

**EVOLVEN**

# **AI for Configuration Risk Governance**

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## AI For Configuration Risk Governance

Digital Transformation, one of the most important initiatives in most enterprises, depends on an ability to rapidly manage change. To extract value from the massive volumes of data generated by this effort, Infrastructure and Operations (I&O) leaders have turned to the utilization of Artificial Intelligence (AI). I&O leaders should include the governance of configuration change in their analysis to ensure stability, security, and compliance during this transformation

### **The Desire for Digital Transformation**

Digital transformation is the move from analog, manual, human-guided processes to digitized, modular, and distributable ones. The drivers for this revolution are the need for speed in addressing changing market conditions, the desire for greater insight into customer behavior, and the opportunity to deploy new business models rapidly. All this stems from an intention to rapidly grow the business. According to a Gartner survey in October 2022, [“89% of Board Directors Say Digital is Embedded in All Business Growth Strategies”](#).

The requirement for speed and agility puts a great deal of stress on your enterprise’s Infrastructure and Operations (I&O), DevOps initiatives, and Development teams. In response, this has led to the rapid adoption of cloud, hybrid, and multi-cloud deployments, the dependence on innovative cloud-native architectures, and new tooling to manage the operations and impact of these novel approaches.

But it isn’t all about technology. Digital transformation also requires people and process changes which have manifested in adopting agile processes, DevOps culture, and the usage of Continuous Integration/Continuous Deployment (CI/CD) to deliver greater value to customers, faster. This “sea-change” has resulted in a so-called “shift-left”, where testing, quality, and performance evaluation are moved early in the software development process. Ownership for the success of a release and ongoing management of the release stays with the organization that built it (A.K.A. “You built it, you run it”)



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**About the Author**

Charley Rich retired from Gartner as Research Director in the IT Operations Management group as an analyst focusing on providing guidance to users and providers of APM and AIOps solutions.

Mr. Rich comes with almost 40 years of IT experience as a Software Product Management Executive having built many innovative APM, big data analytics, SaaS, and UI solutions. He was a key contributor to four highly successful startups, receiving the General Manager's Award at IBM and the President's Award at Tivoli.

## Data, Data Everywhere, but Not a Drop to Drink

This modification of a quote from the [Coleridge poem](#) serves as a metaphor for the situation we find ourselves in today; drowning in a digital ocean of data, yet not able to effectively utilize it to move the business forward. The challenging side effect of digital transformation has been the enormous volumes of data that digitization continuously generates. The volume, velocity, and variety in this data can be overwhelming. However, this data is “gold”. It has what Information Technology (IT) needs of course, but also what marketing and the business desire to better understand their customers. But much of the value in the data is ephemeral and requires rapid analysis before the value expires.

The new inventive observability tools for managing the IT side of digital transformation have the unfortunate side effect of generating still more data in the form of symptomatic telemetry such as logs, metrics, and traces (and changes if you abide by the [4th dimension of observability](#)). This is augmented in turn by real-time application-generated data as well as historical data.

Traditional approaches for handling this do not scale as the magnitude and volatility of the data are overwhelming. The good news is that the technology of Artificial Intelligence (AI) promises to be capable of rapidly extracting value from this data in time to take advantage of the insights derived, find the patterns that are meaningful now, and predict what may happen later. But for this to be successful AI must consider the dimensions of configuration, locality, and the risk incurred as they change as part of its analysis.

We can consider this as a form of data [observability](#) that connects data with its context. This is sometimes referred to as the analysis of data quality. Data observability is often used to drive “NorthStar” metrics where the measure of success is defined in terms of a business objective. Here that objective is avoidance of “pain” or risk from ungoverned configuration change. This pain can impact stability, performance, reliability, security, customer experience, and more.

## AI in the Enterprise

The usage of AI in the enterprise has shown great promise specifically as it has been integrated into new innovative applications such as deep learning, autonomous vehicles, computer vision, natural language processing (NLP), and in the toolkits provided in AI Cloud Services. According to Gartner's survey of boards of directors in 2022, [AI/ML is the number one breakthrough technology imperative to digital business success.](#)



AIOps (Artificial Intelligence for IT operations) based on a subset of AI technologies utilizes a statistical, probabilistic methodology, and employing Machine Learning (ML) has been most effective at correlation based on pattern matching and anomaly detection in time-series data. It has been used to replace older rules-based technologies that required regular hands-on adjustments to keep the rules relevant and effective. While this is an important usage as event volumes have become excessive, it is a very narrow application of this important technology.

Recently AIOps has been successful in replacing some traditional monitoring tools such as virtual network monitoring, observability, and infrastructure as a service (IaaS) monitoring for enterprises that are entirely in the cloud.

However, AIOps has been most successful when its measurement for success is predicated on a specific business outcome (NorthStar objective) such as an increase in customer loyalty.

## Using AI to Manage Risk

With the constant churn in configuration change across hybrid, multi-cloud deployments, it becomes important to better understand the risk resulting from unexpected configuration changes. By configuration changes, we mean alterations within the entire state of the environment including code and data schemas, as well as the operating system, containerization, application-specific configurations, and more.

These changes can be of multiple types, including the following:

- **"Actual"** changes already deployed
- **"Planned"** changes scheduled for deployment
- **"Granular"** changes modifying a single parameter in a configuration file
- **"Complex"** changes encompassing configuration, code, and data

Here are two examples of risky changes and their impact that with configuration risk intelligence and governance could have been prevented:

- A business experienced repeated failures of a CI/CD deployment. After analysis, it was revealed that during the update process Amazon Elastic Container Service (Amazon ECS) instances scaled from 1 to 2. However, the ECS Autoscaler has a max of two instances. When a rolling update was attempted, there was no "headroom" for the new instances to spin up.
- An enterprise reported errors in their web application that only impacted a subset of users. They believed that there were no changes deployed to their environment immediately prior to the errors. However, upon analysis, it was detected that the NGINX configuration was modified, and the "max\_conns" parameter was changed from 0 to 50.

Without insight into configuration change, enterprises risk losing the business value hidden in data, the opportunity to avoid stability issues from change, and security threats as potential side effects of an ungoverned environment.

There is a need for dynamic risk governance to determine and then manage the risk inherent in configurations, the impact of changes therein, and the predicted impact from those configurations and changes. This requires a repository and service implemented in the cloud, that is itself cloud-aware and that captures, persists, and analyzes configurations as they change.

AI as a form of [Change-Centric AIOps](#) should be used to automate the determination and scoring of current and future risks. In this use case, AI should utilize supervised and unsupervised machine learning (ML), predictive analytics, and anomaly detection to uncover patterns that implicate configuration change with unexpected system behavior, both currently occurring, and use its predictive capabilities to enable problem prevention. Typical algorithms utilized for this include decision trees, naïve Bayes, Bayesian networks, neural networks, topic modeling, clustering, k-nearest neighbors, hierarchical clustering, expectation-minimization, principal component analysis, and more. AI should be utilized to establish causal relationships between elements of telemetry data and configuration changes and to predict the risk incurred by these changes.

AI utilized for managing risk in configuration change has definitive requirements specific to this problem.

The algorithms must be pre-trained prior to deployment using the following:

- Significant amounts of deep-dive data specific to the problem of software configuration change
- Subject matter expertise in modern hybrid, multi-cloud software architectures and how the configurations that define them change and evolve

Analysis of configuration data acquired falls into these categories:

- Detection of configuration drift
- Analysis of the risk of impact from a detected configuration change already made
- Predictive analysis of the risk from a planned change
- Correlation of detected configuration changes with the [root cause analysis](#) (RCA) process for IT problem determination
- Automated reconciliation of detected changes with change requests and automated deployments

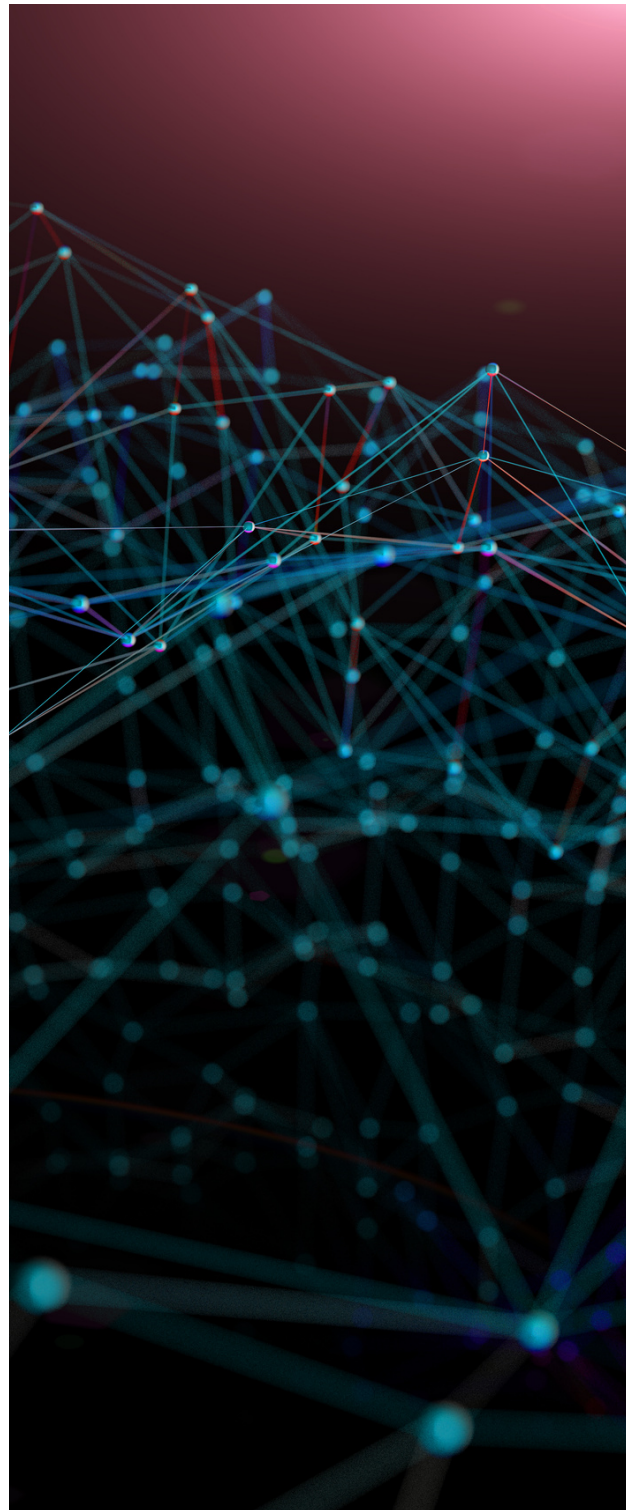


## Configuration Risk

### Intelligence & Governance

IT governance is a framework that provides a structure for organizations to ensure that IT investments support business objectives. However, governance efforts typically leave out [configuration](#) changes. As businesses transform from traditional to digital businesses, risk governance can break down without the inclusion of configuration risk intelligence.

Governing configuration risk means analysis, prediction, reconciliation, and action to prevent the impact of existing and future configuration changes. For this to be effective it should be implemented as early as possible in the application lifecycle. This means starting with code, deep integration into the CI/CD process (and other automation processes), analysis of the production environment, and a feedback loop that connects the results with the prior stages of the lifecycle.



## Summary

AI automation utilized as the enabling mechanism for the extraction of intelligence and then governance of configuration risk can provide insights beyond what today's monitoring and observability tools provide. While observability tools exist that monitor change, most often they are evaluating change in performance and use this as a means to ensure or restore system health. Digital Transformation requires more than observability.

Enterprises engaging in this transformation require contextual analysis of the data they generate allowing them to ensure consistency and security across configurations and predict the impact of existing and future changes. Using AI to power configuration risk intelligence and governance will help enterprises realize their goals for speed in addressing changing market conditions, the desire for greater insight into customer behavior, and the opportunity to rapidly deploy new business models – all in service of rapid business growth.

## About Evolgen

Evolgen is the leading Configuration Intelligence Platform automating change and configuration controls across the hybrid cloud. Evolgen's platform provides DevOps, SRE, CloudOps, and IT Ops with a unified view of the detailed end-to-end configuration state of their environments from applications to infrastructure, from on-premise data centers to the public cloud. Using AI-based analytics, Evolgen detects and prioritizes risks triggered by actual, granular changes in configuration, application, infrastructure, and data so that you can prevent and rapidly resolve stability, compliance, and security issues. Despite the higher pace of changes in agile environments, the result is a greater user experience for customers. With Evolgen, DevOps, CloudOps, and IT Ops teams experience greater visibility into their environments, fewer incidents and faster MTTR.

To find out more visit [www.evolgen.com](http://www.evolgen.com) and follow updates on [LinkedIn](#) and [Twitter](#).