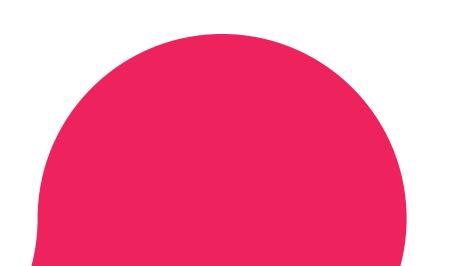


Getting Acquainted with Moogsoft AIOps Platform

EBOOK



Getting Acquainted with Moogsoft AlOps

Artificial Intelligence for IT Operations (AIOps) is a scalable way to streamline the complexities of enterprise IT and help operators to quickly identify and remediate issues affecting performance of vital services.

Moogsoft AIOps® is a purpose-built software platform optimized to deliver continuous service assurance through its role as a real-time operational System of Engagement for your entire organization. It adds the critical layer of intelligence and integration between performance monitoring and IT Service Management (ITSM) systems to reduce Operational actions by up to 99% of events. It also provides a collaborative workspace to resolve situations and capture the remediation knowledge for probable root cause of similar situations. Bottom line: Moogsoft AIOps provides rapid mean time to detect (MTTD) and mean time to resolve (MTTR) incidents.

This ebook will help you understand how Moogsoft AIOps applies AI, machine learning and neural network techniques to monitoring data from applications, cloud services, networks and infrastructure. It will introduce the Moogsoft AIOps user interface and describe workflows to proactively get early detection of changing conditions so IT Operations and DevOps teams can detect and resolve situations before they impact customers, partners or employees.

You will learn how Moogsoft AIOps can effectively help you manage the agility that the company needs for improved responsiveness at scale, all from a single view.

Glossary

General AIOps terms

AIOps: Artificial Intelligence for IT Operations (AIOps) is a modern approach to managing events with real-time artificial intelligence and machine learning techniques using neural networks to detect and resolve anomalies anywhere in an enterprise IT environment.

Algorithm: A process and/or rule set used by a computer to solve problems for a specific use case – our focus here being IT operations; see Signaliser.

Artificial Intelligence (AI): Using computer systems to automate and accelerate tasks normally requiring human intelligence.

Machine Learning (ML): A type of AI that can automatically learn and improve in predicting outcomes from computational experience and other data inputs.

Neural Network: Computer system modeled on the human brain and nervous system to learn from examples without requiring programming of task-specific rules.

Moogsoft AlOps-specific terms

Alert: One or more similar events, typically de-duplicated or an instance of new data detected by a monitor and passed into Moogsoft AIOps.

Event: Message from a monitored system indicating a change in state, including log files and status indicators from third-party monitoring tools.

Signaliser: Algorithms that group alerts based on factors such as time, language, topology and similarity.

Situation: Group of alerts clustered by factors such as time, language, topology and similarity.

Situation Room: A virtual war room for Operators from multiple teams to collaborate while finding resolution to a Situation (incident).

Teams: Logical grouping of responsible Operators by service or applications in one view, such as assets belonging to a particular line of business.

Task Board: Kanban-style board showing Situations and current status for a particular team. * See Moogsoft AIOps Operator Guide for more details.

How AlOps is Transforming IT Operations

In a digital economy that tolerates no downtime, today's IT Operations teams face infrastructure environments that are larger and more complex than ever. These environments will continue to grow in complexity as businesses strive to digitally transform nearly every aspect of their organizations and how they engage with customers. To succeed, Ops teams must manage increasingly diverse architectures with more applications and elaborate infrastructure.

Additionally, the rise of DevOps with its continuous integration and delivery mandate has replaced the old ways of building and managing software. While these environments continuously evolve, they still must run continuously as well. These changes to the IT infrastructure, the speed of business transformation, and the way applications are built and managed have all placed tremendous stress on modern IT Operations teams — and their traditional systems management tools are proving woefully insufficient.

The Moogsoft AIOps platform streamlines IT Operations and provides Ops teams with the rapid incident resolution capabilities they need to avoid outages, meet SLAs, and help accelerate the digital transformation of their business.

As enabling technology, AIOps applies artificial intelligence techniques to IT Operations data — instead of rules-based approaches. Through AIOps, Ops teams monitor all system data to analyze systems and events so that they can see which events matter and require attention. This way the most pressing system events are handled first: those issues that are most likely to cause downtime, affect customer experience, or cause SLAs to be missed.

Moogsoft AIOps Platform Delivers Unique Value

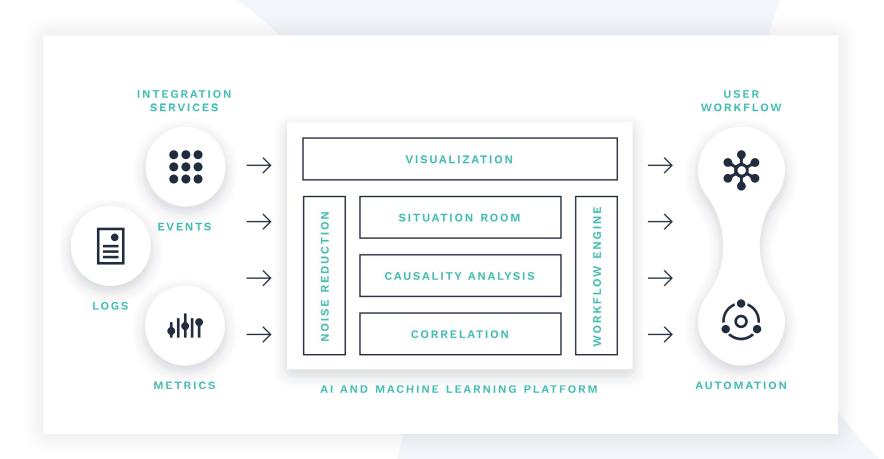
Moogsoft AIOps brings IT Ops and DevOps teams a deeper understanding and control of critical IT architecture, services and business applications. Operators get a rich set of tools for proactive notification and recommended probable root cause to avoid business service interruptions.

Operational Benefits	Business Benefits	
More efficiency – Significantly fewer alerts help Operators focus on what matters most by reducing noise and providing actionable events.	Lower complexity and cost – Reduces alerts by up to 99% and cuts incident ticket volume by up to 60%.	
Full visibility – No more switching between siloed tools to get the big picture. With a "single pane of glass," teams manage everything from one integrated console.	Continuous assurance – Handles millions of events per day to automate analytics and provide accurate remediation insights that keep critical business services at peak levels.	
Be agile – AIOps transforms teams from reactive to proactive, enabling operators with what they need to fix issues before end-users complain or even notice a problem.	Service-quality goal achievement – Cuts mean time to detection (MTTD), mean time to acknowledge (MTTA), and mean time to resolution (MTTR) for enhanced customer experience and more productivity.	
Collaborate anywhere, anytime – Virtual war rooms unify communications; smart notifications alert the right people	Continuous software delivery – Automates workflows with out-of-the-box integrations and open APIs to incident management, runbook automation and continuous software-delivery systems for improved responsiveness and scale.	
Automatically get the answer – AIOps identifies probable root causes of issues to guide teams quickly in fixing issues faster.		

Moogsoft's Agile Platform for AIOps

Not all AIOps platforms are created equal. Many so-called AIOps tools can't consume streaming data to derive insights in real-time from disparate sources across the organization. Instead they need to learn patterns from logs captured in big data stores. They neither enable continuous change, nor do they drive operational workflows, which captures the lessons learned in order to automate the operator feedback of causality (eg. probable root cause) for future incidents and up-skill other team members.

The Moogsoft AIOps platform analyzes events across all enterprise IT systems and provides resolution workflow so Ops teams can rapidly resolve issues that threaten SLAs and customer experience.



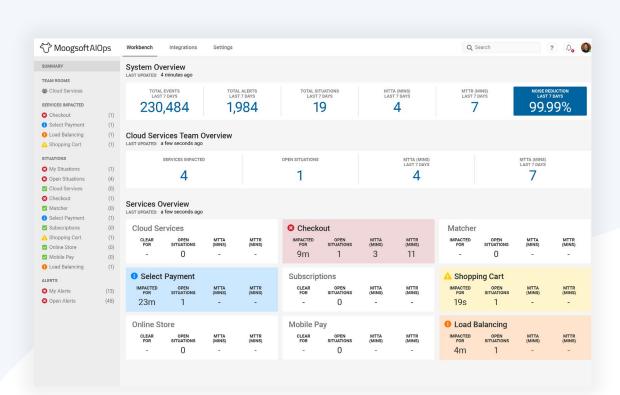
How the Moogsoft AIOps Platform Works

Moogsoft AIOps automatically consumes real-time data from diverse sources throughout the enterprise, correlates the events within that data that truly matter, and immediately shares corrective insights with Operations team members. This accelerates mean time to resolution (MTTR), improves service assurance, and simplifies the management of cloud infrastructure.

Moogsoft's next-generation AIOps platform analyzes millions of events daily across the most complex IT environments and enables IT Ops teams to work more intelligently and more quickly. Unlike other AI systems, such as those from ITSM vendors that must be fed enterprise operational data before they can even begin their analysis, Moogsoft AIOps integrates tightly with existing monitoring and IT management systems and accepts data from disparate sources across the enterprise.

Powered by more than 50 patents, the Moogsoft AIOps platform takes this data through real-time AI and ML to deliver an agile and proactive event-resolution workflow for IT incident management and full-stack visibility. Moogsoft's platform achieves this through its ability to triage vast amounts of data and correlate complex events to then elevate only those conditions that matter — those that could cause an outage or affect SLAs.

In addition to the continuous assurance function of the platform, Moogsoft AIOps learns from its users' behavior over time and enhances collaborative environments. When conditions start to arise that caused trouble previously, Moogsoft AIOps will recognize these circumstances and share information from previous incidents. It will also automatically implement relevant and effective runbook automation workflows so that teams can efficiently reduce mean time to detection (MTTD) and mean time to resolution (MTTR).

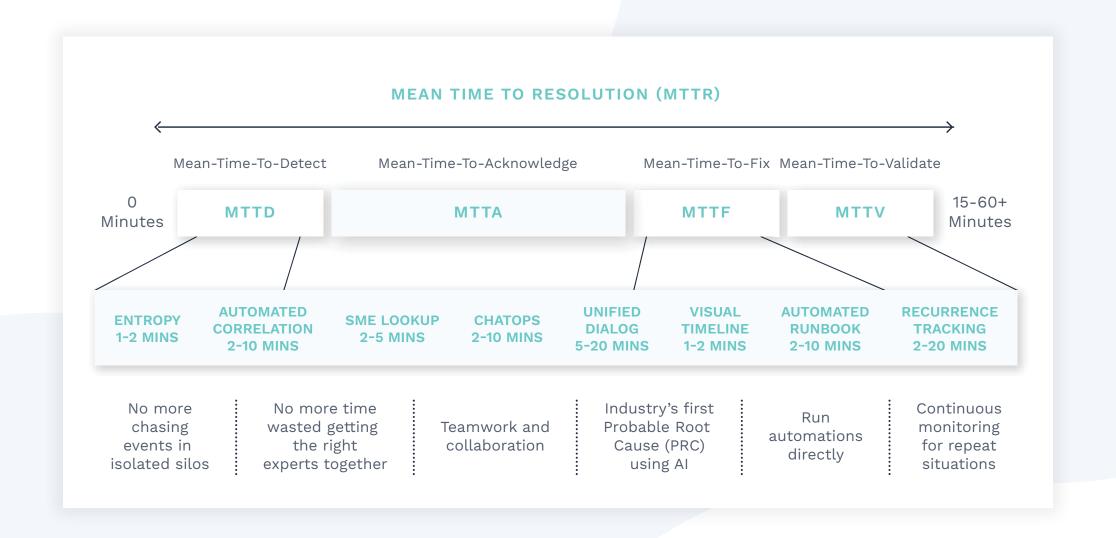


Rapid Mean Time to Resolution (MTTR)

The bottom-line benefit of using Moogsoft AIOps is rapid MTTR of issues. To understand why, consider how much time is required for incident management using a classic rules-based approach versus AIOps.

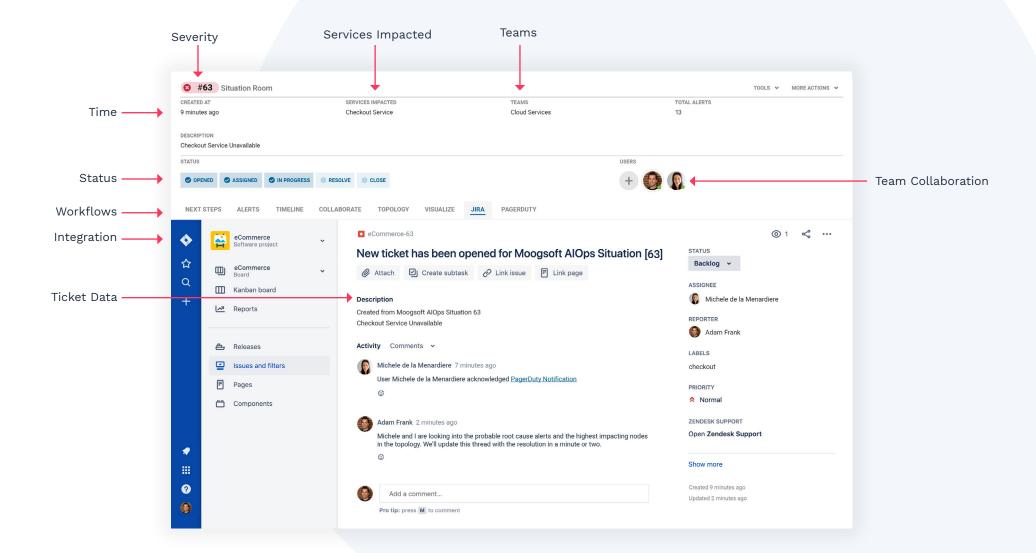
Incident Management Process	Using Rules-based Tools	Using AlOps
Analyze millions of events	Hours	Seconds
Correlate millions of events	Hours	Seconds
Detect anomalies	Hours	Seconds
Detect repeat anomalies	Hours	Seconds
Create / update tickets	Minutes	Seconds
Troubleshoot tens of incidents	Minutes	Assist
Determine probable root cause(s)	Minutes	Assist
Remediate issue	Minutes	Seconds
Learn from failure	Minutes	Seconds

Rapid Mean Time to Resolution (MTTR)



Working with Moogsoft AlOps

The Moogsoft AIOps browser interface is a "single pane of glass" with all the tools and information operators need to do their job, and available with a few clicks of a mouse.

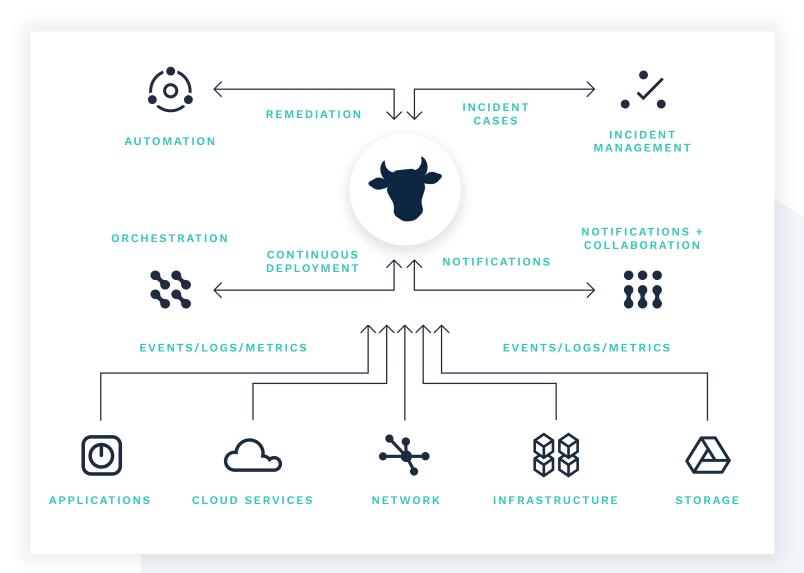


Central "System of Engagement" for IT Operations

Moogsoft AIOps is a single system-of-engagement view presenting complete event correlation of your application-, cloud- and infrastructure-management monitoring systems.

The solution automates workflows with more than 50 out-of-the-box API integrations to external systems such as: incident management, runbook automation and continuous software delivery.

With the integration capabilities of Moogsoft AIOps, operators can finally have customized and dynamic visibility of the current state of enterprise IT. AIOps lets you manage business services across applications, cloud services, software-defined networks and infrastructure that a company needs for a responsive customer experience at scale.



Integrated Workflow for Fast, Efficient Response

Moogsoft AIOps enables integrated workflow with a broad portfolio of out-of-the-box integrations and Moogsoft AIOps Workflow Engine. Powered by AI, the runbook automation of workflow increases efficiencies and lowers IT operating costs. Integrated tools such as automated ticketing, knowledge recycle and probable root cause put operators and DevOps teams in the driver's seat for meeting SLAs.

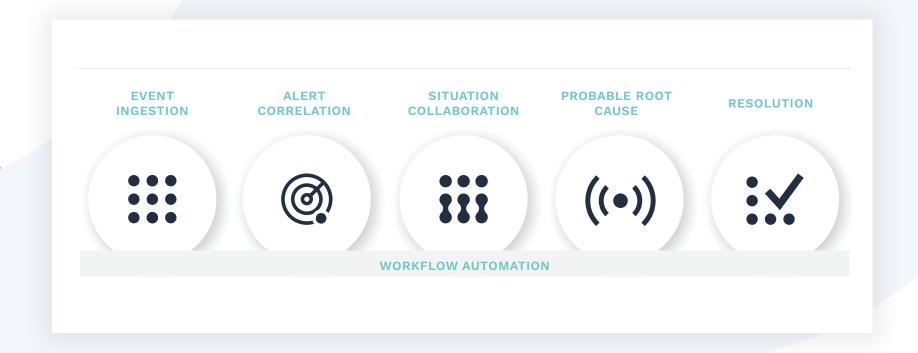
Workflow especially benefits from the ability of Moogsoft AIOps to perform millions of event correlations across multiple service domains for complete real-time situational awareness. Event correlation dramatically reduces the alert fatigue noise by as much as 99%. With events clustered together and automatic ticketing funneled to incident management systems, Moogsoft AIOps shortens the mean time to acknowledge (MTTA) and MTTR metrics for critical business services and applications.

AIOps Integrates Workflow for all Layers of IT Support:

- IT Operators
- DevOps
- IT Service Management
- Application Management & Monitoring
- Compute & Network
- Cloud Services
- Performance Monitoring

Integrated Workflow for Fast, Efficient Response

Using AIOps to control workflow lifecycle is a modern requirement because legacy rules-based enterprise management systems cannot handle dynamically changing conditions. Rules-based systems cannot process the implications of data from unknown or never-seen events, or streaming monitoring data. The rigid logic and limited scope of rules are unable to do anything useful for global multicloud environments.



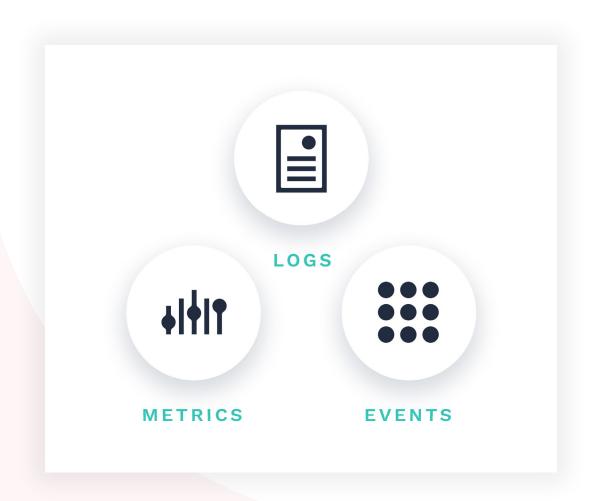
Complete Visibility with Ingestion and Enrichment of Monitoring Data

Continuous Monitoring Across Technology Silos

Moogsoft ingests and normalizes the source data making up millions of log events, metrics, traces and alerts produced by existing monitoring tools – while applying AI and ML in real-time.

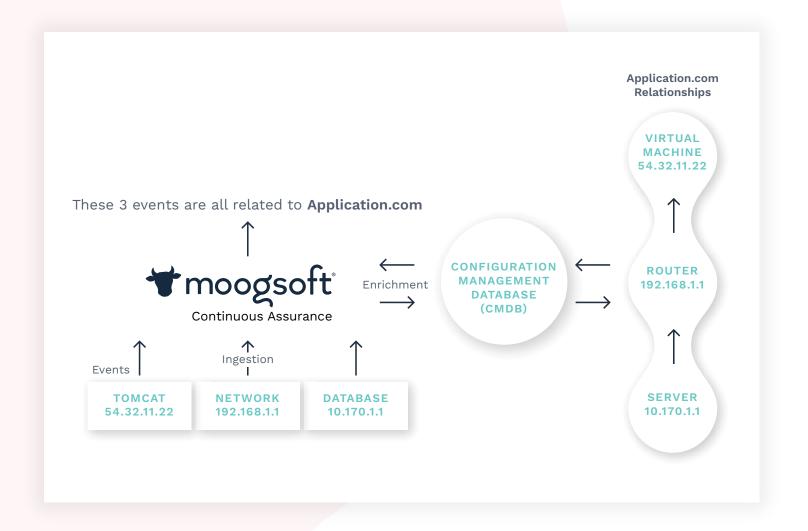
A major advantage of AIOps is the ability to ingest different types of data across siloed technology stacks. Ingestion enables the algorithms to filter data for deduplication, and organize them to reduce event noise and minimize incident volumes.

IT Operations and DevOps teams gain complete visibility across the production environment with the aggregation of event data, logfiles, streaming data, SNMP, email and message bus across cloud and on-premises services for applications, services and infrastructure.



Context with Data Enrichment

A unique difference with Moogsoft AIOps is the added ability to integrate critical information systems such as CMDBs, Asset Management databases or discovery systems. AIOps adds key information such as location, department, business criticality, service relationships, owner and class. The data enrichment adds contextual information for IT Ops and DevOps teams to gain situational awareness to quickly understand interdependencies and relationships for rapid remediation.



Cross-domain Data Enrichment for Applications and Infrastructure

Enrichment data optimizes processes across multiple domains:

- Operational: Functionally modifies behavior within Moogsoft AIOps to drive processes such as clustering. Ideally performed on alert creation.
- Diagnostic: Assists operators to investigate incidents and can be performed at either alert or Situation level. Examples include updates to custom information and Situation discussion threads.
- Informational: Assists IT Ops or DevOps teams with informational updates to the Situation description, services and processes for ease of use and situational awareness.

Separating Signal from Noise with Entropy

Knowing where to focus your resources in a time-critical environment is key to achieving a consistent customer experience. Every event that is ingested into

Moogsoft AIOps is analyzed and is assigned a numerical value that indicates how important that event is within the context of the rest of the system. This value is an attribute of entropy. The higher the entropy value, the more important it is, such as a network outage or application outage. The lower the value the less important it is, such as a CPU fluctuation or router sync issue. High entropy events are the interesting ones; low entropy events are the events that can be safely ignored and are considered noise. As a result of entropy, large numbers of the ingested events can be ignored because they don't contain useful information, without losing the events that need closer attention.

Benefits of Ingestion and Enrichment

- Gain 360-degree visibility across technology stacks from a System of Engagement.
- Reduce event noise to IT Operations and DevOps teams by up to 99%.
- Enrich of data values with context and situational awareness.

Controlling the Chaos with AI-Driven Alert Correlation

Alert Correlation Separates Signal from Noise

Moogsoft AIOps correlation is about making connections between data from multiple IT systems and different parts of the enterprise. Alert correlation allows operators to see patterns across the systems that make up technology stacks to ensure applications and microservices are at peak performance. Moogsoft AIOps correlation algorithms analyze alerts to identify clusters of similarity across service-affecting incidents, problems or changes. The result of this correlation and aggregation is a massive reduction in the number of alerts bombarding IT Operations, NOC centers and application delivery.

Now teams have a powerful tool to match alert information based on time, class or type, geographic location, topology proximity and server priority. By correlating millions of alerts with any mix of these criteria, Moogsoft AIOps reduces the number of tickets that IT Ops and DevOps teams receive by 40%, while teaching the algorithms to deliver highly accurate, recommended probable root cause and resolving steps for recurring incidents. As the teams develop trust in the accuracy of the recommendations, auto-ticketing further streamlines the process for faster fixes.

Benefits of Alert Correlation:

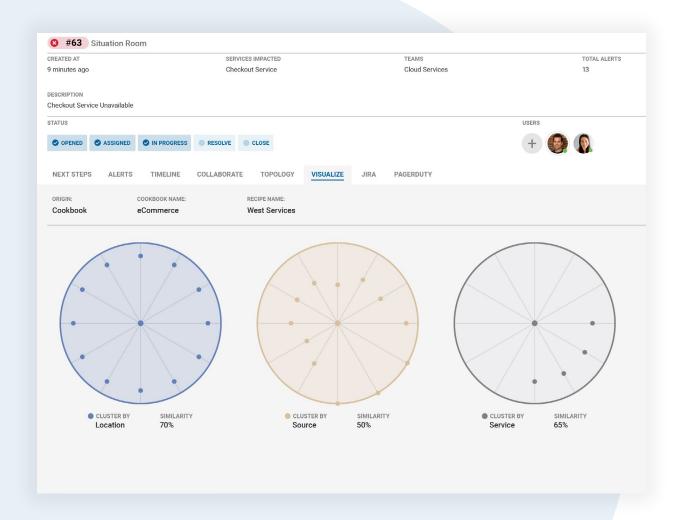
- Shared context for faster incident, problem
- 99% fewer events hitting IT Ops and DevOps teams
- 60% faster mean time to detect (MTTD)
- 40% faster mean time to resolve (MTTR)

Fine-tuning Alert Correlation

Situation Visualization provides a powerful visual tool for understanding the similarity of the alerts within a Situation. Using the tool's rich view into the AIOps algorithms, teams can fine-tune algorithm recipes to focus on the data sets that deliver the most insight for resolving Situations.

Moogsoft Alert Correlation

There is no one-size-fits-all algorithm. Moogsoft provides a number of ML algorithms that are used to cluster alerts into Situations. The clusters are made more precise through recipes that contain identifying characteristics such as: Event arrival times; network topological/proximity; and contextual similarity. These algorithms cluster alerts with enrichment information from CMDBs, or other systems of record. This information adds to the contextual relevance, presents Operation teams with situational awareness, and recommends probable root cause identification.



Cookbook Algorithm

Cookbook is a deterministic clustering algorithm that creates Situations defined by the relationships between alerts. Cookbook clusters alerts into Situations based on: time, topological proximity, class or type, description, server priority, geographical location or environment classification. A Cookbook can run multiple recipes concurrently to correlate the incoming event stream and dramatically reduce the total number of alerts sent to IT Ops and DevOps teams. For example, a Cookbook recipe could match the same service and application, or the same host and location, or indicate the critical nodes within your network and their tendency to produce important events using Vertex Entropy.

Vertex Entropy

Vertex Entropy ingests topology data from sources such as Application Performance Monitoring (APM), Network Performance Monitoring (NPM) systems, or CMDBs. It uses advanced graph theory-based AI to quickly and efficiently identify the critical nodes within your network topology and their topological importance. Working hand-in-hand with

Vertex Entropy, Situation Topology Visualization displays the application and infrastructure topology map with probable root cause, highlighting the root cause node(s) of any customer-impacting problem.

Tempus Algorithm

Tempus is a time-based algorithm that clusters alerts based on the similarity of event arrival patterns. For example, it clusters alerts in real time for availability-related failure scenarios, in which different parts of the technology stack are sending failure events and are likely to be coincident in time. This can be visualized in a timeline to pinpoint the original cause from the cascading downstream alerts.

Agile Situation Rooms Quickly Resolve Service Issues

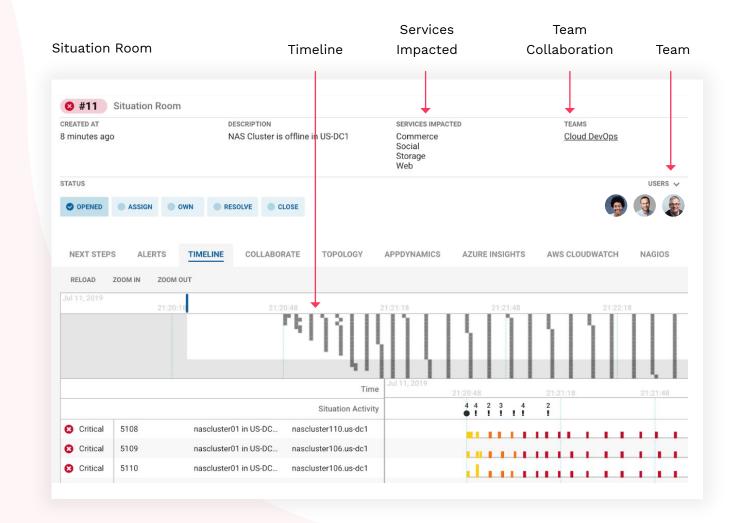
It's Where the Work Gets Done

Team collaboration is the fastest way to resolve complex multi-system situations. When a high severity ticket comes in, and subject matter experts are needed from different teams, the Situation Room is the place to swarm to and meet to fix the problem.

The Situation Room is an integrated just-in-time social collaboration workspace where subject matter experts and stakeholders meet dynamically to quickly resolve incidents.

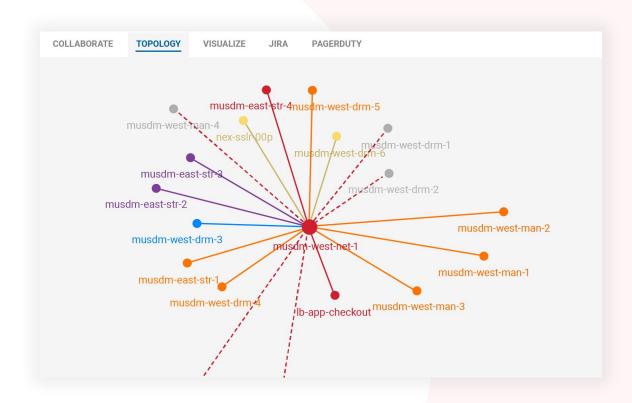
Manage Situations from One View

Topology. Topological data shows a visual representation of connections between resources impacted by a Situation. This tab is revealed when a Situation affects more than one node and Moogsoft AIOps has topological data for those nodes. Zoom in and out or click and drag the nodes to rearrange the view. Red signifies a "critical" Situation requiring immediate investigation; these nodes are candidates for probable root cause.



Faster Mean Time to Resolution (MTTR)

Timeline. No more chasing alerts in silos. Timeline offers a powerful graphical view showing the progression of a Situation. Operators see a breakdown of the Situation's associated alerts in the order they occurred alongside key activity markers. This helps identify probable root cause by showing how a Situation developed and indicates the hotspots where there are higher volumes of more severe alerts.



Benefits: Collaboration, Agility, Transformation

- Collaborative workspace eliminates the frequent "all-hands-on-deck" clumsy war-room meetings and conference calls.
- Agility comes from workflow integrations
 with external IT systems such as incident
 management or runbook automation for workflow
 optimization and efficiency.
- Workflows are transformed for every operator
 who is responsible for elements of a Situation.
 They immediately have all the information they
 need to do their job available with a few clicks of
 a mouse.

Probable Root Cause Guides Resolution of Issues

How it Works - Causality

Moogsoft Probable Root Cause identifies the most likely alerts to have caused a Situation. Through supervised and unsupervised ML, Probable Root Cause quickly analyzes the patterns, previous Situations and timeline, proximity and linguistics of alerts to present the most likely causes. The ability to provide focus for IT Ops, Engineering, Application and Cloud Services teams to triage simultaneous alerts saves time and resources across the organization.

Probable Root Cause is an ML process in Moogsoft AIOps that identifies which alerts are responsible for causing a Situation. Probable root cause looks for patterns in user-supplied feedback and matches it with the live data to provide early indicators of pending service Situations. Performance is superior to legacy "root cause analysis" rules-based techniques that have limited scope and capabilities.

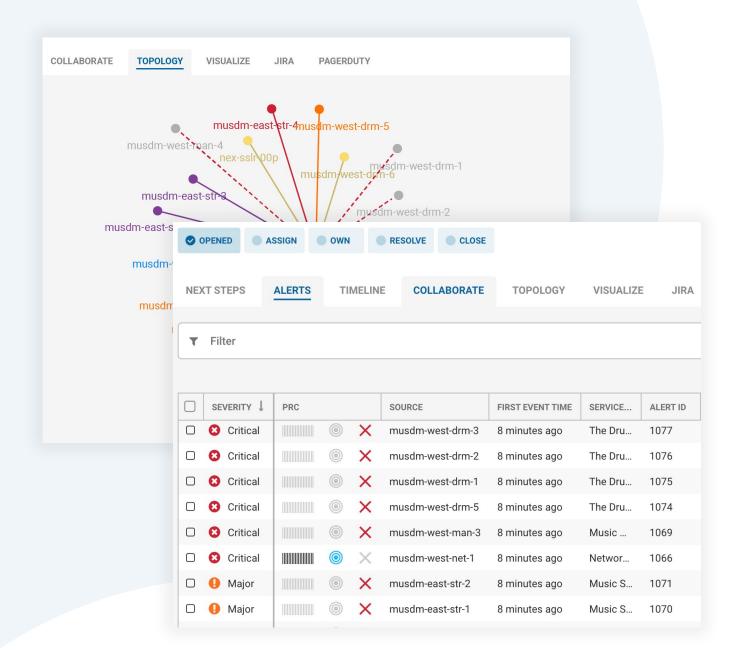
Benefits of Probable Root Cause

- Immediately determine where to begin troubleshooting and diagnosis
- Resolve Situations quickly by examining the top three Probable Root Cause alerts that appear under Next Steps in the Situation Room
- Focus time and resources on fixing the most likely root cause alerts for a more efficient operating model

Probable Root Cause Automation Delivers Faster Mean Time to Fix (MTTF)

Moogsoft Probable Root Cause uses supervised ML techniques in a neural network to look at the workflow of operators and learn from the feedback they provide to the system. Feedback is provided by clicking an icon in the user interface (see screenshot). The ML approach of "classification" allows Moogsoft AIOps to categorize an object by its metadata or attributes. The neural network uses alert attributes in combination with operator feedback to analyze real-time data sets and predict which alerts are the most causal.

With probable root cause, DevOps and IT Ops teams now have automated workflows to enable faster mean time to fix of complex incidents. Now the teams can benefit from learned patterns across static and dynamic conditions and from a variety of datasets. Typical use cases include: public cloud services, business-critical applications and multiple domain enterprise infrastructure.

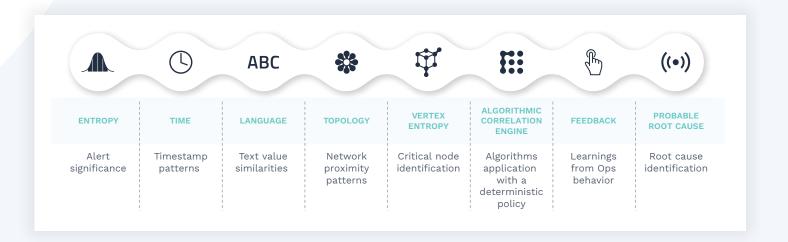


Moogsoft Algorithms Help Meet SLAs

Moogsoft AIOps uniquely integrates a portfolio of AI algorithms for optimizing business value through superior services delivery. The algorithms infuse the platform with an ability to learn from your data, including Situations based on known patterns — and unknown conditions never seen before.

Moogsoft AIOps algorithms include both supervised and unsupervised AI techniques such as ML and Deep Learning to automatically learn from and leverage new information in hybrid and multi-cloud environments. With over 50 patents in artificial intelligence, Moogsoft's portfolio of AI algorithms is integrated with a closed-loop workflow to align service management and monitoring for a scalable solution addressing today's dynamic IT world.

Over time, Moogsoft AIOps becomes even more valuable as it learns from its previously resolved Situations to further refine responses and reduce the MTTD and MTTA metrics. When similar trouble-borne conditions start to arise, Moogsoft AIOps will recognize these circumstances and bring information from previous incidents to the operators' attention.



Summary

With Moogsoft AIOps, as digital transformation efforts hit full swing, IT Operations teams can face the tremendous complexities of modern IT environments with confidence. The Moogsoft AIOps platform provides early event detection, reduces the number of alerts down to those that actually need attention, and shortens the mean time to resolution. In these ways, the Moogsoft AIOps platform helps to ensure service level agreements are met and enables Ops teams to provide continuous assurance for their digital transformations.

To learn more about how to move your organization to AIOps, as more than 120 enterprises have already, visit http://www.moogsoft.com/product/ today.

Resource links

Moogsoft AlOps-specific

Case Studies: http://moogsoft.com/customers/

Blogs: http://moogsoft.com/blog/

Moogsoft University: http://university.moogsoft.com/
Take a test drive: http://moogsoft.com/request-trial

Other resources on AlOps

AIOps Exchange: http://aiops-exchange.org/

* About Moogsoft

Moogsoft is a pioneer and leading provider of AIOps solutions that help IT teams work faster and smarter. With patented AI analyzing billions of events daily across the world's most complex IT environments, the Moogsoft AIOps platform helps the world's top enterprises avoid outages, automate service assurance, and accelerate digital transformation initiatives. Founded in 2011, Moogsoft has more than 120 customers worldwide including SAP SuccessFactors, American Airlines, Fannie Mae, Yahoo!, and HCL Technologies. It has established strategic partnerships with leading managed service providers and outsourcing organizations including AWS, Cisco, HCL Technologies, TCS and Wipro. Moogsoft® and the Moogsoft logo are proprietary trademarks of Moogsoft Inc. All other products or names may be trademarks of their respective companies.

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