

Forward Essentials Highlights

Forward Essentials organizes network configuration and state information making it accessible and easily consumable by network teams.

Key Benefits

Forward Essentials delivers:

- + Time and cost reduction to root-cause network issues
- + Time and cost reduction in maintaining up-to-date network documentation
- + Increased network agility

Deployment Options

Forward Essentials is offered as a Cloud-based product.

The Complexity of Network Operations

Today's enterprise networks contain routers, switches, firewalls and load-balancers from a variety of different vendors. Each vendor has a lineup of different hardware models, operating systems, and configuration syntax (and associated quirks). Underlying these network devices can be hundreds all the way to millions of forwarding rules governing the network behavior for business-critical applications. This results in a level of complexity well beyond what is easily manageable by even the most adept network operations team.

Many of the most frequent tasks in network operators' workflows involve pulling together and building views of network-wide behavior across switching, routing, and security devices. This is currently done in a hop-by-hop manual fashion, which is repetitive, error-prone, time-consuming, and requires deep skill and experience. Network operators are on their own, without the help they desire to complete tasks quickly.

A New Approach to Network Operations

At Forward Networks, our mission is to de-risk and accelerate network operations, by increasing efficiency, reducing outages and verifying network intent. The Forward Platform delivers the enhanced network visibility, policy verification, and change modeling needed to meet these goals.

Forward Essentials

Forward Essentials is our newest offering. As an introductory product of the Forward Platform, Forward Essentials accelerates daily workflows by providing instant search for network device, topology, and inventory information, delivering immediate return on investment.

Forward Essentials

Forward Essentials organizes the network's configuration and state information and makes it accessible and easily consumable by network and security teams. With Forward Essentials, teams can get instant answers as they type questions about their network, as effortlessly as searching the web. Forward Essentials is delivered as a web application with a modern HTML5 easy-to-use interface. Its capabilities include:

Instant search: Network teams often need to gather network-wide views of state and configuration across switches, routers, firewalls and load-balancers to debug network problems. This is currently done in a hop-by-hop manual fashion. With Forward Essentials, by simply querying for IP addresses, subnets, VRFs, VLANs, MACs, or free text, the network operators gain network-wide instant visibility of configuration and state, information necessary for reducing mean time to resolution. The search results can then be refined to focus exclusively on the devices data of interest.

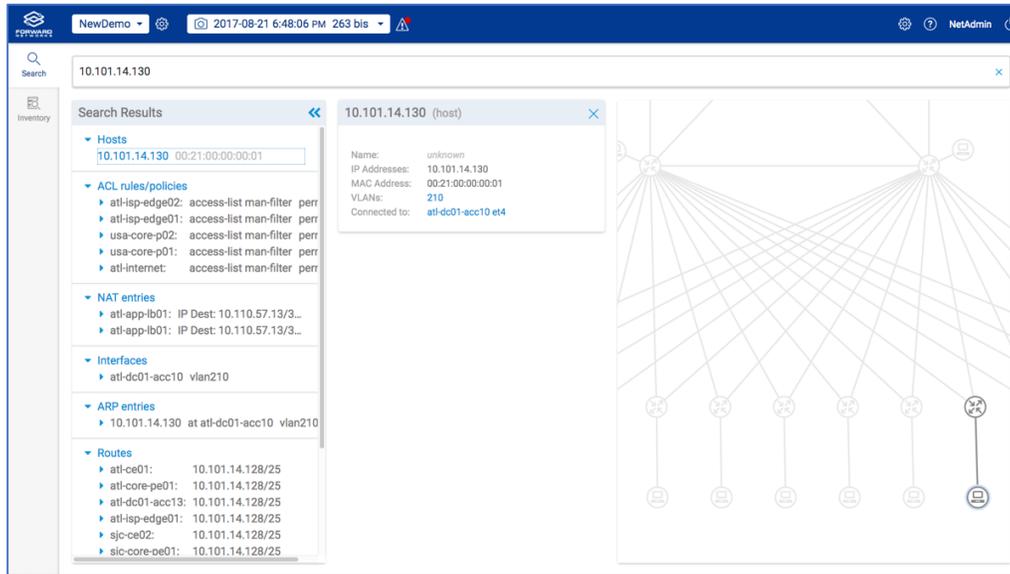


Figure 1: Forward Essentials - Example of IP address search

Always-up-to-date topology: Network teams need network documentation to efficiently solve network problems. It is critical to have access to current documentation, especially when under pressure to solve a business impacting issue. Manually documenting networks of any size is a slow and error-prone process and the resulting documentation becomes instantly out-of-date. Forward Essentials provides an always up-to-date topology with link auto-discovery and editing capability. The interactive topology allows the user to dive into the details of each device's configuration and state, quickly providing access to debugging-critical information.

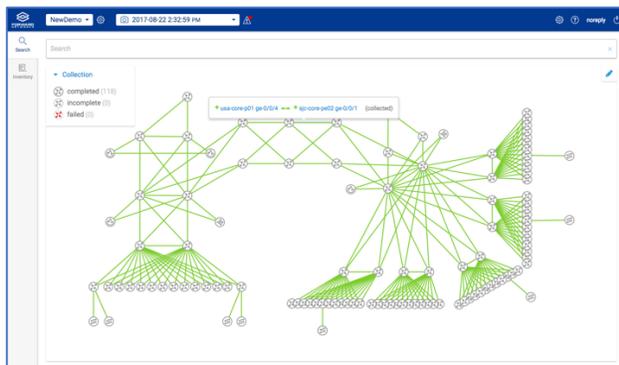


Figure 2: Forward Essentials - Example of network topology

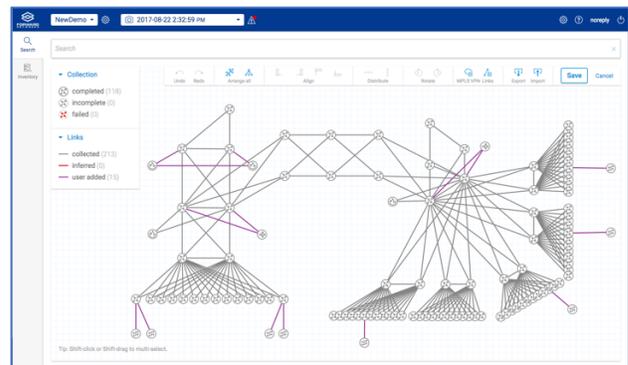
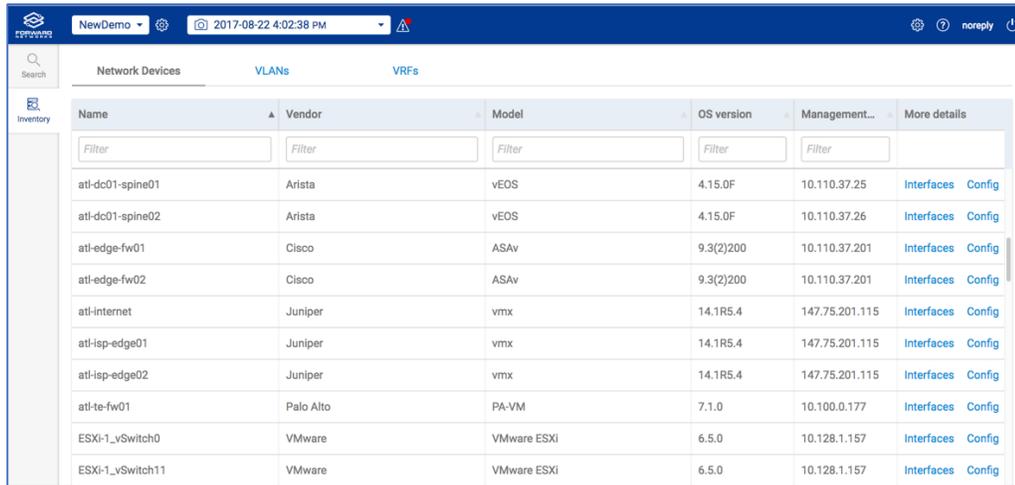


Figure 3: Forward Essentials - Example of topology editing

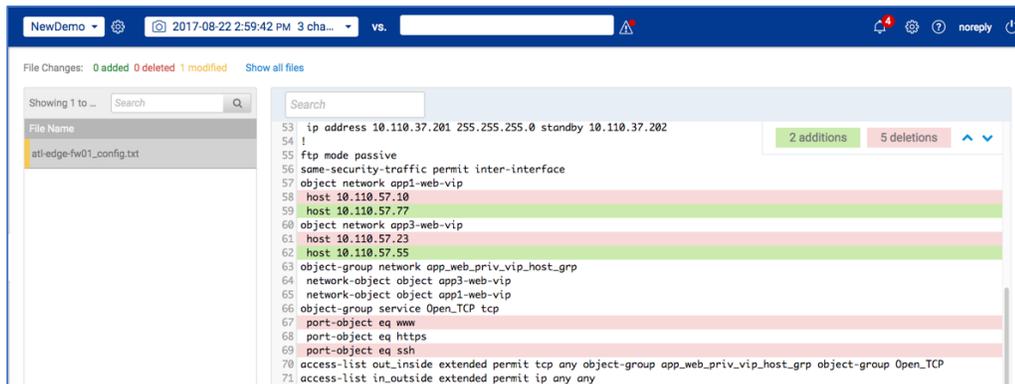
Device inventory: easy tracking of vendors, platforms and software versions for immediate insight about the network infrastructure



Name	Vendor	Model	OS version	Management...	More details
atl-dc01-spine01	Arista	vEOS	4.15.0F	10.110.37.25	Interfaces Config
atl-dc01-spine02	Arista	vEOS	4.15.0F	10.110.37.26	Interfaces Config
atl-edge-fw01	Cisco	ASAv	9.3(2)200	10.110.37.201	Interfaces Config
atl-edge-fw02	Cisco	ASAv	9.3(2)200	10.110.37.201	Interfaces Config
atl-internet	Juniper	vmx	14.1R5.4	147.75.201.115	Interfaces Config
atl-hsp-edge01	Juniper	vmx	14.1R5.4	147.75.201.115	Interfaces Config
atl-hsp-edge02	Juniper	vmx	14.1R5.4	147.75.201.115	Interfaces Config
atl-te-fw01	Palo Alto	PA-VM	7.1.0	10.100.0.177	Interfaces Config
ESXi-1_vSwitch0	VMware	VMware ESXi	6.5.0	10.128.1.157	Interfaces Config
ESXi-1_vSwitch11	VMware	VMware ESXi	6.5.0	10.128.1.157	Interfaces Config

Figure 4: Forward Networks - Example of device inventory

Diff capability: by “diff-ing” historical snapshots of the network, operators can determine what has changed on their network devices between two points in time, easily narrowing down the changes responsible for the network issues



File Changes: 0 added 0 deleted 1 modified Show all files

File Name	Search	2 additions	5 deletions
atl-edge-fw01_config.txt	Search		
53	ip address 10.110.37.201 255.255.255.0 standby 10.110.37.202		
54	!		
55	ftp mode passive		
56	same-security-traffic permit inter-interface		
57	object network app1-web-vip		
58	host 10.110.57.10		
59	host 10.110.57.77		
60	object network app3-web-vip		
61	host 10.110.57.23		
62	host 10.110.57.55		
63	object-group network app_web_priv_vip_host_grp		
64	network-object object app3-web-vip		
65	network-object object app1-web-vip		
66	object-group service Open_TCP tcp		
67	port-object eq www		
68	port-object eq https		
69	port-object eq ssh		
70	access-list out_outside extended permit tcp any object-group app_web_priv_vip_host_grp object-group Open_TCP		
71	access-list in_outside extended permit ip any any		

Figure 5: Forward Networks - Example of Diffs

Additionally, Forward Essentials is ready to plug into existing automation workflows with its comprehensive set of REST APIs and data export capability.

Examples of Use Cases

Root-cause Analysis: With instant, searchable access to network configuration and state and with the help of an up-to-date topology map, operators can root-cause network and security issues faster, thus improving overall efficiency and application time-to-market.

Network Documentation: Network engineers no longer need to spend time updating static network diagrams that are instantly out of date the moment they are saved

Workflow Integration: Access all of the network data created by Forward Essentials through the platform REST APIs to automate network management tasks and enhance your existing dashboards. Setup snapshot triggering to happen after each configuration change, create a custom app to extract the device inventory and device configurations, or a widget for the network topology, or anything else to help spot the next improvement to the network.

Technical Requirements

Forward Essentials is a Cloud-based product which requires the download and installation of a Forward Collector. The Forward Collector is lightweight software which collects configuration and state from network devices and then sends this data securely to the cloud. The overall installation process is easy to follow, and only requires a few minutes.

Supported Vendors and Devices

A10 Networks, Arista Networks, Check Point, Cisco Systems, F5 Networks, Fortinet, HPE, Juniper Networks, Palo Alto Networks, Pica8, VMware vSphere ESXi. Please contact us at info@forwardnetworks.com for more details about supported devices and vendors.

System Requirements	Network Requirements
<ul style="list-style-type: none">• A machine (virtual or physical) with with at least two dedicated cores and 4GB of RAM. Supported Operating Systems: Ubuntu Linux (14.04 and 16.04), Apple OS (10.12), and Windows 7 (or later versions).• The machine must be able to access the https://app.forwardnetworks.com/ webpage via HTTPS.• The user must have admin privileges on the machine.• The latest versions of Chrome or Firefox are required to access the Forward Essentials UI.	<ul style="list-style-type: none">• SSH must be configured and working on the network devices from which the Forward Collector will collect data• The OS instance on which the Forward Collector is installed must have IP and SSH port reachability to the network devices, either directly, or via a jump server

Security

The security of customer data is our top priority. The Forward Platform never receives personally identifiable information (PII). All data sent to the cloud via the Internet is encrypted in transit using the latest industry standards.

- **Data Collection:** The Forward Platform only collects device configuration and state, never packet data. Specifically, the Forward Collector gathers configuration files and dynamic state such as MAC, ARP and IP tables and automatically strips out sensitive data (such as passwords) from device configuration files before uploading to the cloud.
- **Network Credentials:** Network device credentials are only ever stored on the machine that runs the Forward Collector, and never stored in the cloud. These credentials can be configured to allow read-only access to the devices; the Forward Platform itself does not make any changes to the network.
- **Data Secured in Transit:** The Forward Collector protects data in transit to the cloud using the industry standard HTTPS. The servers are fronted by an Amazon Elastic Load Balancer (ELB) that is configured to use the most recent and stringent ELB Security Policy.
- **Data Secured at Rest:** Customer data in the Forward Networks Cloud service is stored in encrypted Amazon Relational Database Service (RDS) instances and encrypted Amazon Elastic File Systems (EFS). All of the encryption keys are managed automatically through Amazon Key Management Service (KMS) that uses Hardware Security Modules to protect the security of encryption keys and its security and quality controls have been validated and certified by several compliance schemes including ISO 27017, ISO 27018, ISO 9001 and PCI DSS Level 1.

About Forward Networks

Forward Networks' mission is to de-risk and accelerate network operations, by increasing efficiency, reducing outages and verifying network intent. Built on a series of breakthrough algorithms, the Forward Platform provides enhanced network visibility, policy verification and change modeling for legacy, SDN or hybrid environments.

Forward Networks is headquartered in Palo Alto, California, and funded by top-tier investors, including Andreessen Horowitz, DFJ, A.Capital, SV Angel, and several luminaries in the networking and systems space.

Please visit www.forwardnetworks.com to learn more or contact us at sales@forwardnetworks.com.