NetBrain Enterprise Suite v5.1

Feature Handbook
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Overview

0.1 Dynamic Network Mapping

Most enterprises use Visio diagrams as a way of documenting the network. This manual approach takes a significant amount of effort. Dynamic mapping is the next generation mapping automation technology, featuring:

- Data-driven map automation – maps with rich details can be created instantly
- On-demand map creation - each map is customized for the task at hand
- Automatically updated – when the live network changes, maps are updated accordingly

0.2 Automated Network Documentation

To automate network documentation, NetBrain leverages a state-of-the-art discovery engine that discovers both network topology and the network design underneath. Any network change will be automatically captured by recurring discovery.

Network documentation is available in the following formats:

- Diagrams in Visio format
- Design documents in Word format
- Inventory reports in Excel format

0.3 Map-Driven Network Troubleshooting

Instead of typing commands into the CLI to figure out what’s happening, you can troubleshoot using a network map as the user interface. With this unique troubleshooting tool, you can:

- Map a problem area instantly through on-demand mapping technology
- Perform advanced diagnostics through a visual monitoring ‘HeatMap’
- Analyze what’s changed in topology, routing, configuration, and traffic flow
- Customize ‘Automation Procedures’ to quickly find errors and discrepancies

Data-driven mapping automation

Automated documentation in Visio, Word and Excel format

Visual Troubleshooting in action
0.4 Map-Driven Change Management (Add-on Module)

It is estimated that 3 out of 4 network outages are caused by changes. Analyzing the exact impact of any network change in a dynamic network can be challenging. With NetBrain's Change Management Workflow, you can:

- Define network changes with a template-driven approach
- Automatically push configuration changes to multiple devices simultaneously
- Analyze the impact of changes by comparing configuration and routing before and after the update
- Automatically Document the results including impacted devices, configuration changes, time stamps, and much more.

With the integrated change management workflow, you can fix any issues inside the change window before outages occur.

0.5 Easy to Use

While NetBrain has over 1,000 features, all are intuitive and easy to use because they are map-driven. There is no need for formal training before users can take advantage of the mapping, troubleshooting and change assurance features. NetBrain is easy to setup as well. Typically, setup can be completed by end users within an hour or two.

0.6 Scalable for Very Large Networks

NetBrain is designed to handle very large networks with tens of thousands of routers, switches and firewalls. Scalability is achieved by intelligently distributing computing among server(s).
Section 1: Deep Network Discovery and Benchmark

1.1 Deep Network Discovery

NetBrain intelligence is built on top of its deep network discovery capability. Traditional discovery tools only find what you have in the network. NetBrain discovers both what you have (network devices) and how they are put together (network design). This is achieved by leveraging a patented neighbor-walking discovery engine combined with advanced network modeling. During the discovery process, NetBrain simultaneously analyzes data collected from SNMP and the CLI, and decodes network design every step along the way.

Often starting with the single input of a seed router, NetBrain’s discovery is powerful but still easy to use. Key features include:

- **Deep** network discovery – output includes devices, topology and network design
- **Fastest** in the industry – up to 2,000 routers, switches or firewalls per hour
- **Accurate** – the algorithm ensures nearly 99% accuracy for discovering networked devices
- **Robust** – capable of handling highly fragmented networks

**Discovery Capabilities At-A-Glance**

- Simultaneous Discovery of Network Topology and Design
- Extremely Fast Leveraging Neighbor-Walking Algorithm
- Recurring Benchmark To Catch Network Changes
- Model Network Without Live Access by Importing Configuration Files

1.2 Recurring Benchmark to Capture Network Changes

Network change is constant. NetBrain has two mechanisms in place to catch changes and ensure network intelligence is accurate and up-to-date:

- **Scheduled re-discovery** will automatically detect newly added or removed devices.
- **Recurring benchmark** will collect and analyze in-depth network data such as configuration files, routing tables, CAM tables and any CLI-command output to profile changes in network topology and design.
1.3 Model Virtual Networks by Importing Configuration Files and CLI Output

Under certain scenarios, users may have to work on a network that doesn’t exist yet (during the network design phase), or that they have no direct access to (e.g. a clients’ network for a consultant). NetBrain can model a virtual network and provide a map-driven work environment by:

- **Importing a set of configuration files** of routers, switches and firewalls from most mainstream hardware vendors
- **Importing specific CLI-Command output** to enhance the network model by adding L2 and Traffic Flow details

To analyze what-if scenarios, users may create a separate local workspace for each virtual network.
Section 2: Dynamic Network Mapping

2.0 Overview: Dynamic Network Mapping

Traditional diagramming technologies require users to manually collect data, and then draw diagrams icon-by-icon and word-by-word.

A dynamic map is data driven and fully automated. It represents a technological breakthrough in network mapping:

- All data supporting the map is automatically collected by the system (including network topology and network design data)
- Map creation is automated with simple user inputs
- When network changes occur, maps can be updated automatically

Since dynamic maps are created on-demand, each map is customized for the task at hand – highly beneficial for real-time troubleshooting.

2.1 Automated Updates

Networks are constantly undergoing change. Maintaining documentation that accurately reflects those changes is a constant challenge.

Dynamic Network Maps always accurately reflect the latest state of the network. Recurring benchmarks (discussed in Section 1.2) can be scheduled to run automatically so that the network model that drives each map is always up-to-date.

When a diagram is critical to the troubleshooting process, having confidence in the accuracy of the diagram is essential.
2.2 Map a Problem Device

When the network is in trouble, the first thing you need is a diagram of the problem area. But that diagram may not exist or may be out of date.

With dynamic mapping technology, you can simply enter the name of the problem device in the search dialog, and then click the “map” button to create a fully-annotated diagram of the problem area.

You may index the network with a variety of different search strings:
- IP addresses
- Interface names
- Text strings in a config file (e.g. "eigrp 100")
- Network object model (e.g. “Cisco 5505”)

2.3 Map a Traffic Path between A & B

Most network problems are related to connectivity between point A and B. But mapping out the A/B path is a labor-intensive manual task and users have to do again and again.

With dynamic maps, mapping a traffic path is as simple as entering two endpoints (via IP or hostname) and an L3 and L2 map of the traffic flow is automatically created.

Refer to section 5.1 for more details about NetBrain’s path analysis capability.

2.4 Map a Subnet or VLAN

For troubleshooting or network inventory, users may need a map of a subnet or VLAN. With NetBrain, a dynamic map for this purpose can be created instantly by entering the subnet IP address (e.g. 192.168.1.0/24) or selecting a VLAN name from a switch’s neighbor dialog.
2.5 Map a Data Center or a Site

A complex data center may include thousands of network devices. Building a comprehensive inventory report and network map can be a daunting task.

You can use NetBrain to automate this task:
- Execute a discovery of the entire network or just the data center of interest
- Map all devices that belong to one site or data center automatically (multiple maps may be created)

All network devices (routers, switches, firewalls and end systems) are included.

2.6 Map Entire Network with Logical Sites

For networks with thousands of routers, switches and firewalls, NetBrain can automatically organize and map the network. For example, you can:
- Map an entire network illustrating the hierarchical relationships between all sites
- Map the logical relationships between sites, for example to see how they connect through MPLS.
- Map WAN connectivity with sites and border routers

You can define sites using NetBrain’s Site Manager, which supports importing of site spreadsheets, or defining site border links. When your network changes, all sites established will dynamically adapt.
2.7 Map Routing Tables

To visualize how traffic is routed towards a destination, users can simply type the destination IP into NetBrain’s routing table toolkit, and drag and drop the matched routing table entry into a map.

The routing table information is retrieved from either the live network, or from using historical data captured by the benchmark engine. As a result, users can visually discover the difference between live and historical routing tables.

2.8 Map a Logical Group of Devices or Links

Devices with common attributes can be grouped together to form a device group. Common attributes include:
- Characters in the hostname (e.g. all Tokyo POP routers have a hostname starting with tok-)
- Configuration file patterns
- Vendor/Models
- O.S. Versions
- SNMP parameters, etc.

Similarly, users can group links together based on common attributes of the LAN/WAN links and create dynamic maps.

2.9 Dynamic Maps with Variables

Dynamic maps of device groups/link groups may include user-defined variables. This is a powerful way for large organizations to reduce the amount of pre-defined maps. For example, create a set of OSPF maps – one for each area; you can create a single dynamic map with a variable “area_number”. Users will define the value of this variable right before they need an actual map. At that time, NetBrain will calculate map elements and create the final map.

Users can use many fields to define the search criteria of a link group/device group, to define a map (e.g. vendor model number, O.S version, routing protocol, VRF, etc.)
Section 3: Automation Procedures

3.0 Overview: Automation Procedures

Many tasks associated with network troubleshooting and maintenance are labor-intensive and error-prone. Manually accessing and analyzing information from the CLI is a slow and antiquated process.

Automation Procedures alleviate this burden by automatically collecting and analyzing network data and reporting anomalies to the user. This helps to maximize efficiency on a wide range of tasks:

- Troubleshooting
- Change Verification
- Compliance
- Mapping
- Traffic Path Analysis
- Inventory

Through a visual programming environment, engineers can intuitively develop their own Automation Procedures.

NetBrain also includes hundreds of procedures 'out of the box'. Some examples are provided below.

3.1 Example Troubleshooting Procedure: ‘Are Interface Errors Increasing’

Sometimes troubleshooting is more tedious than complex. Checking interfaces one at a time for issues is prohibitively arduous. This procedure will check every device in the map and report if there are any increasing interface errors.

Logic: Retrieve 'show interfaces' command twice and calculate the delta of each parameter. If delta is greater than 0, report error and highlight it on the map.
3.2 Example Compliance Procedure: ‘Is Password Encryption Enabled’

Compliance audits generally take a lot of time, especially on large networks with tens of thousands of lines of configuration. This compliance procedure will check whether the device password encryption service is enabled for every specified device.

**Logic:** Search `no service password-encryption` command in the configuration file of every specified device.

3.3 Historical Analysis Procedure: ‘Have EIGRP Neighbors Changed’

Often times, an important troubleshooting step is to determine what changes have occurred in the network. This procedure will automatically detect if EIGRP neighbors have changed since a specified baseline date.

**Logic:**
- Determine if EIGRP is configured on each device
- Parse EIGRP parameters and compare with historical data
- Highlight changes in the map

3.4 Example Mapping Procedure: ‘Map Multicasting Distribution Tree’

Multicasting is notoriously difficult to visualize because it is dynamic in nature. Due to its complexity, many organizations have only one or two individuals who are capable of troubleshooting multicast problems. A multicasting specialist can build a procedure once for anyone to use.

**Logic:** Leverage the following commands to map the downstream source tree:
- `show ip mroute <group>`
- `show ip pim neighbor`
- `show ip igmp group`
3.5 Build Your Own Procedures In Minutes

NetBrain comes with hundreds of built-in procedures but there are virtually unlimited uses for network automation. You can create your own procedures with a simple ‘sample-driven’ platform. There are three components:

- **Probes** – Define how to retrieve live data from the network
- **Parsers** – Define how to parse CLI output
- **Triggers** – Define how to analyze the results and provide user feedback

3.6 Built Once, Used Anywhere

Most user-written scripts work on a certain set of devices and cannot be applied to any other part of the network. Automation Procedures are executable files that can be run on any part of the network, and can be customized to work for any device with a CLI. Domain experts can write their own procedures and share them with the entire team for use anywhere.
Section 4: Traffic Path Analysis

4.0 Overview: Traffic Path Analysis

Networks are designed to move traffic from point A to point B. NetBrain allows users to visualize and analyze these dynamic traffic paths across complex networks, taking into account:

- Dynamic and static routing
- Network address translation (NAT)
- Both L3 and L2 traffic flow

NetBrain provides a historic view of traffic paths, so that users can visually compare the traffic flow between the past and the present.

Traffic path analysis can save a tremendous amount of time throughout network troubleshooting process and network assessment.

4.1 Map Live Traffic Paths

In real-time troubleshooting, users need to know how traffic moves across the live network. Live traffic path analysis retrieves live routing tables, configuration files, and CAM/ARP tables to map both L3 and L2 traffic flow.

The network design behind traffic paths is also decoded, including:

- ACL, QoS, NAT
- Dynamic Routing, Static Routing and PBR
- VRF, Multicasting
- Switch port speed and duplex settings along the path
4.2 Map Historical Traffic Paths

A key question to answer when analyzing a traffic path is “what was the path like before?”

Leveraging benchmark data, users can map L3 and L2 traffic paths using cached data.

By overlaying two paths in single map (one for the live and one for the historical path) users can visualize the changes in traffic flow.

4.3 Enhance Traffic Path Logic with Automation Procedures

With Automation Procedures, NetBrain’s traffic path mapping capabilities become much more versatile. Traditionally, mapping across devices like firewalls and load balancers has been a difficult task making network visualization difficult. Procedures allow for the customization of mapping through such devices. See Section 3 to learn more about Automation Procedures.

4.4 Use Netflow to Drill down Top-Talkers

Besides analyzing point-to-point traffic flow (A to B), NetBrain can leverage NetFlow configured in Cisco devices to provide a view of multiple point-to-point conversations off a LAN/WAN link.

The conversation can be sorted by IP address, port and bandwidth utilization. The conversation pair can be mapped out in real-time as well.

If NetFlow is not supported, NetBrain can leverage IP Accounting technology to provide similar analysis.
Section 5: Automate Network Documentation

5.0 Overview: Automate Network Documentation

Section 2 addressed many ways to create dynamic maps. By leveraging the data model created from the discovery, several other types of network documentation can be created and automatically updated. This is possible with NetBrain’s ‘Data-Driven DCU’ approach:
- Discover the live network
- Create documentation dynamically
- Update documents automatically

5.1 Types of Automated Documentation

Users can automatically create various types of network documentation, including:
- Network diagrams in Visio
- Design documents in Word
- Inventory reports in Excel

When the live network changes, NetBrain’s benchmark engine will capture those changes and automatically update the backend data model. Users can then automatically update the exported documents.

5.2 Build Visio Diagrams Automatically

Dynamic Qmaps are created inside NetBrain through automation. From time to time, users may need static Visio diagrams for collaboration purposes. NetBrain provides a one-click export feature to export any Qmap to a fully-editable Visio diagram.

Conversely, NetBrain can convert a static Visio diagram into a dynamic Qmap, so that users can benefit from map-driven troubleshooting and design features.
5.3 Create Design or Assessment Documents in Word

You can automate the creation of network design or network assessment documents using a template-driven approach. First, users will create a dynamic map to define the area of the network to be documented; then select from a set of content templates outlining what to include in the final document. NetBrain’s document engine will create the final Word document and format it based on the selected style.

The content is highly customizable, leveraging the richness of the NetBrain model and a user-extendable design reader technology. For example, users can create documentation for:

- Assessment of specific network configuration, such as QoS configuration, VoIP configuration, Routing, etc.
- Network design review
- Troubleshooting escalation

5.4 Create Inventory Reports in Excel

Leveraging NetBrain’s discovery engine, the asset reports produced hold the industry’s most comprehensive network inventory data. Asset reports are exportable to Excel, where data can be further analyzed.

Users can extend built-in data fields and import values to new fields using the hostname as the key.
5.5 Schedule Automated Updates of Visio or Qmap

Network change is constant. NetBrain’s benchmark engine will automatically update the backend data model to reflect those changes. The same can be done for Qmaps and Visio diagrams saved on local disks. Users can schedule the update of selected maps daily, weekly or monthly.

As a result, users do not need to manually update network diagrams after network changes occur.
Section 6: Visual Network Troubleshooting

6.0 Overview: Visual Network Troubleshooting

The largest benefit NetBrain provides is the acceleration of the troubleshooting process for virtually any type of network problem with its unique ‘Map-Driven PHD’ methodology:

**Step 1:** Probe the map for network performance bottlenecks and hotspots.

**Step 2:** Historical analysis reveals “what’s changed” around the problem area.

**Step 3:** Drill-down using ‘Automation Procedures’ to automate common troubleshooting logic.

By integrating network visualization, data analysis, and CLI automation in a map-driven environment, NetBrain troubleshooting greatly simplifies the troubleshooting process for engineers of all levels.

Visual Network Troubleshooting At-A-Glance
- Use dynamic maps to visualize problem areas
- Run performance monitoring from the map
- Execute Historical analysis
- Run Automation Procedures to drill-down and uncover hard-to-find issues

NetBrain’s ‘Map-Driven PHD’ troubleshooting methodology

Visual troubleshooting heatmap
6.1 Execute Network Monitoring from a Map

Visual network monitoring is different from traditional network monitoring:
- It uses a dynamic map as user interface to start and stop monitoring
- Real-time data collected from the live network is displayed in the map, along with alarms

NetBrain’s visual network monitoring offers several built-in diagnostics to poll many types of data:
- Bandwidth utilization and delay
- CPU/memory utilization
- Interface errors diagnosis
- Multicasting diagnosis
- And more...

These built-in diagnosis are 100% customizable and expandable, leveraging Automation Procedures.

6.2 Historical Analysis for Troubleshooting

With NetBrain, discovering “what’s changed” is relatively simple.

The batch comparison toolkit will analyze configuration and routing changes between any two data sets (e.g. live and historical data) and list the differences in easy-to-drilldown tables.

Using Automation Procedures, engineers can customize the type of information that is available for comparative analysis.
6.3 Drill-Down with Automation Procedures

Automation Procedures are run to detect configuration or performance issues. The output is displayed in either the dashboard or directly in the map.

Hundreds of procedures exist ‘out of the box’ and others can be customized for virtually any troubleshooting scenario. See Section 3 for more details about Automation Procedures.
Section 7: Map-Driven Change Management (Add-On Module)

7.0 Overview: Map-Driven Change Management

Typically, 3 out of 4 network outages are caused by network change. Engineers can prevent human-error induced outages by leveraging NetBrain’s unique Change Management Workflow to automate network changes and instantly analyze their impact. This is achieved by:

- Using dynamic maps to document network changes visually
- Benchmarking the network before and after changes
- Automatically pushing config changes to multiple devices simultaneously
- Analyzing the total impact of network changes through before/after comparison

Without NetBrain, engineers rely on manual methods to selectively analyze the impact of network changes. Any oversight could result in network outages after the change window.

7.1 Use Dynamic Maps to Define Network Changes

The typical change management process includes a design review step. But without proper documentation of a proposed design, the design review process becomes a rubber stamp.

With NetBrain, engineers can use dynamic maps to document complex network design, making it:

- Easy to create - mostly by automation
- Visual – map-driven
- Portable – everything surrounding the map is self-contained

Users can start by dragging-and-dropping a set of configuration files into NetBrain to model the proposed network changes.
7.2 Benchmark the Network Before and After Changes

To understand the impact of network changes, users must record the network status before and after changes are made. Traditionally, this is achieved by manually collecting and analyzing the output from CLI commands for each relevant device.

NetBrain can completely automate this process. Not only is the collection of data automated, but analysis of the data is automated as well. This can save a tremendous amount of time and reduce human errors.

7.3 Automatically Push Configuration Changes

The process of executing network changes can be very labor-intensive and error-prone, especially when performed across a large set of devices. It is not uncommon to forget an interface, or ‘fat-finger’ a command.

NetBrain can significantly reduce this burden with automated push-config. Users can easily identify devices to be impacted, and then define changes using the built-in config template. To mitigate the risk of configuration errors, users can also specify a rollback template. After issuing the command to execute changes, users can watch the configuration happen live and stop or pause the progress if necessary.
7.4 Analyze the Total Impact of Changes

Armed with benchmark data both before and after the configuration update, an in-depth analysis of the changes can be performed automatically. This includes:

- Configuration changes at each and every device
- Routing table changes at each and every device
- Traffic path changes
- Topology changes in L2 and L3
- Changes in any CLI command output

By automating the change verification process, users can spend time correcting problems before outages hit end users.

7.5 Document the Results

NetBrain's automated documentation platform can be leveraged to build customized documentation for the network change. This includes:

- Impacted devices
- List of configuration changes
- Review history
- A map of the changes

 Automatically document results of the change

Compare configuration, routing tables, etc. to discover changes
Section 8: Advanced Configuration and Routing Management

8.0 Overview: Advanced Configuration Management

Traditional configuration management tools treat configuration as a set of flat files and manage them at that level. NetBrain parses configuration files into network object models and provides a much richer configuration management solution. For example, NetBrain is intelligent enough to detect the specific ACL change of a device, while traditional tools only detect that the text inside a configuration file has changed.

NetBrain manages data such as routing tables, CAM tables, CDP tables, etc. This enables users to discover meaningful differences between versions of data, which is much richer than a textual 'diff comparison'. For example, the text of a routing table can be different from one version to another, but the actual routes may not change.

In short, NetBrain's configuration management is designed to handle more complex needs than maintaining versions of configuration files.

8.1 Use Search to Access Configuration, Routing, CLI Data

To access historical data managed by NetBrain, users can leverage its powerful search capability. The search result dialog will provide additional operations to further refine results.

With the easy-to-use search function, users can access configuration files, routing tables, CLI command output, etc.
8.2 Use Maps to Access Configuration Data On-Demand

Through NetBrain’s Design Reader technology, complex configuration files can be decoded by technology type and relevant portions of the configuration displayed in any map.

Users can also use Design Reader to evaluate historical configuration, simply by switching the source from “current” to a historical DataFolder.

8.3 Schedule Data Collection Automatically

NetBrain’s automatic data collection can be scheduled to run at user defined intervals, whether every day, week or month. Users also have the ability to further customize data collection, by selecting the exact types of data to be gathered.

Once data is collected, NetBrain will recompute the backend data model and sync up with client workstations automatically, ensuring up-to-date knowledge.
Section 9: Network Design Analysis

9.0 Overview: Map-Driven Design Analysis

Network design is often embedded into millions of lines of configuration files. NetBrain enables engineers to visualize and analyze complex network design through dynamic maps, greatly reducing complexity while troubleshooting and upgrading. The type of design NetBrain can visually analyze includes:

- **Dynamic routing protocols** such as BGP, OSPF, EIGRP, ISIS and RIP
- **Multicasting** design
- **MPLS VRF** design
- **VLAN** design and **Spanning-Tree** status
- **Over 100 typical designs** based on customizable design templates, including QoS, VoIP, security, etc.

Design Analysis At-A-Glance

- Analyze routing protocol design
- Analyze multicasting design
- Analyze MPLS VRF design
- Analyze VLAN design
- Use Design Reader to analyze various network designs

9.1 Analyze Routing Design

NetBrain can automatically decode routing design such as BGP, OSPF, ISIS, EIGRP and RIP. From any dynamic map, NetBrain annotates the routing design by color coding links (for IGP protocol) or devices (for BGP protocol). Design Reader templates for each routing protocol allows users to drill-down to the details of each protocol from within a map. If needed, customers can customize templates to yield more relevant analysis.
9.2 Analyze Multicasting Design

NetBrain automatically decodes multicasting design such as PIM-DM, PIM-SM and PIM-SDM. The results are annotated in a related dynamic map.

For multicasting RPF analysis, NetBrain provides a toolkit called route propagation analysis, which will evaluate unicast routes towards the multicasting source and map the multicasting forwarding tree.

9.3 Analyze MPLS VRF Design

For any devices configured with MPLS VRF, NetBrain can annotate the VRF alignment in a relevant dynamic map. When retrieving route tables, NetBrain is VRF-aware as well.

For complex path calculation, NetBrain will take into account VRF design.
9.4 Analyze VLAN Design

NetBrain understands VLAN design across LAN infrastructure and is capable of annotating VLAN design from any L2 dynamic map. To make it easier to understand, a L2 VLAN is denoted with a corresponding L3 network segment.

NetBrain can look into the live spanning-tree status and annotate any port that is blocked for each VLAN.

If a port is configured with voice VLAN, it can be highlighted so users can identify proper VoIP phone connections.

9.5 Design Reader to Drill-Down Network Design

Design Reader is a template-based configuration file analyzer. There are over 100 built-in templates to analyze network design such as QoS, VoIP, Multicasting, Routing, ACL for routers, switches and firewalls. Design Reader includes built-in sample maps, which enables users to share best practices about certain technologies.

Users can author their own Design Reader templates through a simple scripting language.
Section 10: NetBrain for Collaboration

10.0 Overview: Dynamic Documentation for Collaboration

Successful collaboration requires efficient knowledge sharing. Traditionally, this is done through static and manual documentation – a very laborious process.

Dynamic documentation, compared to static documentation, is created with a high level of automation, and can significantly enhance organizational collaboration:

- Troubleshooters can better escalate their problems by providing a dynamic document related to what’s been done already
- Design reviews will be more effective when everything is documented within dynamic maps
- After changes are made, operational hand-off is streamlined when changes can be captured automatically by a dynamic documentation system

10.1 Use Qmap as Portable Workspace

Every Qmap is a self-contained knowledge resource containing much more than just a map. The built-in Map Data Pane contains all the relevant data relating to the map, all in one place. Data is clearly organized for easy sharing and portability. Types of embedded data include:

- Device configuration files
- Show-command data run against devices in the map
- Performance monitoring (e.g. utilization, delay, port up/down status, etc.)
- Attachment files to external resources

Collaboration At-A-Glance

- Use maps as a portable collaboration media
- Automate design documentation for design review
- Use NetBrain for troubleshooting escalation
- Use NetBrain for Operational Hand-off
10.2 Map Hyperlinks

To highlight and easily reference key network data, directly on the map, users can easily create and append custom hyperlinks. Once a hyperlink exists on the map, a single click will open the data. Available hyperlinks include:

- Show-command data output
- Automation Procedures to be run on devices in the map
- Links to external reference material

10.3 Use Map Center to Share Maps and Network Knowledge

Users can publish their static Visio maps and dynamic maps in a shared map center. The Map Center makes it easy to browse and search for desired maps.

For dynamic maps, users can schedule an automated update to keep everything accurate.
Section 11: Integration with Existing NMS Systems

11.0 Overview: Integrate with Existing NMS

The value NetBrain brings to existing network management systems is:
- On-demand visibility into any part of the network, on top of the data the existing NMS has provided
- A single view (through dynamic maps) into multiple data sources, reducing the complexity for end users to learn about multiple systems

Integration At-A-Glance
- North-bound integration
- South-bound integration
- Use NetBrain maps to Access data in other NMS

Integration Opportunities
- Availability and Performance Monitoring Tools
  » Enables map-driven diagnosis
- Change Management Tools
  » Enables QA automation
- Inventory Management Tools
  » Enables single view of data
- Knowledge Management Tools
  » Enables document automation
- Event and Ticket Systems
  » Enables map-based collaboration

11.1 Integrate with a Network Alert System

Network alert systems generate text-based alerts, which are difficult for human engineers to work on. Through NetBrain’s API and event system menu extension capability, users can create a dynamic map of each alert on-the-fly. This capability will greatly accelerate network troubleshooting.
Section 12: Scalability for Large Networks

12.0 Enterprise Scalability Features

NetBrain Enterprise Suite is designed to handle very large networks with hundreds of concurrent users in a secure manner. It is comprised of the following key components:

<table>
<thead>
<tr>
<th>Components</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OE Workstation (OE)</td>
<td>Client software to create and work with dynamic diagrams</td>
</tr>
<tr>
<td>OE-Designer Workstation (OE-D)</td>
<td>A special client software for design engineers</td>
</tr>
<tr>
<td>Workspace Server</td>
<td>Holds the shared workspace that models the live network</td>
</tr>
<tr>
<td>Database Server</td>
<td>PostgreSQL DB</td>
</tr>
<tr>
<td>License Server</td>
<td>Manages floating seat licenses</td>
</tr>
<tr>
<td>Gateway Server</td>
<td>Central Server Management</td>
</tr>
<tr>
<td>Network Server</td>
<td>Provides benchmark and proxy service to workstations</td>
</tr>
</tbody>
</table>

Through intelligent server load balancing, NetBrain can support networks with hundreds of thousands of network nodes and millions of end systems. The largest single-server deployment of NetBrain has supported a network with 20,000 network nodes.

Scalability At-A-Glance
- Use multiple servers to distribute the load
- Use Sites to visualize and organize very large networks
- Use multiple workspaces for very large networks
- Use local workspaces for design