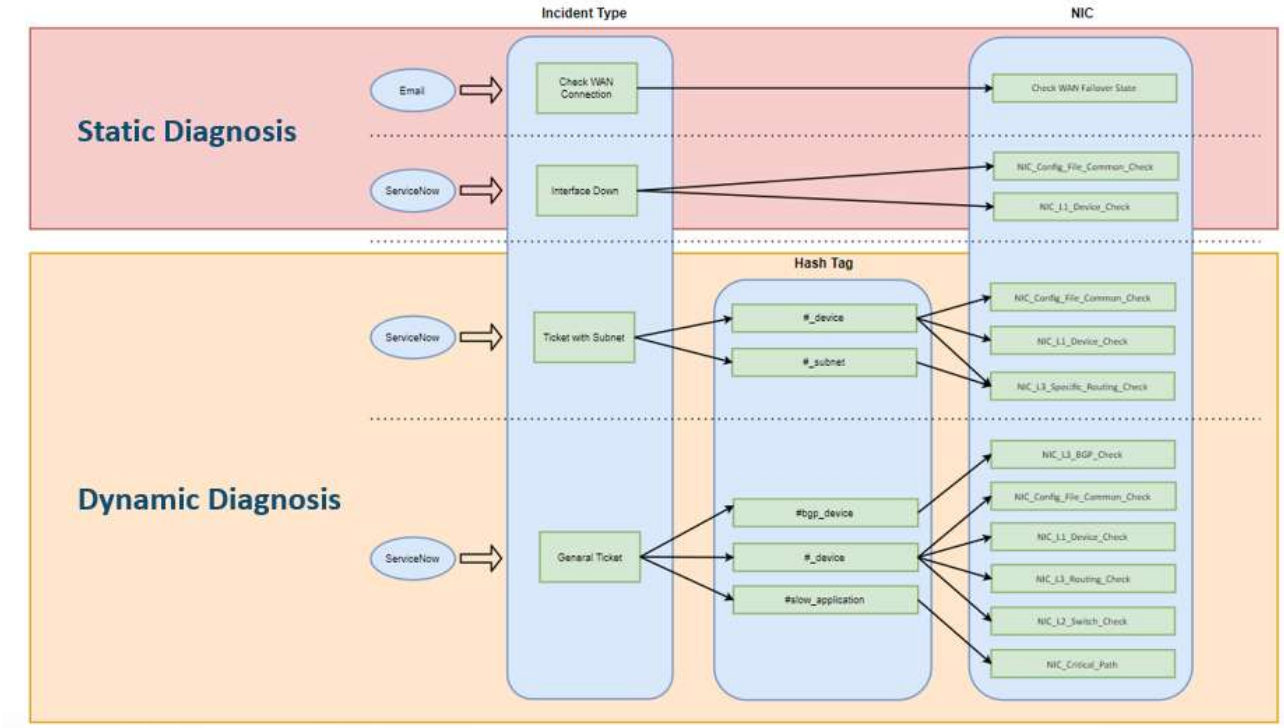


Preventative Automation License – Incident diagnosis without integration to ITSM

Without integration with the ticketing system, the diagnosis can be triggered **by Email**. This method provides the following functions:

- Users can export an Email template from an Incident Type.

- Users can fill in the data of the Email template and send an email to the NetBrain IE system.
- Upon receiving this email, the IE system will create an Incident, match and trigger a Diagnosis, and reply with a link to the Incident Pane.



Users can also chat with NetBrain Bot in Microsoft Teams to trigger the diagnosis.

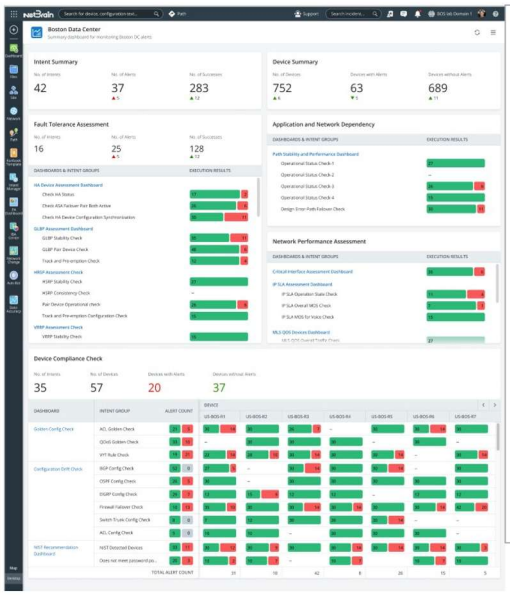
Preventative Automation licenses – Continuous Network Assessments

The Preventative Automation license gives you immediate access to a plethora of automated Assessments from our Automation library. This library contains over 100 Assessments built to reflect Industry best practice and regulatory and compliance requirements as well as common assessments created and used by our large customer base. The result is that NetBrain has compiled all of this intelligence into an easy to consume format so enterprises can quickly derive value from Automation.

By simply clicking any of these standard assessments against your baselined Network you can evaluate the health of your own network or security posture in seconds. These are being used for compliance assurance, Predictive Service Management, Change assurance and Audit response across all industries with measurable outcomes of improved MTTR and reduction in tickets as well as delivering perpetual audit output.

Customers with specific requirements can tailor the library for its own purposes. You can edit these assessments as you see fit, using them as a template to capture your specific parameters, architectural needs and policies to quickly reflect the needs of your own business while building on the logic in the Network Intents that have already defined. Customers can then begin every day with a clear dashboard highlighting all that is genuinely important to their unique business allowing them to confidently prioritise operational efforts. An example of where most customers start their Automation journey is below:-

Automation in Action – Continuous Assessment



Top 10 Example Continuous Assessment Automation Dashboards

1. **Change Assessment** – What's changed in my network?
2. **Anti-Drift Assessment** – Are there deviations from my config rules?
3. **Network Health Assessment** – Is my network 100%?
4. **Security Assessment** – Am I vulnerable to known NIST standards and CVE bulletins?
5. **Critical Applications** – Are my applications healthy?
6. **Life Cycle Management** – Is my hardware End of Life, End of Service?
7. **Hybrid Network Assessment** – Is my cloud, ACI, hybrid network healthy?
8. **Triggered Automation Assessment** – What issues occurred in the last hour, day?
9. **Past Outage Assessment** – Are known problems happening again?
10. **Capacity Assessment** – Is my network running out of bandwidth?

Optional- CHANGE ASSURANCE LICENSING

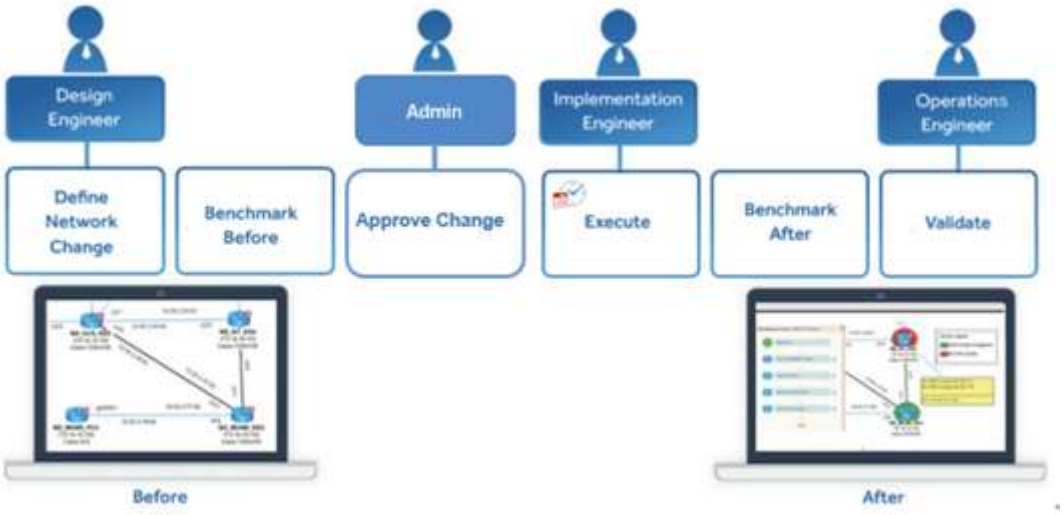
Managing network changes can be a challenging task for IT teams as it requires seamless planning, implementation, and verification. All of these require reliable data at the very start otherwise an unpredictable outcome is probable. Based on the executable runbook automation framework, the NetBrain Change Management license introduces an adaptive workflow to document the best practices of the change management process and ensures a safer network change task:

- **Reduce Human Error in Network Change** — the Design, Implementation, and Operations teams can leverage a single, reliable map to define and validate changes. Changes can even be deployed using no-code automation.
- **Implement Changes with One Click** — the Design team can predefine a configuration template that the Implementation team can execute with one click. If required, these changes can be rolled back to the previous working configuration but even more powerful, any unpredictable outcome is visible in NetBrain enabling live troubleshooting and fixing forward.
- **Validate Changes Visually** — the Operations team can verify whether the changes were implemented as planned by executing a predefined runbook based on service path and device compliance.

NetBrain has a track record of reducing change related incidents by >50% inside the first 12 months of deployment in our large enterprise customers. Further improvements through Continuous Network Assessment and perpetual compliance assurance are also realised across the board.

Network Change Task Flow

The typical workflow of a Change Management task is as follows:



The following links detail the steps that users would take to leverage NetBrain in delivering more predictable change outcomes for the enterprise.

1. **Define Network Change** — define network changes, such as commands and devices.
2. **Benchmark Before** — collect network data as a baseline before implementing the change.

3. **Approve Network Change** — approve a network change task in the NetBrain or an external system.
4. **Execute Network Change** — execute commands on devices.
5. **Benchmark After** — collect network data after implementing the change.
6. **Compare** — compare and validate the differences between two benchmark baselines.

This chapter covers the following topics:

- Creating a Network Change Task
- Approving a Network Change Task
- Executing a Network Change Task
- Network Change Template
- Managing Network Change Credentials
- Access Controls
- Archiving a Network Change Task
- Exporting a Network Change Task to Word
- Sharing a Network Change Task

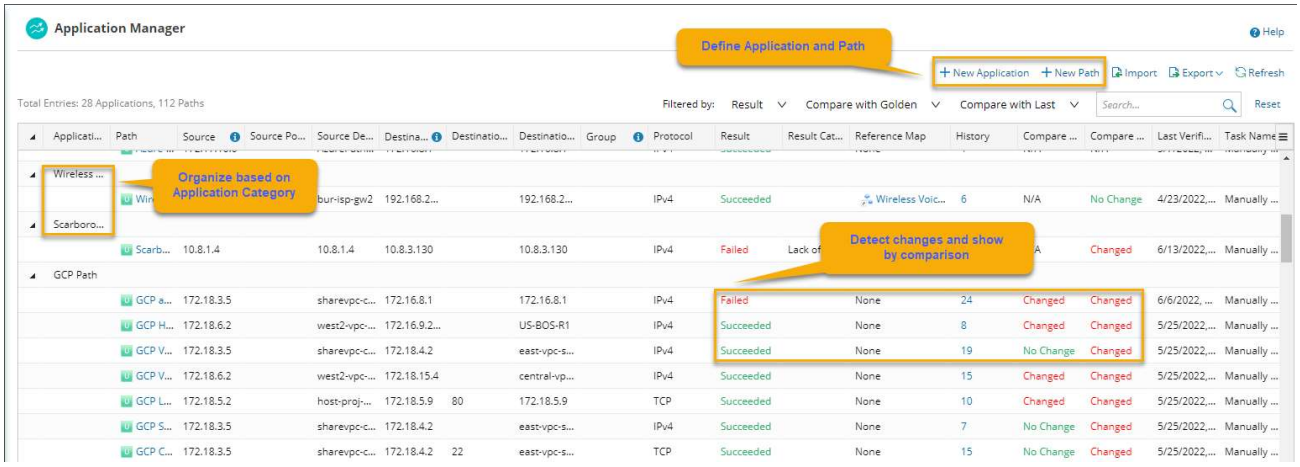
Optional- APPLICATION ASSURANCE LICENSE

Operational users often struggle to prioritise effort when responding to outages as there is little context as to which services are impacted when an incident ticket is raised. Having the ability to track your most important services/applications and the devices that these services are dependent upon helps IT teams to focus on what is important and to be able to troubleshoot with surgical focus.

Application Assurance Module (AAM) enables you to manage traffic paths based on applications and verify the application paths periodically to detect possible network changes and ensure application consistency.

This section explains how you can use NetBrain to provide your team with unparalleled application insight across your network and proactively manage that flow to reduce outages using automation.

Application Assurance Licenses- Main UI and Use Flow



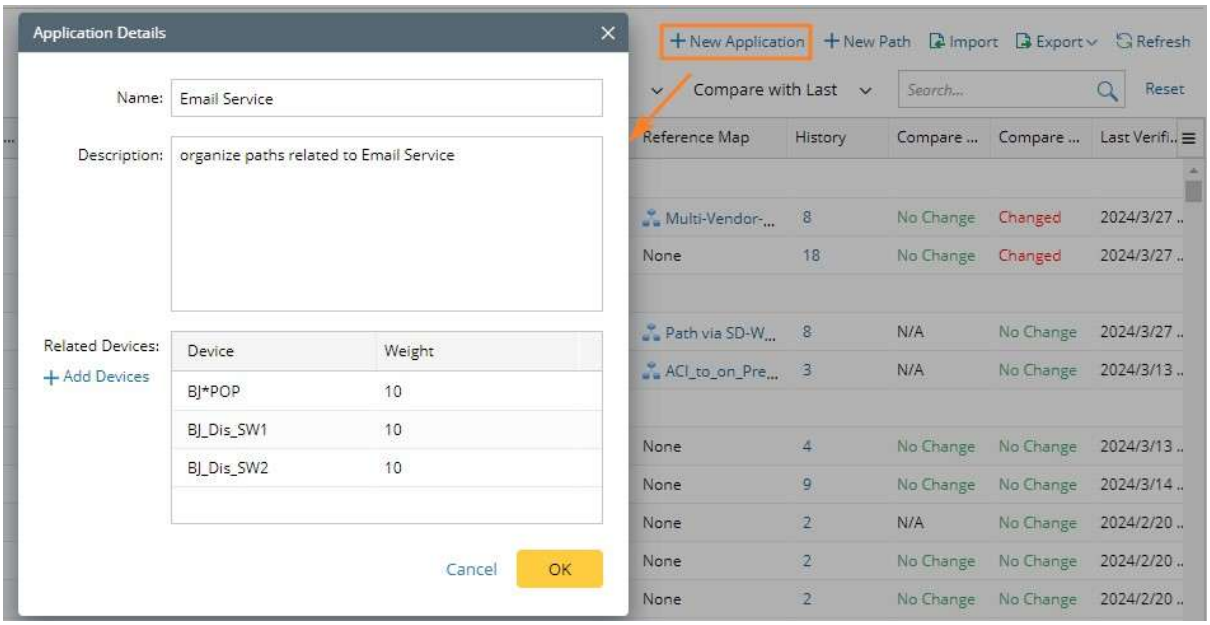
The following is a recommended flow for verifying paths in batches in the system:

1. Define Applications
   - Define Applications and Paths.
   - Define Golden Paths for Application Paths.
2. Verify Applications
   - Verify Application Paths Automatically.
   - View Results and Generate Report.
   - Troubleshoot the Path Changes with Runbook Automation.

Application Assurance Licenses- Defining Applications and Assigning Paths to Applications

Example: Create an Email Service application and add paths to the application.

1. Click the start menu and then select **Application Manager**.
2. Click **New Application** at the upper-right corner and define the details as follows:

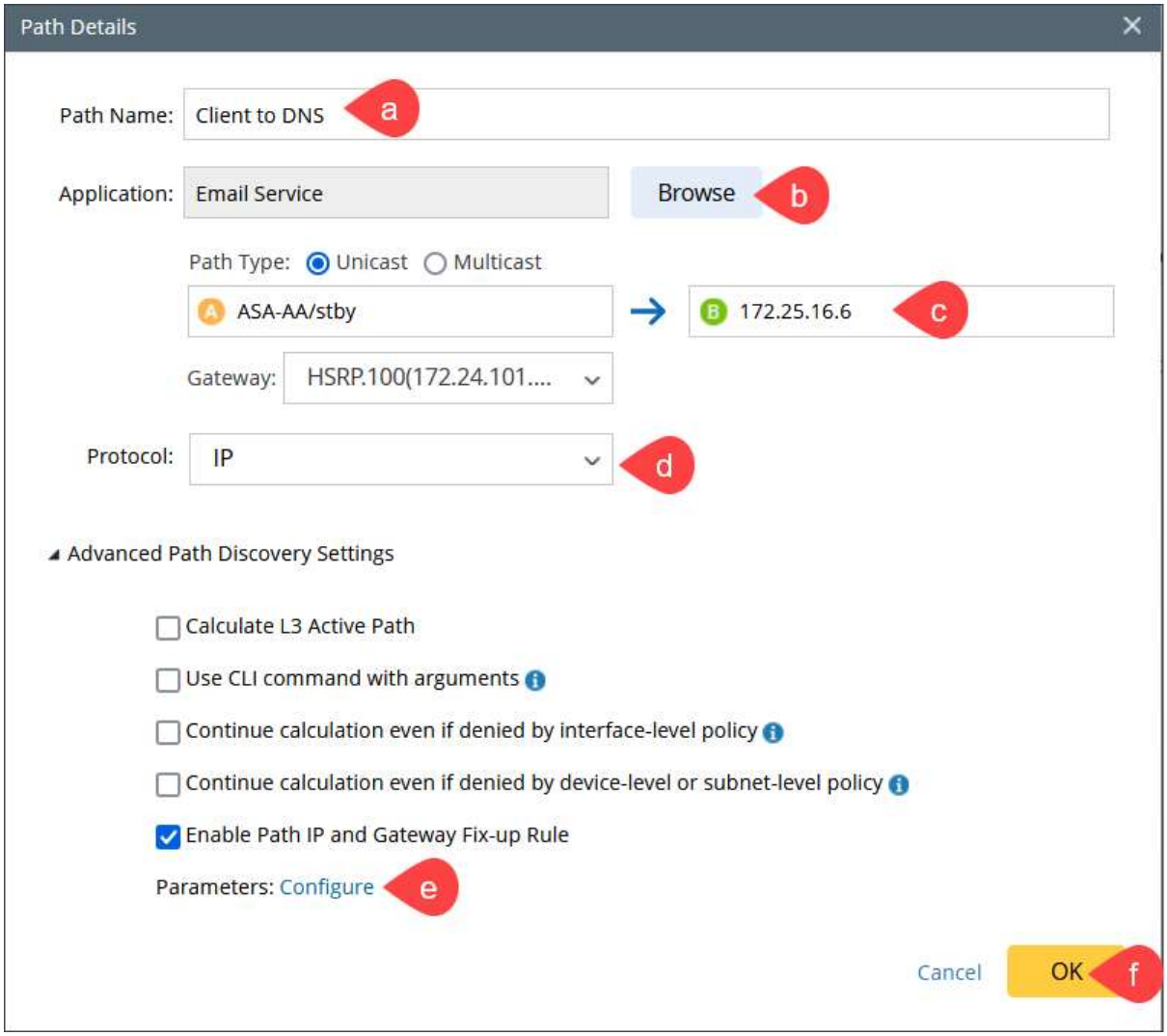


   a. Enter a meaningful name for the application, such as **Email Service**.
   b. (Optional) Add a description of the application.
   c. (Optional) Add related devices to the application and define a weight for each device.

      Tip: Each related device has a default weight value of 10, and you can double-click to modify t details.

   d. Click **OK**.
   e. Repeat to add more applications.

3. Click **+ New Path** at the upper-right corner of the Application Manager pane and define the details as follows:



   a. Enter a meaningful name for the path, such as **Client to DNS**.

   b. Select an application for the path, such as **Email Service**.

   c. Specify the parameters to calculate the path.

      - For the unicast path, enter the source and destination.
      - For the multicast path, enter the multicast receiver, source, and group value.

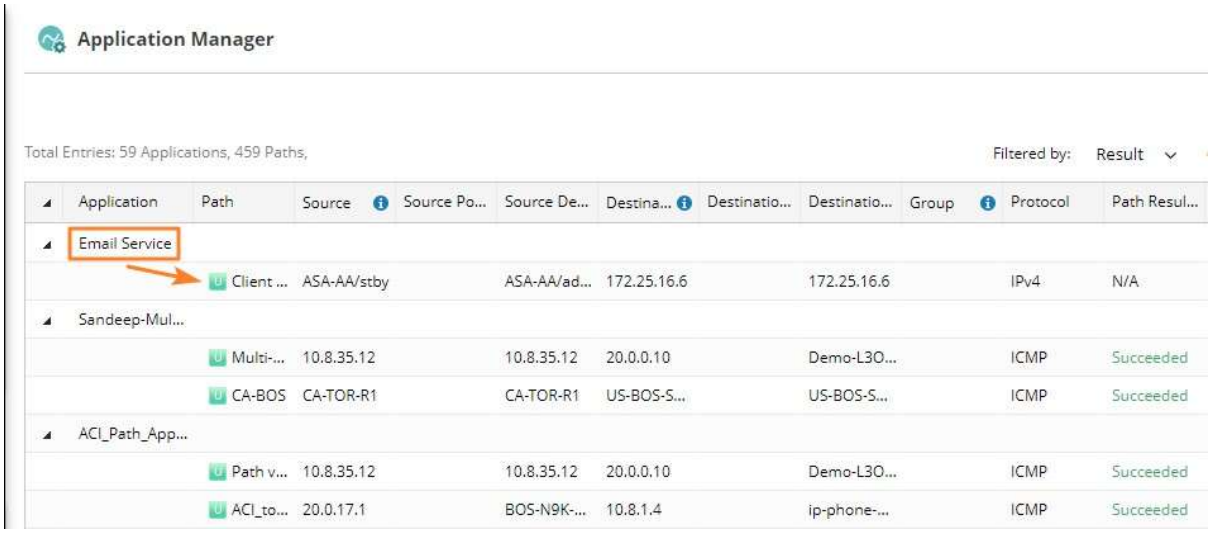
   d. Specify an application protocol for the path. By default, the protocol is IPv4.

   e. (Optional) Click **Configure** to input QoS parameters if the source device is an end system with QoS configured. See Parameters for details.

   f. Click **OK**.

   g. Repeat to add more paths to the application, such as **Client to SMTP** and **POP3 to Client**.

4. View the applications and paths. The paths are organized and displayed per application.

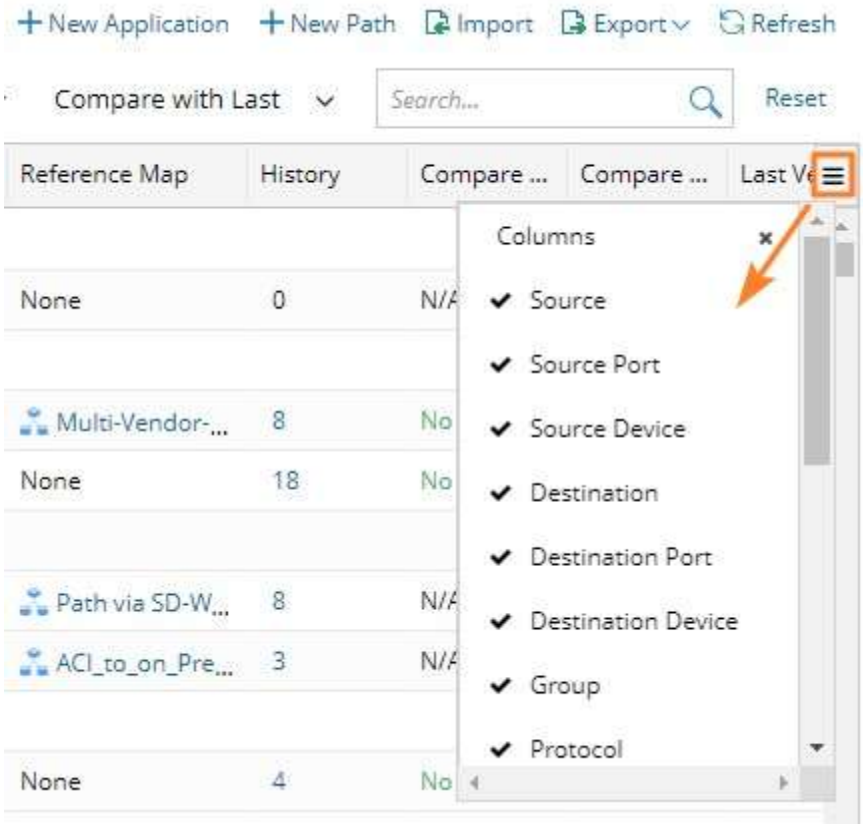


Tip: Right-click a path entry to calculate the path with live data. If the calculated path goes as expecte

Tip: You can also predefine applications and paths in batch in a CSV file and then import these applica then edit new applications and paths based on the exported file.

Application Assurance Licenses- Customize Table Headers in Application Manager

The Application Manager displays all the information about paths by default. To remove specific table headers, click the ≡ icon and uncheck them.



Golden Path is a traffic path when your network is healthy. The system automatically compares the results of the verified paths with golden paths when it periodically verifies them.

Golden Paths can be set through any of the following ways:

- Set Golden Paths Manually in the Application Manager
- Set Golden Paths Automatically Through Basic System Benchmark

Application Assurance Licenses- Set Golden Path in the Application Manager

When assuring an application it is important to understand and manage against a baseline path. What route does your application take today and is this the right route?

By following the steps below you can set a Golden Path one by one for the paths in the Application Manager. Any deviation from that path will then be alerted and the reasons for deviation (config drift, change, fail over etc) will be forensically highlighted and alerted to the relevant teams.

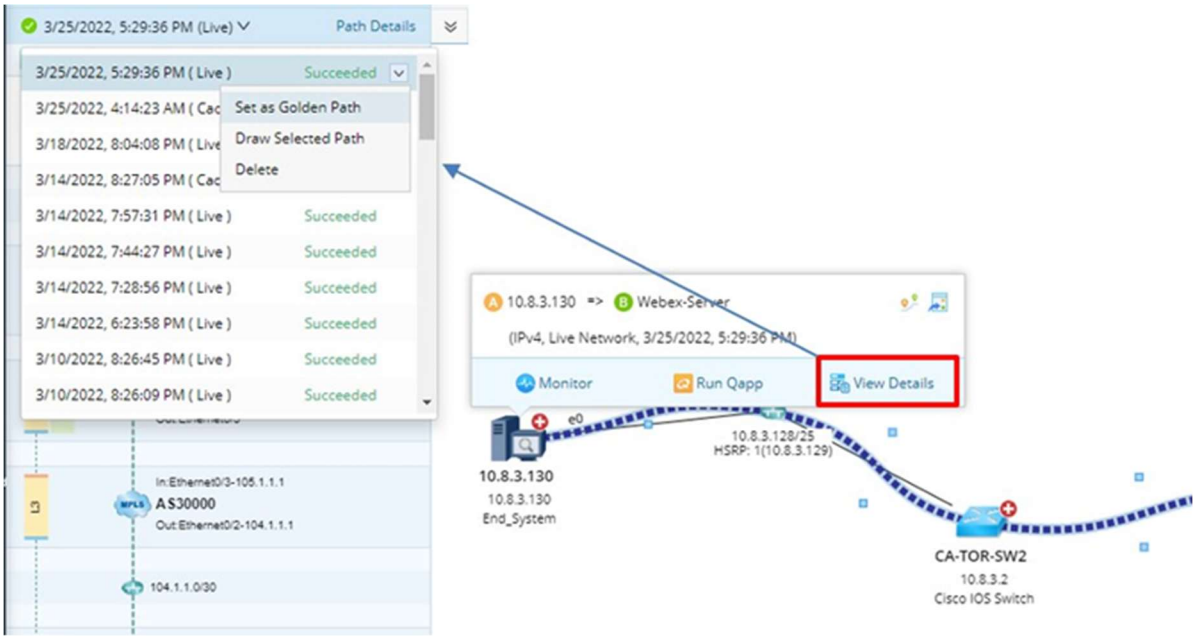
How to create the Golden path:-

1. Right-click the path you want to set Golden Path for in the Application Manager.

   Note: Make sure that a path has been calculated at least once before you set the Golden Path.

2. Select **View Path History** in the right-click menu.
3. Right-click a history path and select **Set as Golden Path**. A confirmation dialog will pop up, and click **Yes** to continue if you are sure to set it as Golden Path.

Tip: If you are unsure whether a path is appropriate as a Golden Path, you can draw it on a map for a check first. To do so, right-click the path in the **History** dialog to select **Open Path in Map**, select the path on the map, click **View Details** in the pop-up dialog and then click the historical path drop-down list to select **Set as Golden Path** in the Path Result pane.



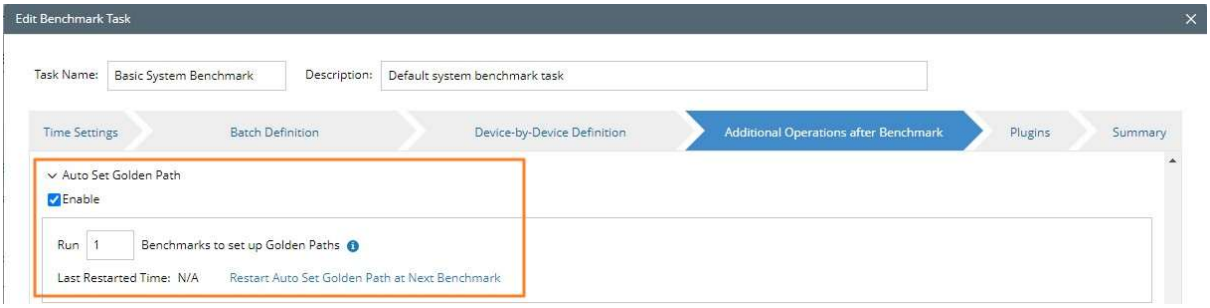
Application Assurance Licenses- Set Golden Path Automatically through Basic System Benchmark

You can automatically set golden paths in batch through the **Basic System Benchmark**. The golden path settings in the Basic System Benchmark target all application paths in the Application Manager. After the benchmark task runs several times, the system analyzes the results of one calculated path and automatically sets the path as Golden Path if it meets the defined requirements.

1. On the **Domain Management** page, click **Schedule Task** on the **Start Page** tab.
2. Edit the **Basic System Benchmark** and navigate to the **Additional Operations after Benchmark** tab.

   Note: The Auto-Set Golden Path function is only available in the built-in **Basic System Benchmark**.

3. In the **Auto Set Golden Path** area, check the **Enable** checkbox.



4. Set the times to run the benchmark for the Golden Path definition. If the results of a path in the specified consecutive times of benchmark executions are successful and the same, the system automatically sets the last result of the path as the Golden Path.

Note: If you want to restart the automatic calculation for Golden Path, you can click **Restart**. The system will start recalculating Golden Paths at the next benchmark execution, and the Golden Paths which have not finished settings in the previous benchmarks will be dropped.

Application Assurance Licenses- Verifying Application paths to detect changes

You can set your NetBrain system to periodically monitor the application paths and send alerts and emails when the path changes. There are two ways to do this:-

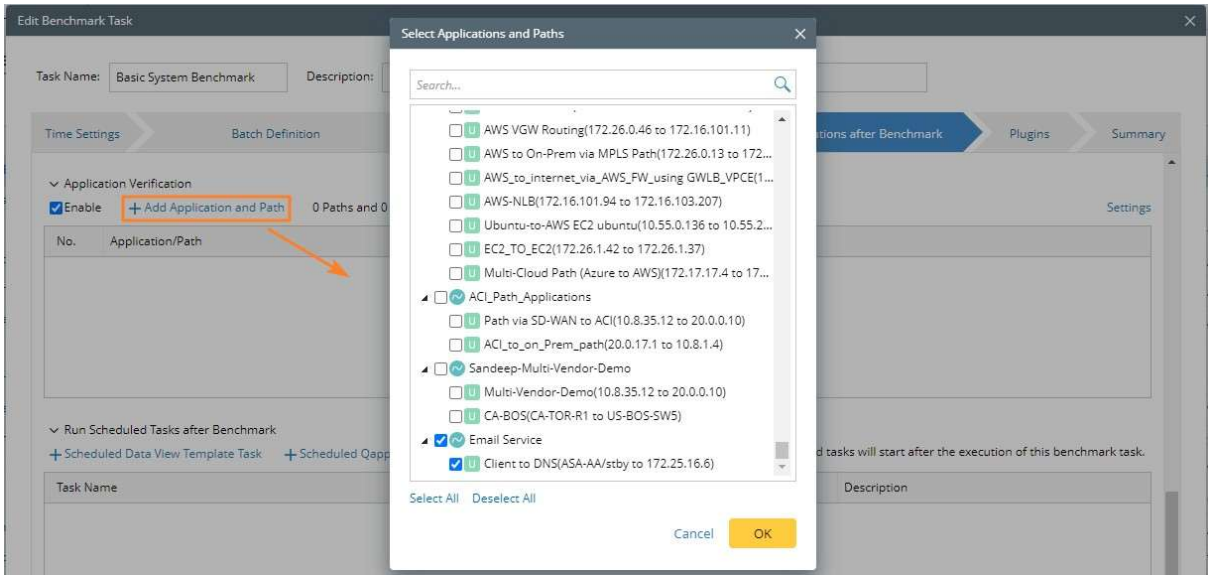
- Verify Application Paths via Basic System Benchmark
- Monitor Application Paths by Scheduling Qapp

Application Assurance Licenses- Verify Application Paths via Basic System Benchmark

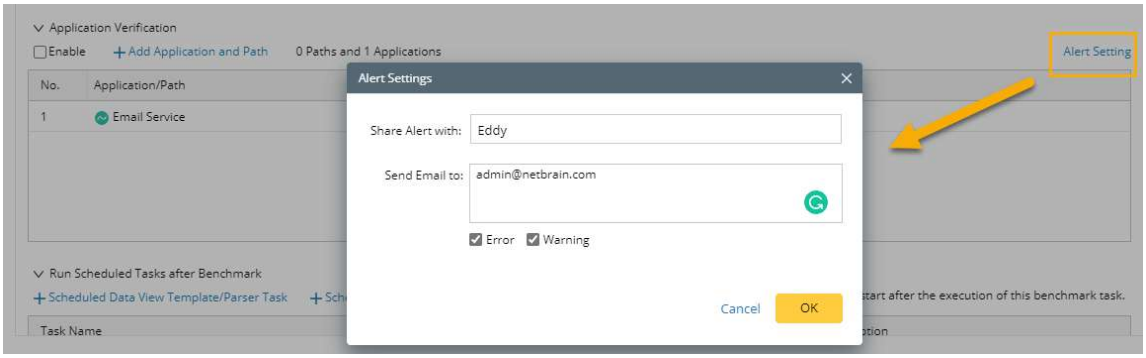
It is highly recommended that you add the application paths to the Basic System Benchmark for verification. These paths will be verified as soon as the benchmark is executed.

Note: If you want to verify application paths in another benchmark task, make sure you select all the data typ

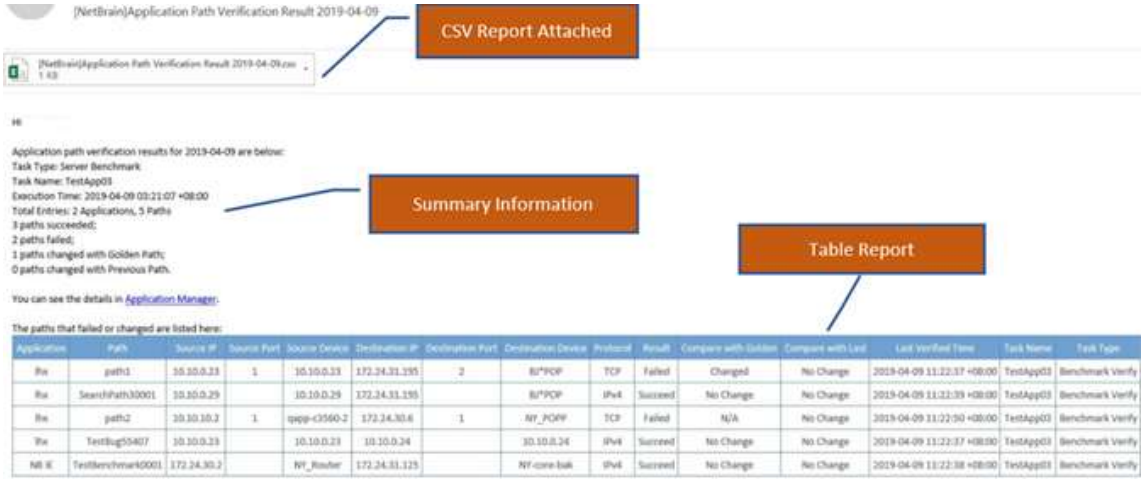
1. On the **Domain Management** page, click **Schedule Task** on the **Start Page** tab.
2. Edit the **Basic System Benchmark**, and go to the **Additional Operations after Benchmark** tab.
3. In the **Application Verification** area, check the **Enable** option, and add paths or applications you want to verify.



4. Click **Alert Setting** to define system and email alerts for path changes or failures. The system will send alerts to specified users if the paths fail or change compared with Golden Path or the last verified result.
    a. In the **Share Alert with** field, enter a username and then select the matched user account from the populated drop-down list.
    b. In the **Send Email to** field, enter at least an email address.
    Alert Email Definition Sample:



Email Notification Sample:



d. Select the alert level for system alerts and email alerts.

5. Submit the benchmark task.

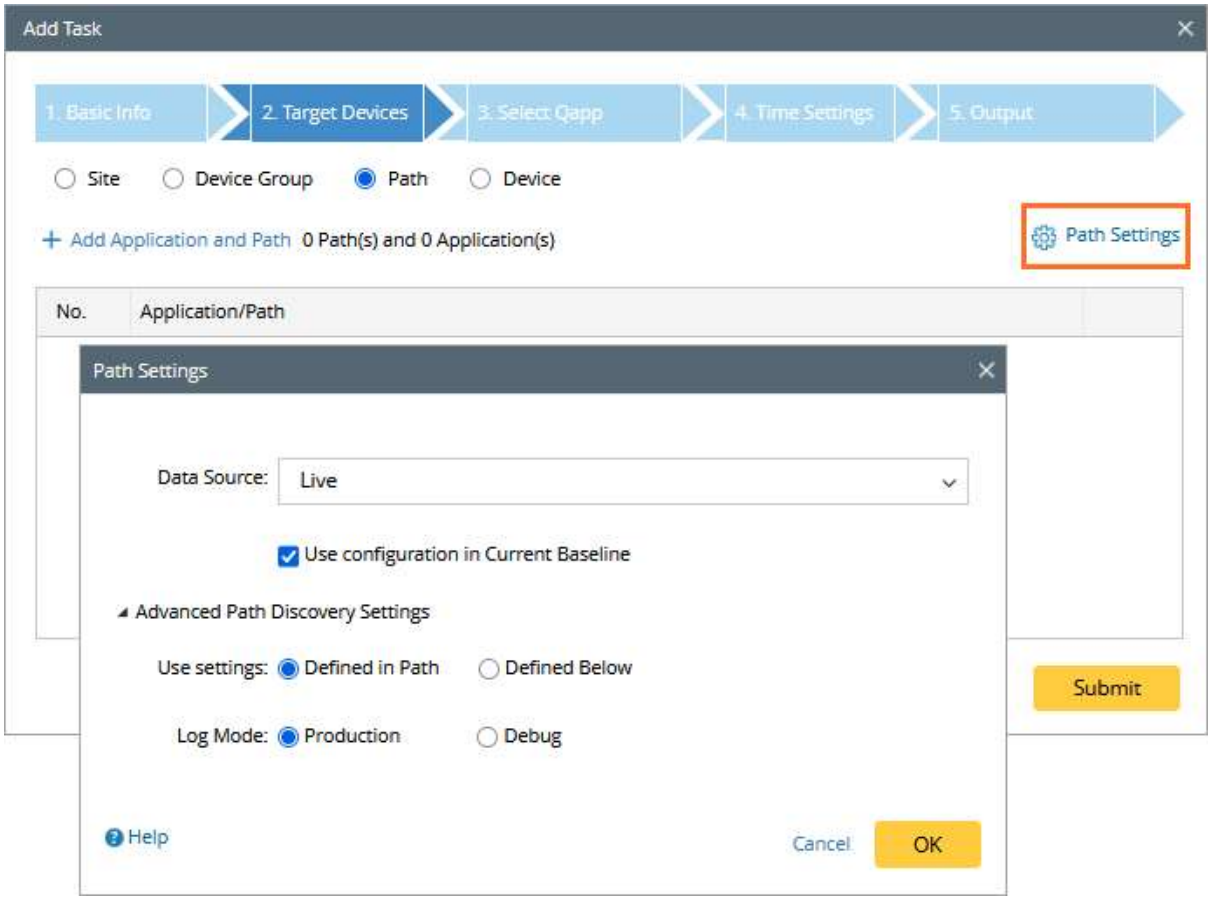
Application Assurance Licenses- Verify Application Paths by Scheduling Qapp

You can periodically monitor application paths in a scheduled Qapp task. Once the paths change, the system can detect them and send out system alerts, email alerts, or both.

Note: The steps below assume you have basic knowledge of the NetBrain Scheduling Qapp function.

1. On the **Domain Management** page, click **Schedule Task > + Add Task**.

2. On the **Target Devices** tab, click **+Add Application and Path** to add the paths that you want to monitor.



3. On the **Select Qapp** tab, select a Qapp to run on the devices of the selected paths.
4. On the **Time Settings** tab, set the time and frequency to run the task. To monitor the application paths continuously, select **Continually,** and then define the frequency to repeat the task.
5. On the **Output** tab, define system alerts and email alerts for path changes or failures.
    a. In the **Share Alert with** field, enter a username and then select the matched user account from the populated drop-down list, or directly enter an email address.
    b. In the **Send Email to** field, enter at least an email address.
6. Click **Submit** to save the task.

Application Assurance Licenses – Viewing path results and exporting reports

At each run cycle, the system compares the current result of a path with the last calculated one and the Golden Path. The calculation and comparison results are recorded and visualized in the Application Manager.

- View the Latest Results in the Application Manager
- Export Path Results

Application Assurance Licenses- View the Latest Results in the Application Manager

The Application Manager shows the latest path results and supports a variety of filter methods to filter the results.

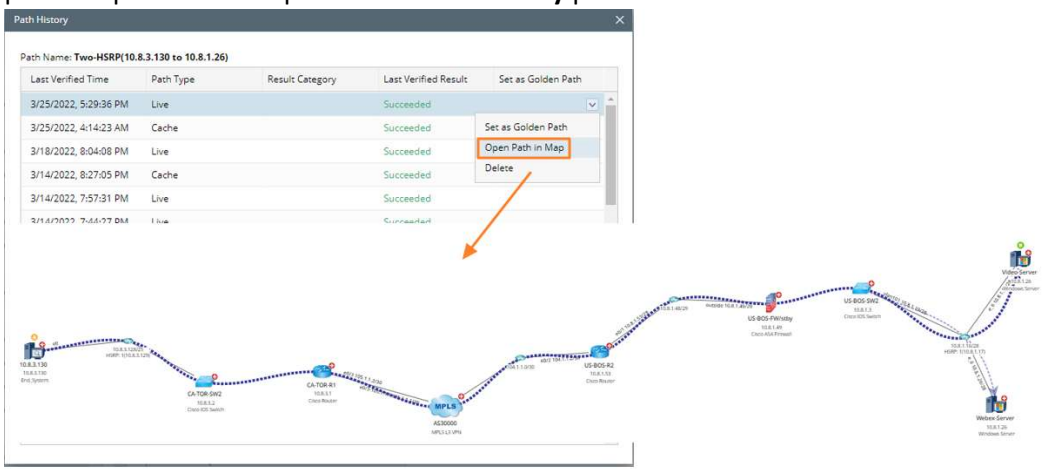
Applicati...	Path	Source	Source Po...	Source De...	Destina...	Destinatio...	Destinatio...	Group	Protocol	Result	Result Cat...	Reference Ma...	History	Compare ...	Compare ...	Last Verifi...	Task Name
	GCP a...	172.18.3.5		sharevpc-c...	172.16.8.1		172.16.8.1		IPv4	Failed		None	24	Changed	Changed	6/6/2022, ...	Manually ...
	GCP H...	172.18.6.2		west2-vpc-...	172.16.9.2...		US-BOS-R1		IPv4	Succeeded		None	8	Changed	Changed	5/25/2022,...	Manually ...
	GCP V...	172.18.3.5		sharevpc-c...	172.18.4.2		east-vpc-s...		IPv4	Succeeded		None	19	No Change	Changed	5/25/2022,...	Manually ...
	GCP V...	172.18.6.2		west2-vpc-...	172.18.15.4		central-vp...		IPv4	Succeeded		None	15	Changed	Changed	5/25/2022,...	Manually ...
	GCP L...	172.18.5.2		host-proj-...	172.18.5.9	80	172.18.5.9		TCP	Succeeded		None	10	Changed	Changed	5/25/2022,...	Manually ...
	GCP S...	172.18.3.5		sharevpc-c...	172.18.4.2		east-vpc-s...		IPv4	Succeeded		None	7	No Change	Changed	5/25/2022,...	Manually ...

1. View the changed or failed paths in the **Result**, **Compare with Last,** and **Compare with Golden** columns.

2. Draw the current and Golden paths on a map to see the differences. To draw the paths on a map, select **Draw Latest Path on Map** and **Draw Golden Path on Map** respectively in the right-click menu of a path.

3. Draw the current and last calculated paths on a map to see the differences.

Tip: The Application Manager stores the last calculated and earlier historical paths. To view and map path to open it on a map from the **Path History** pane.



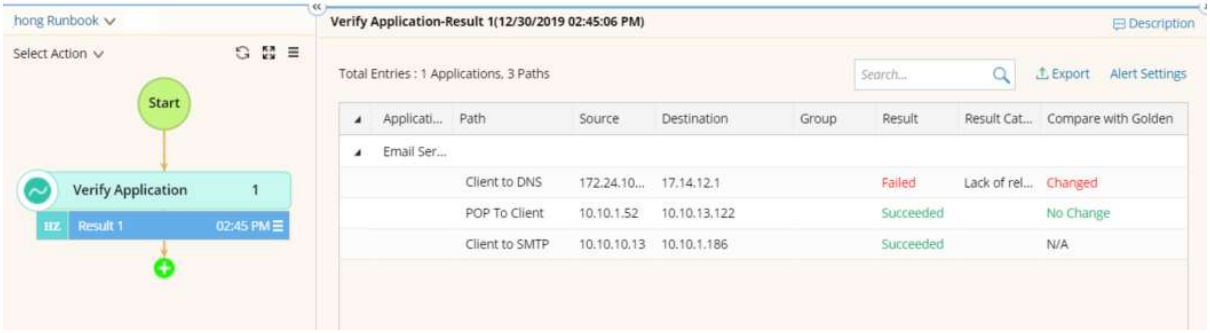
Application Assurance Licenses- Export Path Results

You can export the latest path results to a CSV file. Click **Export** in the Application Manager and select **Export Report.**

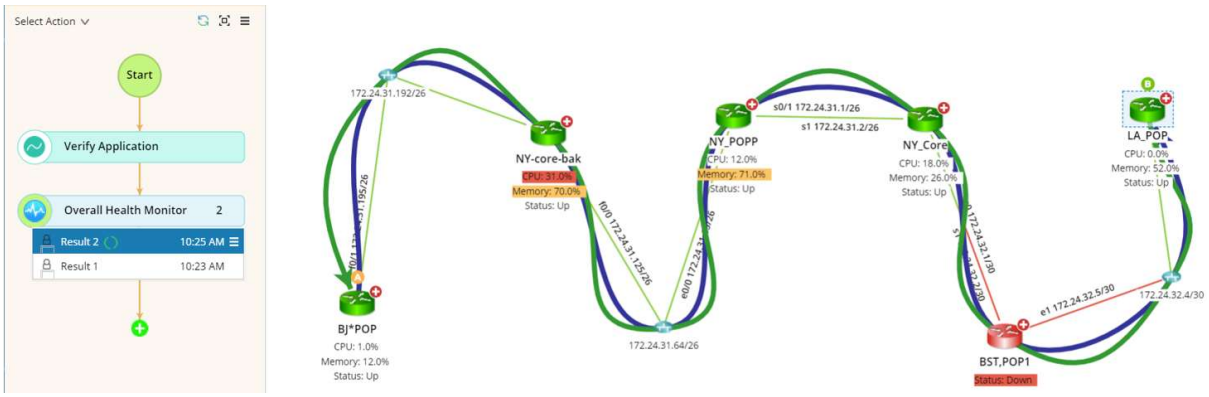
Application Assurance Licenses – Troubleshooting Path changes using Runbook automation

You can verify application paths in a runbook and run Qapps, CLI command, or other automation to troubleshoot when a path changes.

1. On a map, open a runbook and add a **Verify Application** node to the runbook. When you open this you will see that the applications ate ordered by [weight] from high to low
2. Click the **Verify Application** node and add the application paths.
3. Click **Run** to calculate and verify the paths.

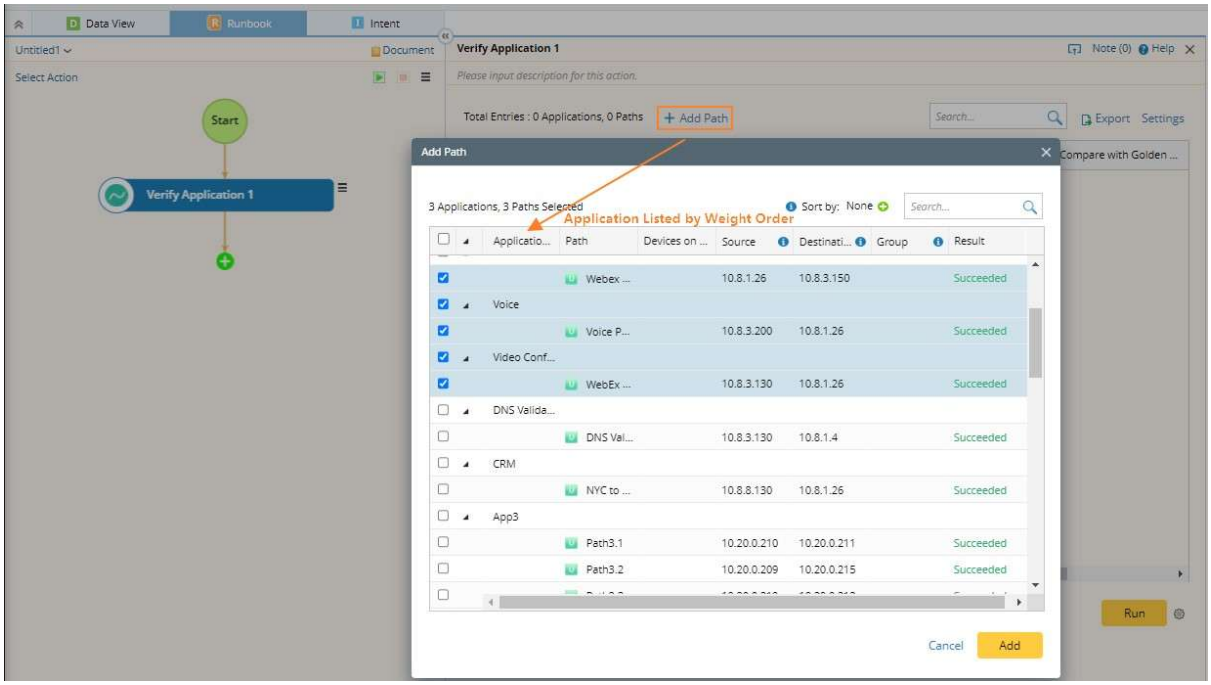


4. Right-click a verified path with changes and draw the path on a map.
5. Add Qapps or other actions you want to run for the application paths.



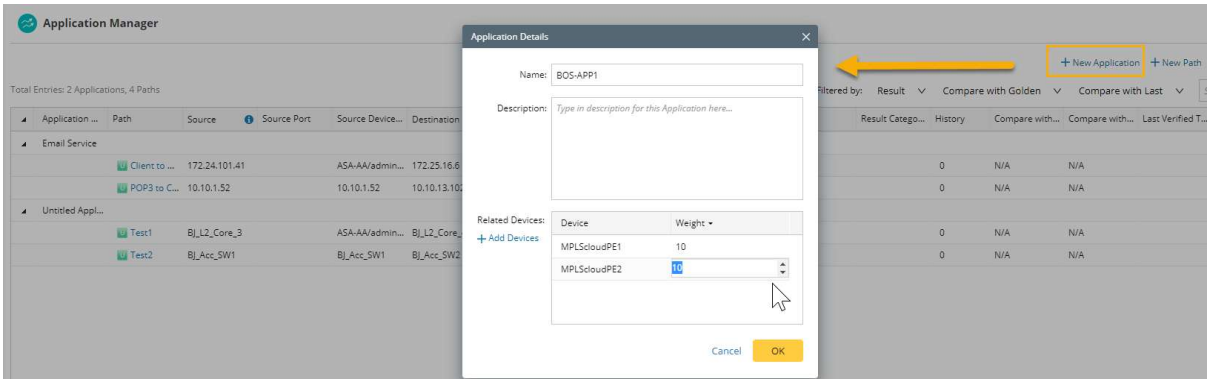
Application Assurance Licenses- Application Weight

When you select paths to add them to the **Verify Application** node of a runbook, the applications will be listed and sorted by weight from high to low.



The weight of an application is the sum of device weight and path weight.

- **Device Weight:** The device weight of an application is the sum of the weights of all devices involved in the application. When assigning devices to an application, you can manually assign a weight to each device.



- **Path Weight:** The path weight of an application is the sum of the weights of all the paths contained in the application. For example, APP1 has two paths, and the weight of Path1 is 3, the weight of Path2 is 5, then the path weight of the App1 is 8.

The weight of a path depends on how many devices the path crosses have appeared on a map, and one device weighs 1. For example, if a path crosses 5 devices, only 3 of 5 appear on the map, and the path weight is 3.

PLATFORM USER LICENSING

Administrator Seat Licenses

The Administrator Seat license is a concurrent user license that provides complete, unfettered access to the NetBrain Platform. The license offers a wide range of features for managing, diagnosing, and interacting with network incidents and devices. It is designed for Superusers to garner the most value from NetBrain.

The Seat License allows users to manipulate devices within the map, zoom, apply data views, and perform detailed edits such as saving, exporting, and running diagnostics. Users can add or remove maps from incidents, request editing rights, and manage various data views.

The diagnosis capabilities include running self-service diagnoses, querying alerts from preventive automation, subscribing to preventive automation, and viewing diagnosis results. Device management in the system is also robust, enabling users to add, edit, or delete device notes, flag devices, and add or remove devices and interfaces from incidents.

Furthermore, the Seat License allows for comprehensive member management, including inviting members and enabling or disabling access codes. It also supports general operations such as setting incident status, creating, or editing incidents, and associating or switching between incidents. Advanced settings like support information and email notifications are also configurable within the system.

The Seat license supports extensive message handling, including the ability to view, post, search, edit, and delete messages, as well as advanced functionalities like pinning messages, switching message modes, and embedding rich text and attachments.

Incident Portal: No license required

The Incident Portal is designed for users who do not have full access to the NetBrain platform but want to be able to influence an incident. To this end the Seat license users can award certain levels of access and edit rights to Incident Portal users to allow them to drive incident resolution without full, edit access.

The Incident portal shares many features the Full Seat licenses in terms of visibility, but the edit capabilities are more limited to essential incident management functions. Users can view, post, search, edit, and delete messages, but the message handling capabilities are somewhat less extensive compared to the full Seat License; for example, the ability to pin messages or insert map links directly into messages is not supported.

Mapping functionalities are present, allowing users to drag and move devices, zoom in and out, and apply basic data views. However, the advanced map editing and management features available in the Seat Licenses are not present in the Incident Portal. The ability to add maps to incidents or request map editing rights is also absent.

In terms of diagnosis, users can run self-service diagnoses and view diagnosis results, but the portal does not support querying alerts or subscribing to preventive automation. Device management is limited to basic actions such as adding, editing, or deleting device notes and flagging devices.

The Incident Portal does not support member invitations, or the more advanced general operations found in the Seat License. Users can set the incident status, but creating, editing, or associating incidents is not supported. Similarly, advanced settings and notification options are not available.

Function Portal: No license required

The Function Portal is designed to provide external unlicensed users with access to certain features of the Seat License without requiring full system accounts. It supports viewing dynamic maps, applying data views, and interacting with mapped data, although it lacks the comprehensive editing capabilities found in the Seat License. Users can view path results and calculate live paths under specific conditions, such as when certain modules are enabled.

Device management within the Function Portal is centred around the One-IP Table, which allows users to search and map devices and their connections. However, the Function Portal does not support full device note editing or the ability to add or remove devices from incidents.

Message handling in the Function Portal is minimal, focusing more on viewing and interacting with shared network data. The portal does not support detailed message functions like those in the NetBrain Platform or the Incident Portal.

General operations in the Function Portal are limited to logging in, viewing data, and interacting with predefined content such as maps and paths. The portal is intended for collaborative troubleshooting and network visualisation, with the ability to divide domain data into smaller, accessible segments for external users. Unlike the Seat License, the Function Portal does not support incident creation, editing, or advanced notification settings.

NETBRAIN PROFESSIONAL SERVICES – 'JUMPSTART' PROJECT DELIVERABLES FOR PHASE 1

Project Initiation phase

1. Internal kick off call to define project tasks and key The User outcomes
2. Incident Data Analysis Completion
3. Customer kick off call to introduce the project and agree roles and responsibilities
4. Enrol The User contacts to NetBrain University for ongoing training
5. Enrol The User contacts to Customer Portal for access to technical documentation and support
6. Confirm NetBrain License Availability on The User platform

NetBrain Software deployment phase

1. Driver/Patch Pre-Check
2. Deployment Team Pre-Check
3. Upgrade and Resource Update – during this phase we will conduct initial discovery of the network with the customer

   The system provides the following three ways to discover your network and we will work with them to ascertain the most viable in their environment.

   - Discovering Network via Seed Routers
   - Discovering Network by Scanning IP Range
   - Discovering Network via API

Data Accuracy Audit

1. Execute Data Accuracy Wizard
2. Resolve Domain Issues for completeness of discovery. See NetBrain documentation supporting the customer deployment activity - https://www.netbraintech.com/docs/ie101/help/index.html?building-domain.htm

During this activity we would perform the following actions although the outcome of these actions is dictated by The User's environment:

Category	Task	Expected Result
Discovery	Configure Network Settings	▪All Front Servers are connected ▪All network credentials are configured
	Discover Network Devices	▪All managed network devices are discovered
Fine Tune	Clean Up Domain Issues	Resolve all managed devices under the following categories: ▪Unknown IP ▪Missed Devices

Category	Task	Expected Result
		▪Discovered by SNMP ▪Unknown SNMP sysObjectID ▪Unclassified Network Devices ▪Hostname-Changed Devices
	Create MPLS Clouds	▪MPLS Clouds are created based on a full list of CE devices with CLI access
	Add Internet Cloud	▪All paths between boundary devices and the Internet are visible and can be calculated successfully
	Add Generic Device	▪Devices that cannot be accessed are manually added to the domain
	Resolve Duplicated IPs	▪No conflicted IP
Site & System Tasks	Create Sites	▪All sites are created ▪No unassigned devices
	Schedule Benchmark Tasks	▪Benchmark task is enabled and executed successfully ▪**Update Site Maps** is enabled
	Schedule Discovery Task (Optional)	▪Discovery task is enabled and executed successfully
	Schedule Data View Template/Parser Task	▪All applicable built-in DVTs are enabled and executed successfully
	Schedule Qapp Tasks (Optional)	▪Target tasks are enabled at a proper frequency
Advanced Tasks	Define Device Access Policy (Optional)	▪Users are assigned to corresponding policies as required
	Create Layout Style (Optional)	▪All sites are associated with customized layout
	View Domain Health Report	▪All issues reflected in the report are resolved

3. Parsers and Data Views scheduled for The User - To instantly visualize the values of concerned parser variables in a data view template, you can schedule a Data View Template/Parser task to retrieve and parse network data regularly. Once scheduled, the task is auto-enabled, and can also be triggered through Benchmark.
4. System Tasks Scheduled for The User – This is a very large area and subject to the key outputs the customer seeks. For example we would schedule benchmark and discovery tasks regularly, ensuring that the following built-in tasks are set up for the The User:

   ▪**Basic System Benchmark** — regularly collects live data as baselines to build topology, calculate paths, and recalculate device groups, sites, and MPLS Virtual Route Tables.

   ▪**Scheduled System Discovery** — discovers new devices in your network and adds them to your domain automatically.

5. Domain Review undertaken – Under this element we will work with the customer to resolve any issues under the following categories:

    ▪**Fully CLI-Accessed Devices** — the devices discovered successfully during a discovery and do not need further actions to tune or rediscover.

    ▪**SNMP-Only Devices** — the devices accessed by SNMP but failed to be accessed via Telnet/SSH.

    ▪Latest CLI configuration Retrieval Failed — Discovered devices that NetBrain successfully retrieved configurations via CLI before but failed to retrieve CLI configuration in the last Discover task.

    ▪**Missed Devices** — the devices existing in the current domain but failed to be verified during a discovery.

    ▪**Unknown SNMP SysObjectID** — the devices whose SysObjectIDs are not defined in the Vendor Model table.

    ▪**Unknown IP** — the IP addresses that cannot be accessed via Telnet/SSH and SNMP in the **Discover via Seed Routers** method during a discovery.

    ▪**SSH Fingerprint Check Failed** — the devices whose current fingerprint keys are different with the latest ones retrieved during live access.

    ▪**MPLS Cloud** — used to enable A-B path across a vendor supplied MPLS network.

    ▪**Hostname-Changed Device** — the device whose hostname is changed and exists with more than one hostname in a domain.

Phase 4 - Integrations

1. Integrate with the ITSM platform (ServiceNow) – This is subject to The User's needs and capabilities. NetBrain offers a RESTful API and we will work with the customer to deliver integration to the ITSM of their choice using this API. However, the end state workflow will be determined by the customers' operating model and is rarely defined pre-sale

https://github.com/NetBrainAPI/NetBrain-REST-API-R10.1

Phase 5 – Automation Library

1. Deploy and retrofit Automation Library - NetBrain will install hundreds of pre-built Network Intents from the Automation Library. These can be clicked and deployed in the The User environment to deliver immediate automation capabilities for Preventative Automation, Triggered automation, Manual automation to drive down MTTR and reduce incidents. This library is open to be used by the The User team as they see fit. Links to the most common automation approaches can be found at:-

https://www.netbraintech.com/docs/ie101/help/index.html?automation-toolkit.htm

https://www.netbraintech.com/docs/ie101/help/index.html?interactive-automation.htm

https://www.netbraintech.com/docs/ie101/help/index.html?triggered-automation.htm

https://www.netbraintech.com/docs/ie101/help/index.html?preventive-automation.htm

2. Build automation around The Users' top 3 problems using the above automation capabilities.

Phase 6 – Handover to The User and final training