Improve Efficiency with Automated Remediation

A Broadcom Reference Outcome Blueprint

Improve business success through enhanced operational efficiency based on automation of issue remediation.

1. Introduction

Driving automation into business processes is essential for all organizations that seek to maximize operational efficiency and resilience. One of the key outputs of the thoughtful application of automation is providing the best possible user experience in the delivery of products or services to customers; in other words, business success.

Remediation of issues, such as slow responsiveness, must be achieved reliably, quickly and efficiently. Pivoting from manual to automated resolution is a crucial step to achieving these objectives for all business stakeholders.

Integrating Broadcom's AIOps with an Automation Engine (such as Automic Automation) delivers a robust technical framework to observe, analyze and act! Broadcom AIOps enables highly scalable monitoring of key performance indicators (KPIs) across the diverse silos of disparate technical systems within your business. Additionally, AIOps includes analysis capabilities built upon the algorithmic and machine learning capabilities of automation.ai. The integration with Broadcom's Automic Automation system provides the mechanism to act, collectively achieving the means to efficiently, quickly and reliably address issues.

This blueprint serves as a guide for integrating AIOps with Automic Automation and applying the resultant capabilities in your organization to maximize business success.

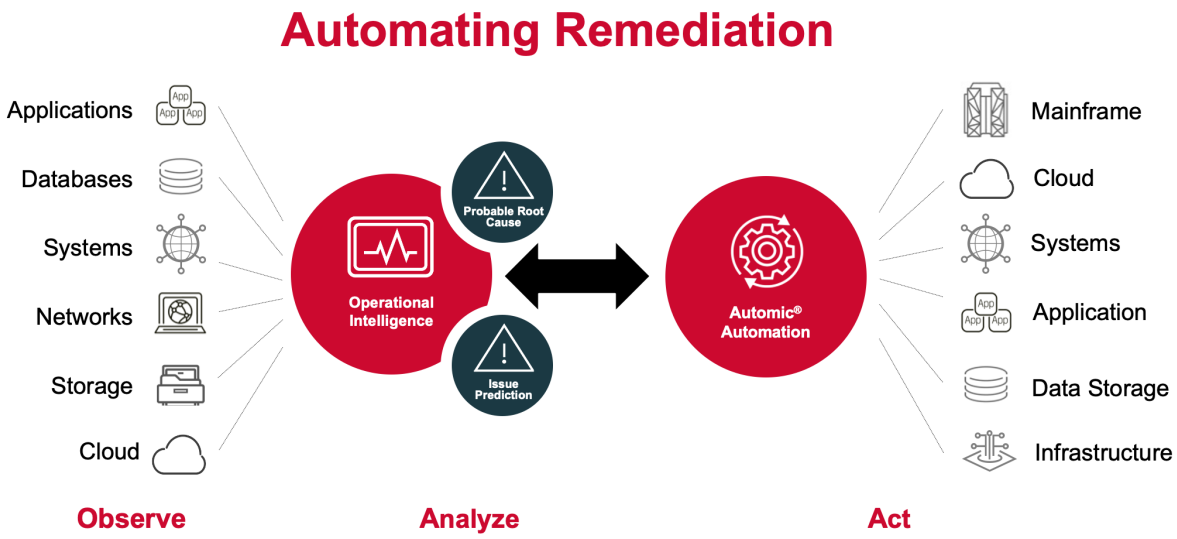

Figure 1 - Automating Remediation

2. Business and Technical Context

Situation

As issues arise within the complexity of modern IT infrastructure, it is difficult to accurately identify the root cause, much less rapidly apply a fix. More often than not, the first indication comes from consumers of a service rather than internal operations. Multiple high value human resources, from across the organization, must be redirected from their current task to investigate each issue, sit on triage calls and eventually determine a fix. This is extremely disruptive to business operations, resulting in extended resolution time frames, loss of productivity and innovation. Manual (one-off) remediation frequently leads to inconsistencies & mistakes, prolonging the disruption. Even after issues are resolved, the urgency to get back to one's primary job results in the resolution not being fully documented or automated for the future. This often manifests itself by doing the same process over and over again at great cost to the organization.

Impact

Outages and poor performing IT-systems degrade business services and processes that depend on them. In the best scenario, only customer confidence is eroded, and competitive advantage lost. Worse impacts include interruptions to revenue generation, critical infrastructure, and public safety.

Repeated manual remediation is error prone. It costs staff resources and distracts focus on planned priorities. Finally, it costs time, which multiplies the loss of customer confidence, revenue interruption, and other business impacts.

Resolution and Outcome

AIOps and Automic Automation solutions together observe, analyze, and act on data and systems across the organization. They give your business the means to remediate issues automatically, often before customers experience any impact.

By adding Automation infrastructure to the Root Cause Identification and Predictive Insights outcomes, AIOps and Automic Automation empower your ability to:

Observe: AIOps is a robust monitoring solution, capable of integrating data across multiple domains - application, infrastructure, network and cloud. AIOps provides a complete view of your technology ecosystem and can correlate technology to key business services.

Analyze: Leverage advanced algorithmic and machine learning techniques in AIOps to surface key operational insights and see patterns through the noise. Correlating these insights to key business services to ensure remediations are targeted on your top priorities.

Act: Tightly integrated with AIOps, Automic Automation actions perform simple or complex tasks defined through an accessible drag-and-drop interface. Actions triggered by AIOps events resolve, or assist in resolving, issues in an automated manner. Critical value is added by monitoring these actions to ensure maximum reliability and auditing them for cybersecurity and compliance requirements.

Automated Remediation streamlines inefficient, labor intensive and slow processes. It minimizes adverse impacts on business services and processes and frees up staff to focus on strategic priorities, such as innovation, instead of troubleshooting and remediation.

3. Architecture

Robust automated remediation leverages both AIOps and Automic Automation. AIOps provides the “observe” and “analyze” capabilities while Automic Automation provides the “act” capability. Built-in integration between the solutions may be deployed in either Cloud, on-premise, or hybrid deployments.

The key components and relationships of these solutions are illustrated below:

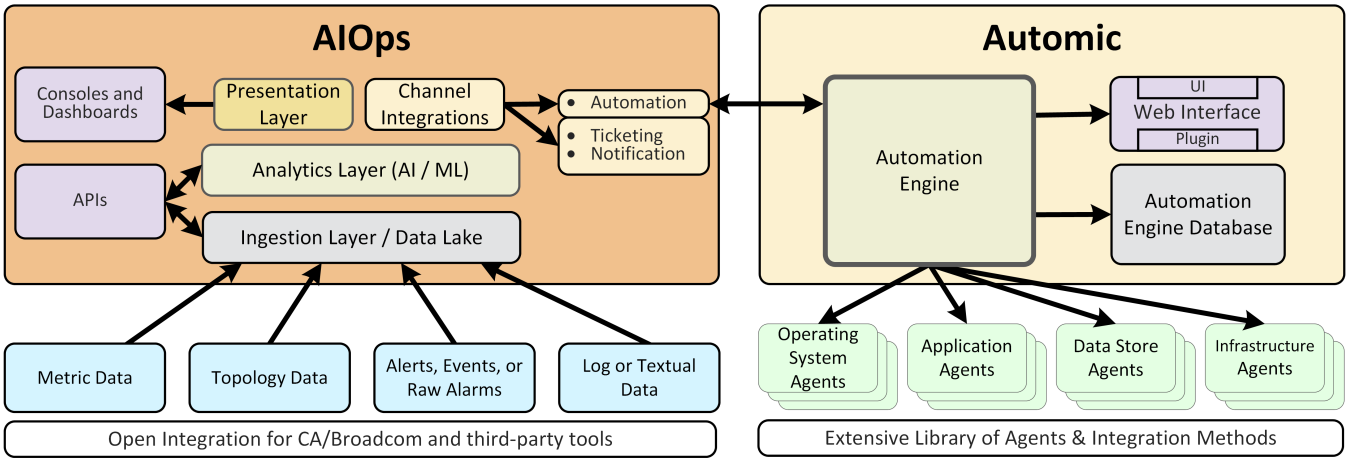

Figure 2 – Automated Remediation Solution Architecture

Components

AIOps

AIOps ingests metric, topology, alert and event data from available sources and stores this information in its data lake. The Analytics Layer applies machine learning, regression models and proven analytic techniques to determine alarm situations. Notably, AIOps is able to associate data without explicit definition of the association. With these derived associations, AIOps crosses technical boundaries and provides insights that you may not otherwise see. Alarms are displayed in the AIOps console or a custom dashboard. Alarms can trigger external actions through the Channel Integrations capability. Channels include a link to an automation engine (in our case Automic Automation), ticketing and/or email/message service for notifications. Probable Root Cause Identification and Predictive Insights are two powerful analysis features provided by AIOps to efficiently pick up and resolve issues efficiently. *Learn more about each of these by clicking on the links*.

Automic Automation

Automic Automation is a highly scalable and extensible platform for defining and performing actions on technology components throughout an organization. You will not need to replace or refactor existing capabilities – Automic Automation will integrate with, and build upon, what you already have in place. Automic Automation does not replace existing tools like Chef, Puppet or Ansible; it enhances them with greater coverage and central management.

Automic Automation is built upon an object oriented and natively clustered architecture with the capacity to scale to millions of transactions a day across tens of thousands of endpoints. Separate, worker and communication processes allow the solution to expand capacity, availability and fault tolerance with the addition of more processes and servers. A central database provides action persistence, logging, and audit trails for reliability and transparency.

Component Integration

AIOps and Automic Automation are technology-agnostic and can interact with any IT ecosystem – from mainframe to microservices, cloud, network devices, applications, APIs and distributed services. AIOps events trigger Automation Actions, which are sent to Automic Automation through the AIOps Channel Integrations.

Linkage between AIOps and Automic Automation allows events and alarms in AIOps to be associated with automated actions in Automic Automation, as pictured to the right. Recommendations are presented with associated confidence level. This is a key feature of Intelligent Remediation that you'll be able to utilize as your automation library grows.

Further details on the architecture are in the product documentation:

- AIOps Architecture Overview
- Automic Automation Architecture
- Automic Automation Multi-Server Operation

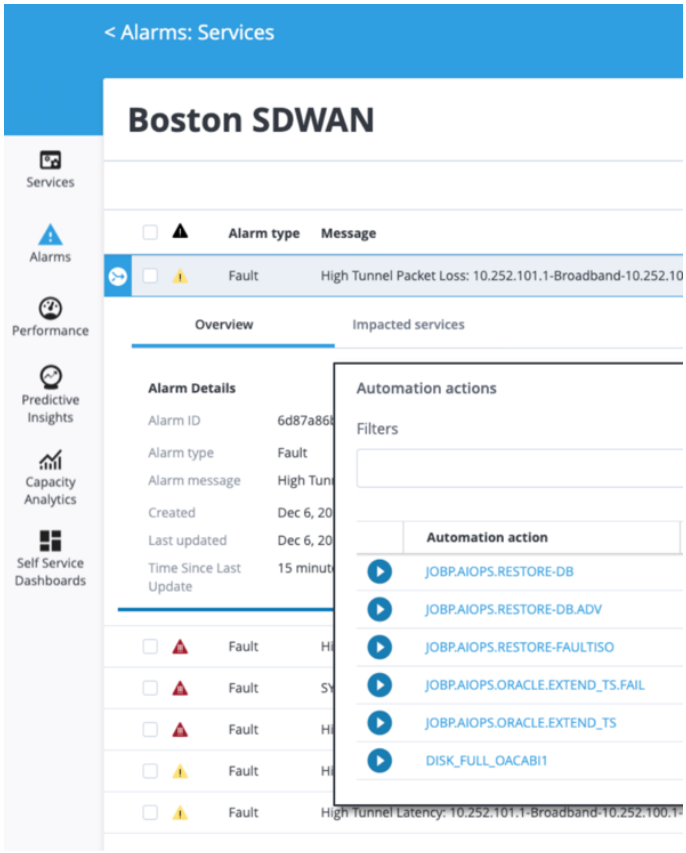

Figure 3 - AIOps Automation Actions

Automations

Processes in Automic Automation are combinations of individual steps linked to each other. Objects represent individual steps. Developers and object designers create, edit and work with them in the Process Assembly perspective. Objects that are executing, or have been executed, are called Tasks, which are visible in the Process Monitoring perspective. For more information on Objects, see Object Types.

Workflow objects orchestrate the automatic processing. Processes (objects) are assembled in a Workflow and connected. This way, you determine the sequence with which they will be executed. Workflows support conditional sequencing based on data from earlier steps. For more information about Workflows, see Workflows (JOBP).

An example Workflow could do the following: stop an application, update configuration, restart, and run reports which execute in a certain sequence. In the Process Designer, insert the Jobs in the Workflow and link them with a line. A workflow may be embedded in another Workflow.

The Automic Automation Marketplace contains hundreds of downloadable action packs, solutions and templates such as Interacting with:

- Log Files
- Docker
- Apache
- Kubernetes
- Jenkins

Almost any sort of customized automation can be built using a Marketplace item as a starting point.

The Marketplace can also be used to share your creations with the world.

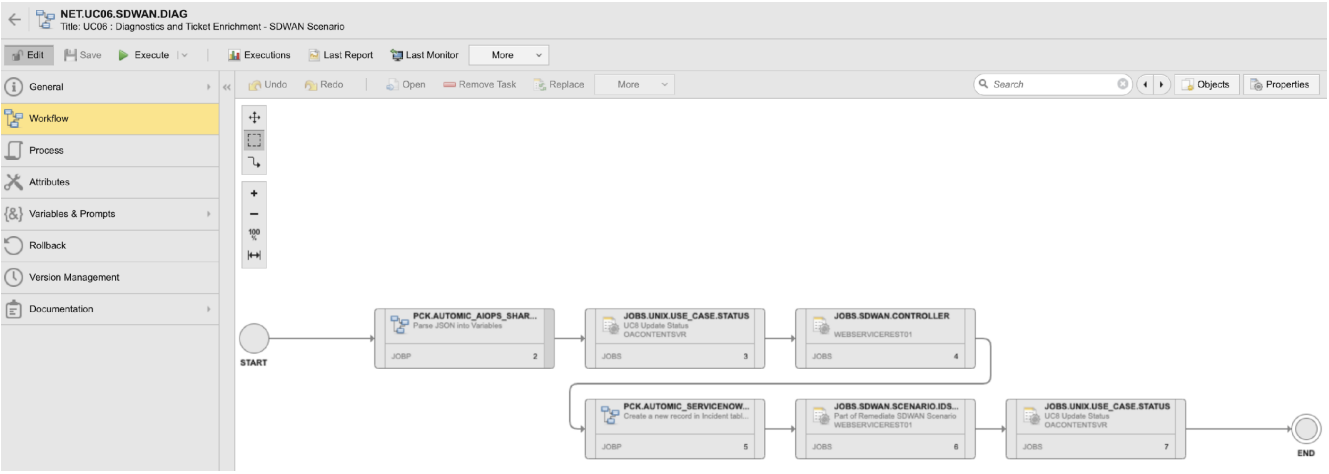

Figure 5 - Workflow Example, Process Assembly Perspective

4. Considerations

Process & Iterate

With the flexibility and capabilities enabled by AIOps and Automic Automation some customers may wonder where to begin. Fundamentally, you would pick a useful target (for example your top 5 incidents) and start the process of focusing observation and analysis

on this then building up a set of automations that increase efficiency. AIOps and Automic Automation solutions are designed to support changes, no need to get it perfect in the first pass. From this point iterate in short cycles to keep momentum & ensure each step is delivering value.

Establishing an automation team can be highly effective & is recommended. This team may be virtual or dedicated but it's domain of responsibility should cross the entire enterprise's technical infrastructure and have connection to business strategy. The team should approach the journey of automation in the following ways:

- Focus on service management
- Leverage tooling across teams
- Iterative 'small' changes, rapidly
- Remove manual tasks
- Prioritize based on risk
- Minimize MTTR (Mean-Time-To-Recovery)

Build Up an Automation Library

Automations are both common & highly specific to an enterprise. Tasks such as restarting a server, adjusting memory allocations or reading a log file are standard. There are many out of the box capabilities and marketplace solutions for performing these tasks. However, they all must be customized with enterprise specific information to be applicable to your implementations. Leverage the object-oriented nature of the Automic Automation to construct, then build upon a library of enterprise specific building blocks. Start simple then grow in sophistication to create ever more capable automations. Use a modular building block approach to maximize reusability and adaptability.

Workflows can be highly enterprise specific. Built up from shared building blocks workflows can embed enterprise specific processes and policies. For example, a workflow can embed policies such as applying a change in a pre-production environment, testing, then promoting and testing in production – failures at any point could trigger a rollback and alert for expert attention.

Define Business Services

Automation efforts may be enhanced significantly by defining & associating service definitions. This allows alarms and automations to be associated with valuable business services rather than just technical components. This is accomplished interactively via the main AIOps console and does not require extensive or permanent configuration. Enterprises should feel comfortable expanding & restructuring service definitions in a continual manner to best reflect key business outcomes.

5. Next Steps

Increasing automation in your business and technical processes will bring great value to your organization. The blueprint for automation outlined in this paper can be applied to your business. The following resources and pointers will help you get started today:

- Broadcom.com – Visit us at Broadcom.com to learn more about our infrastructure software and solutions
- Digital Hub – Visit the Digital Hub to try out and learn more about our products
- Education Resources – for Automation & AIOps (DX Operational Intelligence) learning paths
- Education YouTube Channel – To see & learn how our products work
- Software Documentation – Provides a central point for in depth product
- Automation Marketplace – To see all of the Action packs & Connectors immediately available

- Improve Business Agility with Intelligent Automation – Take automation to the next level this reference outcome blueprint

- Contact your Customer Account Manager or Sales – For assistance and / or questions