

# Brocade Workflow Composer Network Automation Platform

## HIGHLIGHTS

- Automate the entire network lifecycle—from initial provisioning, configuration validation, or troubleshooting/ auto-remediation with event-driven automation
- Integrate network automation with tool chains and processes from other IT domains to enable true, end-to-end IT workflow automation
- Unleash IT agility with turnkey, customizable, or do-it-yourself network workflow automation—all supported in multivendor network environments
- Leverage the power of DevOps methodologies, popular open source technologies that embrace industry best practices, and a thriving technical community for peer collaboration and innovation

## Brocade Workflow Composer Brings Network Automation to IT Operations

To unleash new levels of business innovation and competitive advantage, customers are embracing digital transformation. Success depends on building an agile business. In the digital era, IT agility is key to business agility.

However, IT infrastructure is only as agile as its least agile component. The lack of network automation and the inability of the network to align with IT operations and tool chains today is the single biggest inhibitor to an organization's ability to capitalize on digitalization. In fact, 75 percent of CIOs say the network is an issue in achieving their organization's goals.<sup>1</sup>

Network infrastructures continue to be highly labor-intensive as advancements in network automation have lagged behind automation in other domains, such as compute or storage. But with 66 percent of IT organizations aspiring to emulate successful cloud provider architectures, automation, and agility<sup>2</sup>, it is clear that the network and the operational model must transform.

Many businesses are overwhelmed at the prospect of undertaking such transformation. It requires changes to the

network infrastructure, organizational and operational models, and new skill sets. However, when the process is broken down into evolutionary, manageable steps, businesses can navigate the journey at their own pace. One of the first places to start is to automate the entire network lifecycle.

Organizations that have embraced the DevOps movement understand that business agility cannot be achieved simply by automating and orchestrating one domain within the services delivery chain, however. When operating in functional silos, execution of tasks that span multiple domains can take days or weeks. The functional domains—such as the network, compute, storage, and applications—must be stitched together to ensure that the transition from one function to another is minimized, streamlining and optimizing the delivery of services and infrastructure changes in a fast, reliable, and repeatable way.

<sup>1</sup> Brocade Global CIO Survey 2015 Report.

<sup>2</sup> ESG Research Report, Data Center Networking Trends, February 2016.

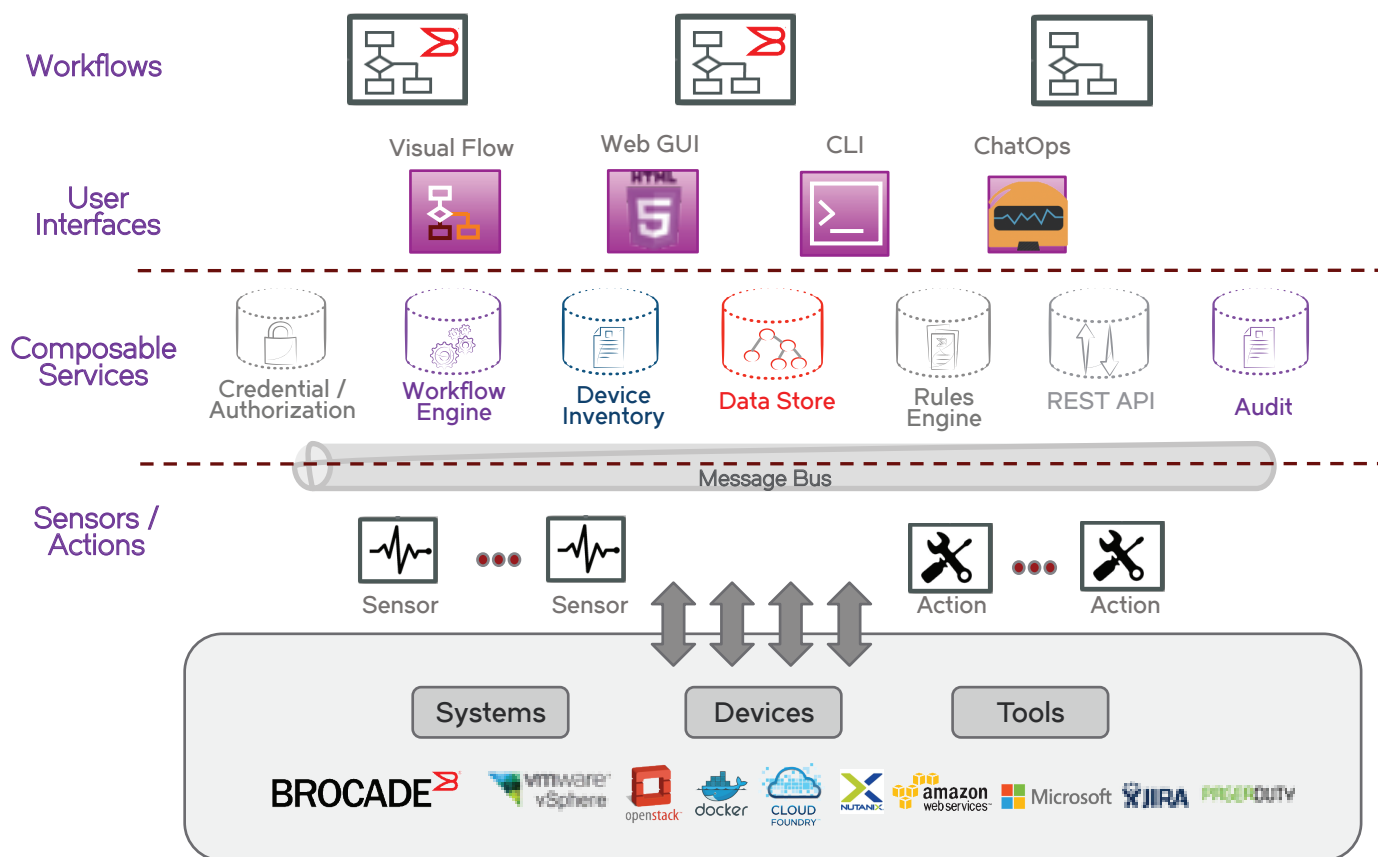


Figure 1: The Brocade Workflow Composer workflow-centric, cross-domain network automation architecture.

The way to do this is through workflow-centric, cross-domain automation that leverages the power of DevOps methodologies, popular open source technologies, industry best practices, and a thriving technical community for peer collaboration and innovation. This approach enables on-demand services delivery and business agility by breaking down the cross-functional silos and allowing the network and all other domains to programmatically participate in the

entire services delivery chain. Brocade® Workflow Composer™ is a unique network automation platform designed to address these requirements, enabling cross-domain workflows to bridge silos and enabling split-second, cross-domain automation to improve business agility.

### Workflow-Centric Automation

To enable cross-domain automation, organizations must think in terms of workflows.

*“Workflows have emerged as a fundamental part of the operational wiring at companies such as AWS, Facebook, and LinkedIn.”<sup>3</sup>*

— Dmitri Zemine

A workflow is a series of steps and logic assembled and executed to accomplish a business or technical objective. Steps within a workflow represent tasks to be

<sup>3</sup> Dmitri Zemine, "The Return of Workflows," blog found at <http://devops.com/2015/04/09/return-workflows>.

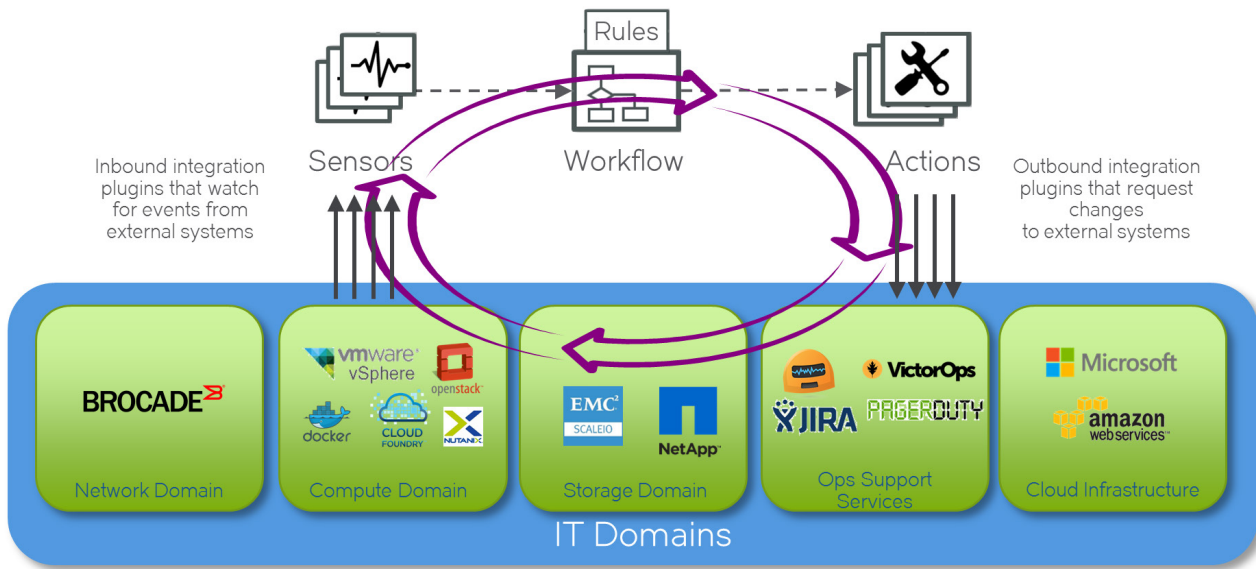


Figure 2: Anatomy of a Brocade Workflow Composer workflow.

executed programmatically, while rules in the form of “If this, then that” statements reflect the intelligence built into the workflow for execution. Workflows are a proven mechanism for converting manual operations and business rules into IT services delivery at scale, because they enable operators to separate the required tasks from the hardwired code, making the tasks simple to define, visualize, and change. Workflows can be single-domain, such as provisioning a network device or service, or they can be cross-domain, such as detecting a network device issue and automatically creating and assigning a Helpdesk ticket to a network operator.

Based on the principles and practices of mega-scale cloud providers and the DevOps culture, Brocade Workflow Composer takes a workflow-centric, cross-domain approach to network automation. Brocade Workflow Composer is a highly flexible solution that provides turnkey, customizable, or do-it-yourself

network workflow automation—all of which are supported in multivendor network environments. With Brocade Workflow Composer, operators are able to automate the entire network lifecycle—from initial provisioning and validation to troubleshooting and remediation—for network lifecycle management and integration with tool chains and processes from other IT domains.

### Cross-Domain Workflow Automation

For cross-domain workflow automation to work, it must take inputs from and be able to request changes on a network device or other cross-domain platforms and applications. By leveraging technologies acquired from the Brocade acquisition of StackStorm Technologies, Brocade Workflow Composer accomplishes this cross-domain integration by using customizable sensors and actions (see Figure 2). Sensors are inbound integration

points that watch for specific events from external systems. When an event occurs, it triggers the corresponding workflow. For example, when a new leaf switch registers, a sensor might trigger the “Configure IP Fabric Leaf” workflow.

Actions are outbound integration points that request changes to external systems. Actions are invoked either by users via a graphical user interface (GUI), a command-line interface (CLI), and so forth, or by workflows. An example of an action might be that when a “Configure IP Fabric Leaf” workflow is run, it uses a Network Configuration Protocol (NETCONF) action to configure the IP, Border Gateway Protocol (BGP), and so forth on the switch.

With this unique, open, and customizable approach, workflows can respond to events and execute actions in a programmatic way on any network device, cross-domain platform, or application.

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## AUTOMATION ON YOUR TERMS

*Brocade Workflow Composer allows IT organizations of all sizes to transition to automation at their own pace.*

### An Evolutionary Approach Yields Revolutionary Results

- *The process of automating infrastructure involves various steps, each of which delivers greater value but requires advancements in technology, skills, and processes. While some organizations are farther along in this process, many are seeking ways to get started by using their existing skills, resources, or investments. Brocade Workflow Composer enables IT organizations of any size to transition to automation at their own pace.*
- *Develop and execute your automation strategy at your own pace with turnkey, customizable, or do-it-yourself network workflow automation—all supported in multivendor network environments*
- *Automate with confidence by leveraging the power of proven DevOps methods, popular open source technologies, industry best practices, and a thriving technical community for peer collaboration and innovation.*
- *Easily automate the entire network lifecycle including provisioning, configuration validation, and troubleshooting and remediation with event-driven automation*

## Executing Workflows

Workflow execution is provided by Brocade Workflow Composer's open, extensible, microservices-based framework. This framework leverages the power of DevOps methodologies, popular open source technologies, industry best practices, and a thriving community for peer collaboration and innovation. Through the Brocade Workflow Composer framework and customizable sensors, actions, rules, and workflows, operators are able to integrate network automation with existing tool chains and processes from other IT domains to enable split-second execution of cross-domain, event-driven IT workflow automation.

Whether your organization is just beginning to undergo its digital transformation or is well on its way, Brocade Workflow Composer enables organizations to consume, customize, or create automation workflows that are aligned to business needs.

### Examples and Benefits of Network Workflow Automation

Whether you are a cloud provider or enterprise IT organization looking to accelerate your organization's transformation to digital business and

cross-domain automation, or you are simply looking to improve customer satisfaction by resolving network issues faster, Brocade Workflow Composer provides workflows for many common provisioning, validation, and troubleshooting operations. Table 1 shows some examples of these customizable workflows.

*“Event-driven provisioning and network automation within the cloud stack is a crucial piece of our service offering to meet the complex demands of enterprise cloud systems.”*

— Travis Mims, Director of Engineering at Cloud Automation Solutions

### Examples and Benefits of Cross-Domain Automation

Brocade Workflow Composer includes over 1000 customizable sensors and actions for popular platforms and IT applications, to get any IT organization up and running with automation quickly. Unlike many solutions that focus on provisioning of devices and services, Brocade Workflow Composer provides software-driven lifecycle network management that includes

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**Table 1:** Brocade Workflow Composer workflow categories.

Workflow Category	Description	Benefit
Provisioning	Layer 3 IP fabric with Border Gateway Protocol-Ethernet Virtual Private Networking (BGP-EVPN), to intelligently upgrade a fabric's firmware without downtime, manage a data center tenant, and more	Perform operations quickly, consistently, and with minimal skills or resources.
Validation	BGP peering state, physical connectivity, Virtual Link Aggregation Group (VLAG) state checks, and more	Quickly and easily ensure that infrastructure is configured properly.
Troubleshooting	Ability to trace IP/MAC addresses across fabric, discover EVPN paths, remediate BGP issues, and more	Dramatically reduce mean-time-to-resolution for network-related issues.

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provisioning, validation, remediation, and troubleshooting.

The following provides an example of an automated troubleshooting workflow for addressing a network BGP-related issue:

1. BGP peer goes down
2. Brocade Workflow Composer sensor triggers BGP troubleshoot workflow
3. Brocade Workflow Composer action extracts:
  - Switch IP address, BGP peer IP address, and egress interface
4. Brocade Workflow Composer action logs into switch to:
  - Execute workflow to determine if service is active
  - Execute workflow to determine if interface state is down
    - If down, restart interface, otherwise do nothing
5. Brocade Workflow Composer creates and updates Helpdesk ticket in JIRA with collected outputs

6. If service cannot be restarted, Brocade Workflow Composer:

- Includes Helpdesk ID and URL
- Posts message to Slack
- Launches incident to PagerDuty

This example is why a user of Brocade Workflow Composer technology claims that this capability turns “2 a.m. problems into 10 a.m. follow-ups.”

Table 2 shows additional examples of these points of integration and their benefits.

## Getting Started

Brocade Workflow Composer runs on a Linux-based server and executes single-domain or cross-domain workflows from Brocade or the community using popular open source technologies such as Python, Puppet, Ruby, and Mistral to enable event-driven automation with cross-domain technologies and platforms.

Brocade Workflow Composer is available as a free download from MyBrocade® ([www.my.brocade.com](http://www.my.brocade.com)). If you are not already a member, sign-up is free and

is required to access downloads. To download, follow these steps:

1. Go to [www.my.brocade.com](http://www.my.brocade.com).
2. Once logged in, select Software Downloads.
3. Enter “Workflow Composer” in the Search field and press Search.
4. Select the appropriate link to begin downloading.

## Learn More

For more information about integrated Brocade Workflow Composer, visit [www.brocade.com/en/possibilities/technology/network-automation.html](http://www.brocade.com/en/possibilities/technology/network-automation.html).

## About Brocade

Brocade networking solutions help organizations achieve their critical business initiatives as they transition to a world where applications and information reside anywhere. Today, Brocade is extending its proven data center expertise across the entire network with open, virtual, and efficient solutions built for consolidation, virtualization, and cloud computing. Learn more at [www.brocade.com](http://www.brocade.com).

**Table 2:** Brocade Workflow Composer cross-domain workflows and benefits.

Use Case	Point of Integration	Benefit
<b>Monitoring:</b> Managing Alerts through ChatOps	SolarWinds, PagerDuty	Eliminate the manual process of task creation and trouble ticketing, and enable auto-remediation.
<b>Cloud Computing:</b> Collaboration through ChatOps	OpenStack, Slack	Instead of each team member running the same command in one window, getting the same output, and then discussing the interpretation of the results in another window, simply do everything in one window.
<b>Automated Remediation:</b> Disk space cleanup	Nagios, Senu, Slack, BMC, Ansible, Puppet	Turn 2 a.m. calls into 10 a.m. follow-ups. Avoid early morning calls simply to log in remotely and clean up log files that filled up the whole disk.
<b>Cluster Resiliency:</b> Node failure auto-remediation	Atlas, Slack	If you are running critical infrastructure of any kind, you need auto-remediation to protect against failure.
<b>Fabric Reliability:</b> Link flap auto remediation	Splunk, SolarWinds	Remediating link flap to prevent application timeouts is crucial in mission-critical networks.
<b>Resource Management:</b> Cross-domain remediation	Nagios, Senu, New Relic, VMware, Puppet, Chef	Alerts arrive from multiple sources, and remediation is through multiple management systems. Wiring them together automates tedious error-prone tasks.

**Corporate Headquarters**

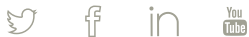
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