The Change Intelligence Platform

Gain additional value from changes made to your IT-infrastructure and ITSM-data

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July 2020
White Paper
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Table of Contents

1 Key Points of this White Paper

This white paper is of interest to readers who deal with the following topics and application scenarios in their professional working environment:

Actual & Target CMDB & EAM: Mapping the actual and target Configuration Management Database (CMDB) and Enterprise Asset Management (EAM).

IT Operations: Identifying desired and undesired changes in the IT environment and trigger actions if necessary.

IT Security: Rule-based verification of security aspects (port status, validity of SSL certificates, configurations, used technologies).

IT Documentation: Automated documentation of the IT environment and all associated changes in an audit-proof manner.

IT Architecture: Comparing the actual and target enterprise IT and software architecture and analysis of the technologies used.

IT Controlling: Allocating costs for the dynamic use of resources (hardware, software) and services.

IT Monitoring: Creating transparency about all changes in the IT environment including monitoring configurations.

Process Management: Deriving and monitoring process models, variants and key performance indicators (KPI) from business processes, batch jobs and DevOps pipelines.

IT Support: Improving root cause analysis for solving problem tickets based on change- and verification checks.

2 Introduction

Are you still collecting data or do you already have information?

Data has often been referred to as the new oil of the information society. However, oil is only an intermediate product on the way to valuable end products and does not itself provide any inherent added value. Only the information obtained from the data makes it possible to gain insights, derive conclusions and make decisions. And thus the information itself represents a benefit that enables the automation of business processes and the operation of companies in the era of digitalization. Internal information technology (IT) plays a key role and will be the Achilles' heel for the transformation from an IT supported to a digital company.

Classic CMDB approaches have failed in companies

In 2002, version 2 of the IT Infrastructure Library (ITIL) introduced the concept of a Configuration Management Database (CMDB). Since then, many companies have introduced one or even several CMDBs and have tried to derive added value from them. The practical experiences of customers were rather disappointing though. For example, simply mentioning the term CMDB is perceived by many employees as a synonym for a lot of effort and little benefit. This experience is intensified by the continuous increase in dynamics and agility in IT, such as virtualization, containerization, DevOps as well as the technology approaches of cloud platforms. But what does a new CMDB approach need to do to eliminate existing weaknesses and meet customer requirements in the best possible way?

Requirements for a modern CMDB to create added value for companies and IT

- **Minimal manual effort** for data entry and maintenance
- **Maximal automation** of data imports and post-processing
- **Continuous data updating** for data timeliness and consideration of the high dynamics of cloud technologies
- **Central repository** for data in the form of assets and configuration items (CI)
- Extension of the infrastructure CI view by an **overall view of all aspects of IT** and the company (Full Stack)
- Mechanisms to verify and improve **data quality** in the data sources or in the imported assets and CIs

- Complete **change history** at the level of asset and CI data attributes
- Mapping the relationships between assets and CIs in the form of **topologies**
- **Integrated and external solutions**, which create corporate and operational added value based on asset and CI data

Is this all utopia or is there still hope for a solution?

What is the bottom line after several failed attempts to introduce a solution? Has the dream of a central repository of company-relevant assets and configuration items been shattered?

At Versio.io, we deeply believe that the need for a CMDB is more important than ever as businesses become more dynamic and move towards digitization. In this white paper, we want to show you modern and digital approaches that will help companies handle the changes and challenges of the digital era.

3 The Versio.io Approach

Versio.io - Your central enterprise repository for all assets and configuration items including integrated value-added solutions

With the enterprise software product Versio.io we provide a technical platform as SaaS or on-premise option for companies to record and evaluate their relevant assets and configuration items in a central repository and generate added value directly based on the integrated solutions.

The following applications and data sources should be considered when selecting assets and configuration items:

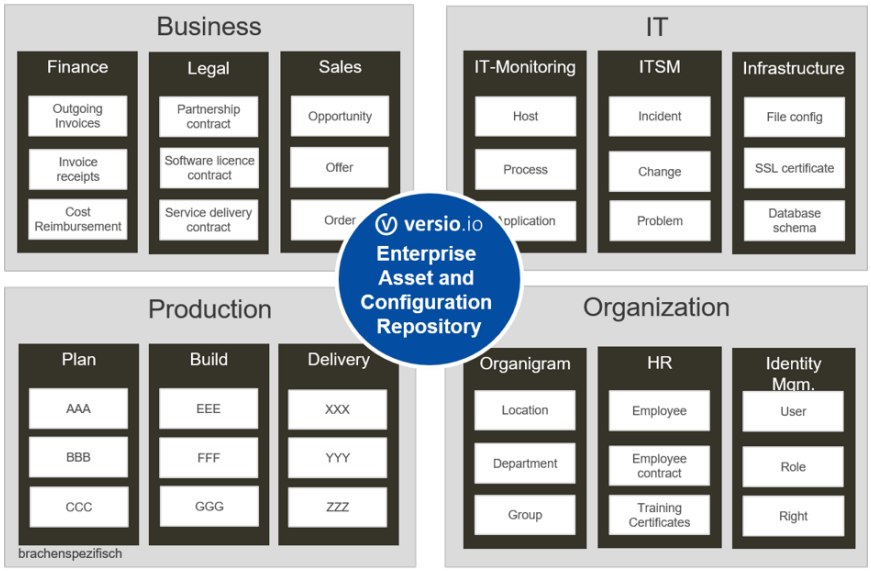


Figure 1: Overview of possible company data sources to be included

Due to the high degree of automation during installation and the continuous data import of assets and configuration items, Versio.io can realize the following added value in less than 15 minutes setup time:

Versio.io SaaS and a high degree of automation enable the productive use of added value in minutes instead of months

- **Transparency** about all changes
- **Data history** down to the attribute level of every single change over the entire life cycle
- **Revision security** and auditability of all data
- **Validation** of regulatory, corporate and operational rules (Governance & Compliance)
- **Allocation** of the dynamic use of resources and services (cost allocation)
- **Optimization** of the resources required for the provision of services (capacity optimization)
- **Mining and monitoring** of business processes, batch job & DevOps pipelines

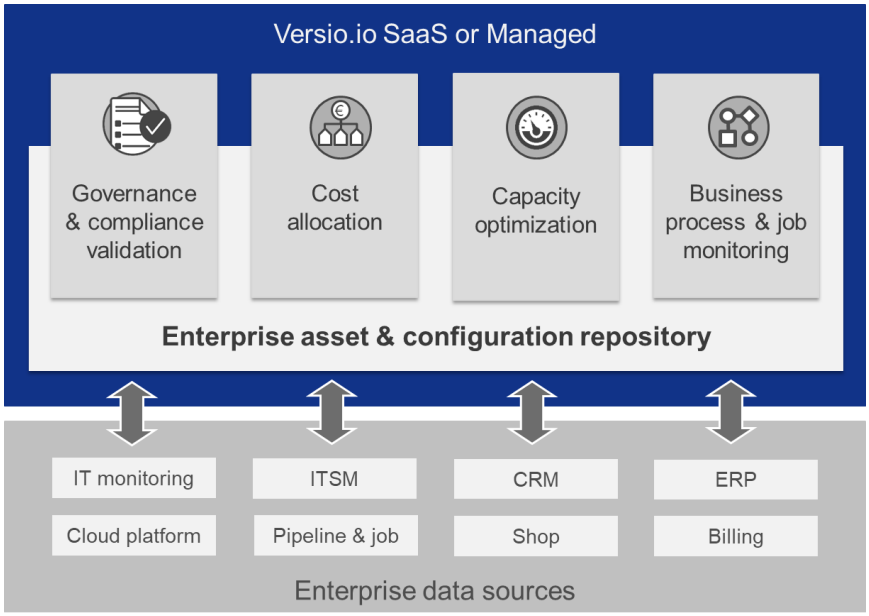


Figure 2: Create added value from existing company data

The storage method data imported into Versio.io plays a central role in the efficient post-processing of assets and configuration items. This leads to a higher data quality than in the original data source, which enables the added value mentioned above. Thus, Versio.io can eliminate the weaknesses of traditional CMDB approaches and provide a fundamentally new approach for the dynamic and digital age.

The high data quality in Versio.io is based on continuous data imports and historicized data storage

- **Automated and continuous data imports**
  Assets and CIs are imported automatically and continuously from various third-party applications and data sources using the Versio.io *OneImporter*.
- **Historization of data**
  For each imported data set it is validated whether the asset or CI has changed in terms of its attributes and stored with a complete change history in the temporal Versio.io database. Thus, any change can be accessed throughout the lifecycle of an asset or CI (see Figure 3).

- **Standardization and harmonization of attribute values**
  During data import, the Versio.io *OneImporter* optimizes possible weaknesses of the data sources with regard to the attribute format (e.g. time or volume information, splitting of summarized operating system information). The harmonization and standardization enable and facilitates downstream processing in Versio.io.
- **Topological mapping between data**
  Versio.io enables the mapping of relationships between assets and CIs from different data sources (e.g. SSL certificate belongs to a service of a web server). This allows a complete mapping of a topology between the data. On the basis of these relationships, downstream processing (e.g. cost allocation, cause analysis) can be drastically simplified and automated.

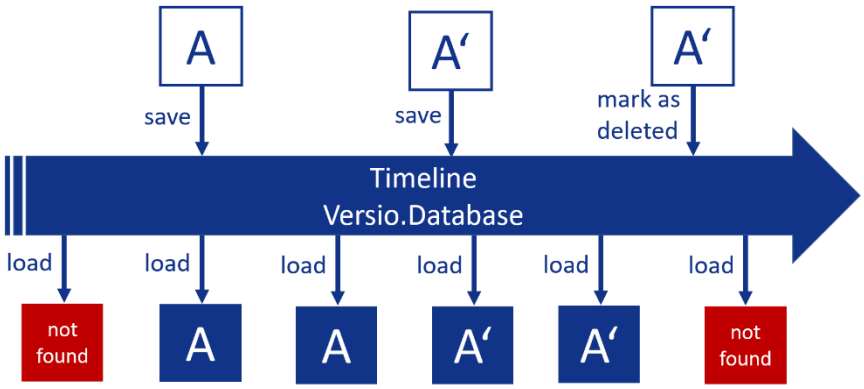


Figure 3: Historicized storage and retrieval of an asset or CI

4 Versio.io Asset & Configuration Repository

The core of Versio.io is the Asset & Configuration Repository - the new generation CMDB

The *Asset & Configuration Repository* is the core platform of Versio.io and constitutes a new generation of Configuration Management Databases (CMDB) and Enterprise Asset Management (EAM) solutions. The repository in the form of the Versio.io database provides all functions necessary for importing, reading and querying assets and configuration items. It is the basis for all further Versio.io solutions.

Highly specialized and visualized analysis and evaluation options give the user fast access to information and knowledge.

4.1 Instance History Viewer

Mapping of the entire life cycle of asset or CI attribute values

The Versio.io *Instance History Viewer* provides a comprehensive and detailed view of all aspects of a single asset or CI. It displays the metadata as well as the current status in the form of the asset or CI attribute values. Versio.io historization allows you to map all changes over the entire life cycle of these values. Special filter functions can display only the changing attribute values for each change point, making it easier for the user to capture the essential information.

In addition, all instances related to the asset or CI are visualized in the form of a topology in order to be able to recognize relationships.

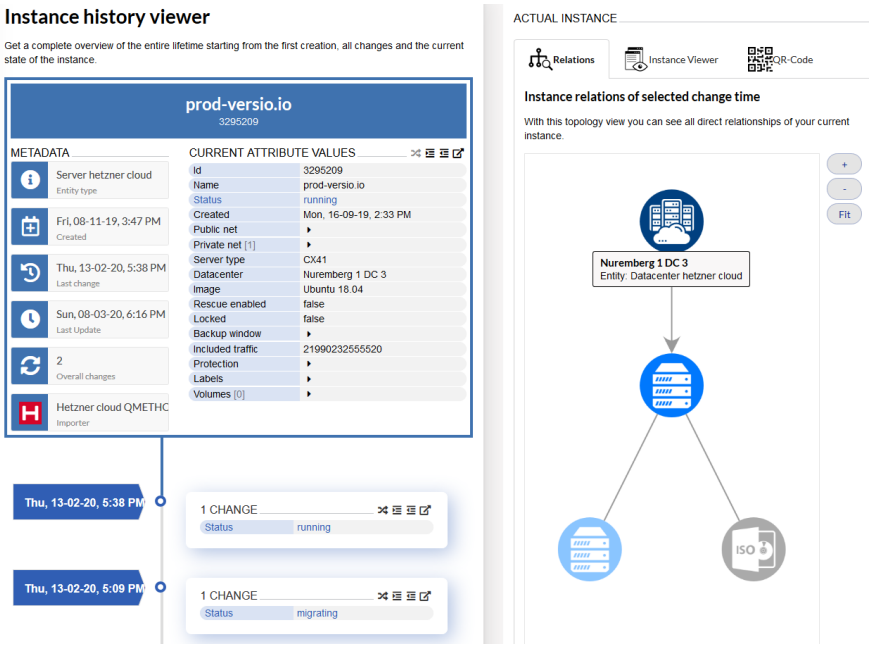


Figure 4: Detailed insight into the status and change cycle of assets and configuration items including topological dependencies

4.2 Operations Diary

Chronological overview of all operational changes provides objectivity and stabilizes business and IT operations

The Versio.io *Operations Diary* is a special visualization of all assets and configuration items recorded in the change history. A timeline provides a chronological overview for defined time periods and groups (entity groups) of assets and configuration items. For each entity group, the number of changes and the number of assets or CI

affected by the changes are displayed. The table below summarizes details of the changes per individual asset or CI. A link takes the user to the Instance History Viewer to receive the full information.

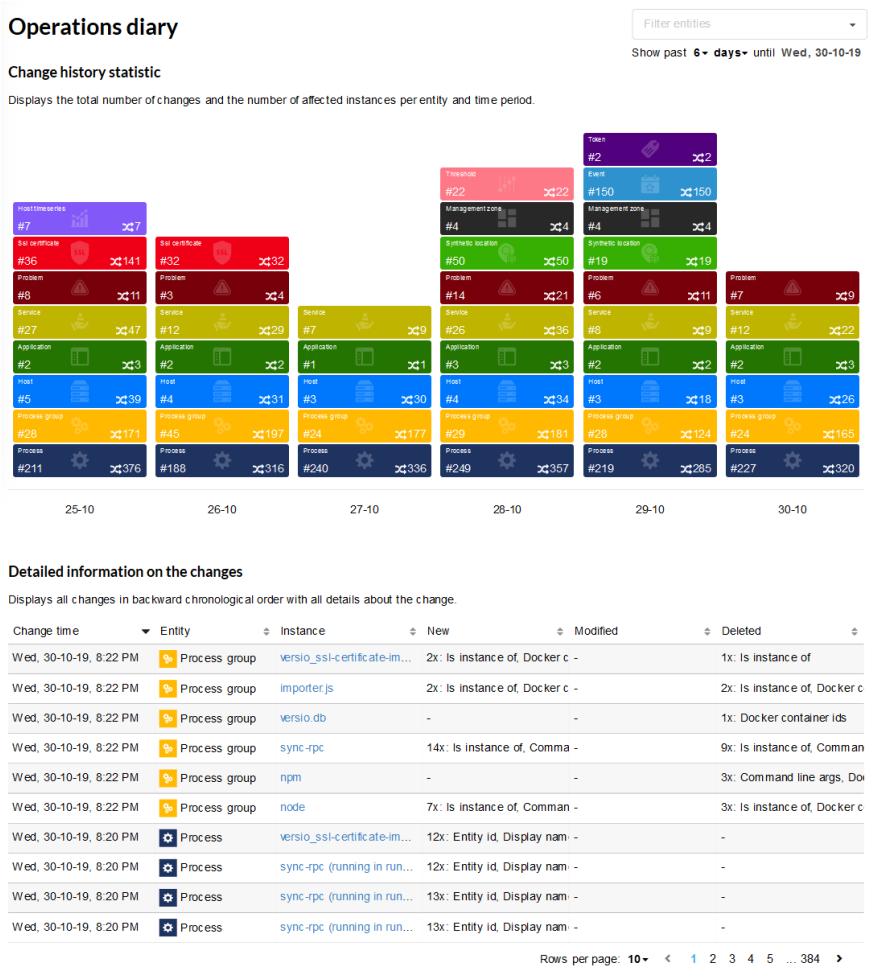


Figure 5: Transparency and objectivity about all changes over time

4.3 Topology Analysis

The Versio.io *Topology Analysis* enables visualization in the form of a topology. This includes all assets and CIs that are related to the root instance or a subsequent instance. These topological relationships are provided or created either by the import data sources, the Versio.io *OneImporter* or by your own import mechanisms. Thus, complete topology trees and networks can be visualized (e.g. system architecture). Furthermore, the visualization can be limited to vertical and horizontal topologies.

Use topological relationships between assets and CIs as core functionality for automation and analysis

Due to the historicized asset and CI data in Versio.io it is possible to visualize topological changes over time.

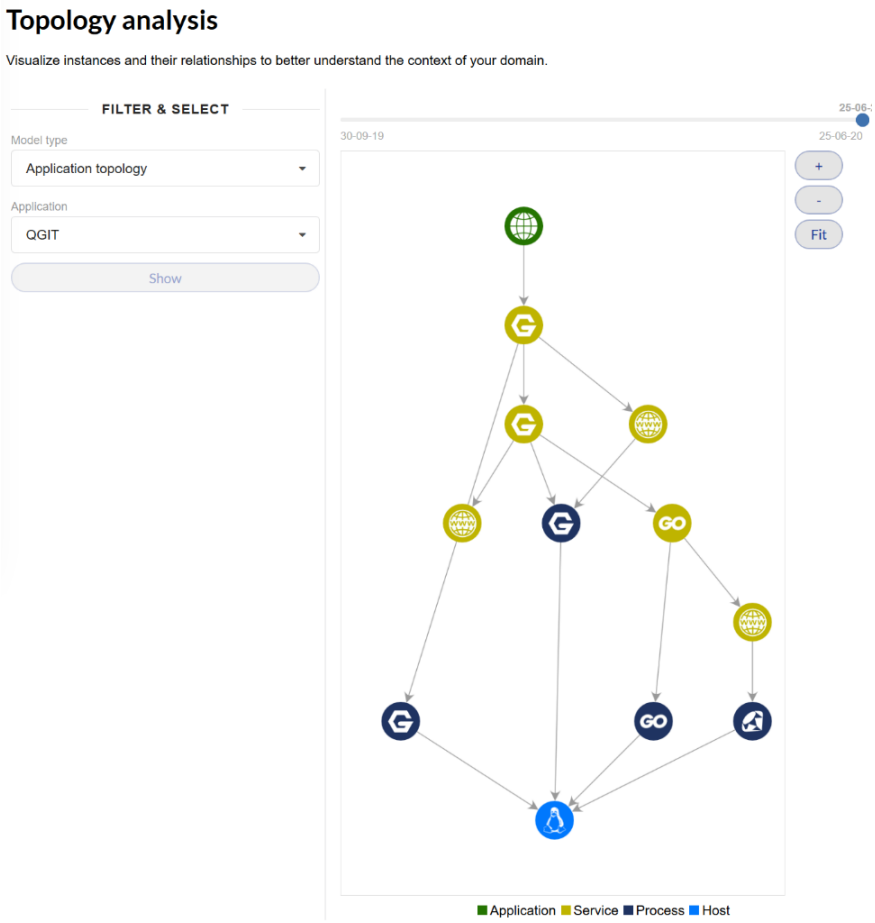


Figure 6: Significant insights from visualization in a topology

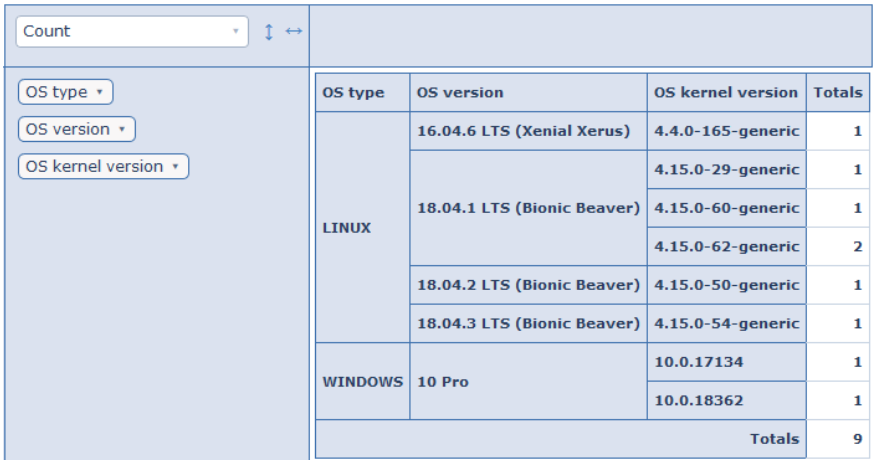
4.4 Inventory Analysis

Analysis of asset and configuration item data for inventory management

With Versio.io *Inventory Analysis*, asset and configuration item data can be analyzed and evaluated in the form of a pivot table at entity level. The historicized asset and CI data in Versio.io makes it possible to evaluate the change of analysis results over time. This enables users to promptly determine objective decision criteria or to carry out inventory management more efficiently.

With Inventory Analysis, the following questions can be answered promptly:

- What is the degree of virtualization or containerization in my IT department?
- How up-to-date are the versions of my routers and firewalls?
- Which technologies in which version are in productive use?



OS type	OS version	OS kernel version	Totals
LINUX	16.04.6 LTS (Xenial Xerus)	4.4.0-165-generic	1
	18.04.1 LTS (Bionic Beaver)	4.15.0-29-generic	1
		4.15.0-60-generic	1
		4.15.0-62-generic	2
	18.04.2 LTS (Bionic Beaver)	4.15.0-50-generic	1
	18.04.3 LTS (Bionic Beaver)	4.15.0-54-generic	1
WINDOWS	10 Pro	10.0.17134	1
		10.0.18362	1
		Totals	9

Figure 7: Conduct inventory and analyses based on asset and CI data

5 The Versio.io Solutions

5.1 Governance & Compliance

Versio.io Governance & Compliance verifies compliance with legal, security, corporate and operational requirements to avoid potential risks and errors. The following requirements, for example, can be implemented:

Validation of compliance with regulatory, corporate and operational requirements

- Compliance with naming conventions (host, dashboard, parameter naming)
- Identification of security problems (open ports, processes with known software security flaws)
- Compliance with the target planning regarding architecture, technology or CMDB

- Identification of unplanned changes (changed configuration without existing change ticket)
- Detection of non-updated system components (router, firewall, operating systems, IoT devices)

The verification is based on the data collected by the Versio.io Asset & Configuration Item Repository and identified changes to this data. Rules can be created visually to allow non-technical users define rules. The rule definition can be used to map verifications of any complexity. For technically experienced users, a verification via JavaScript is also available.

The visual definition facilitates the creation of rules for non-technical users

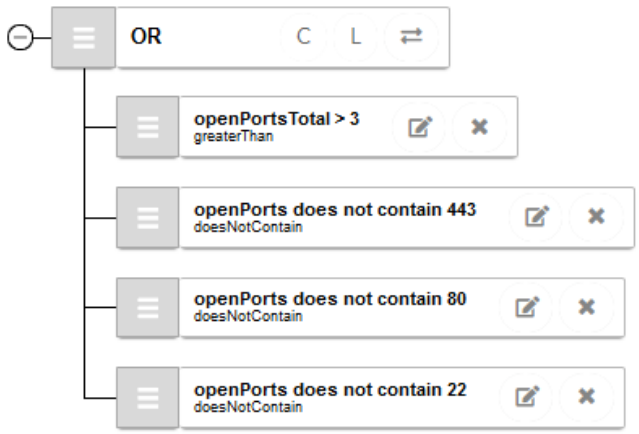


Figure 8: Example of a rule definition for the verification of non-permitted, open host ports

Each individual rule violation is automatically recorded and documented. For visually defined rules, an event-cause analysis (root cause) is automatically provided, which allows for quick and easy traceability of the rule violation and thus reduces the time required to correct it.

Fast error detection and correction through fully conditioned cause analysis of a rule violation

Each event can be linked with individual actions (alerting), which are executed when the event occurs. This enables the following integration scenarios, for example, to be implemented:

- Notification via e-mail or chat application
- Automated creation of incident tickets

Trigger customer-specific actions based on events

- Starting predefined, automated actions
- Transferring the event data to dashboard systems
- Transferring the event into monitoring or event systems in order to optimize the root cause analysis in these systems in connection with further events or measured values

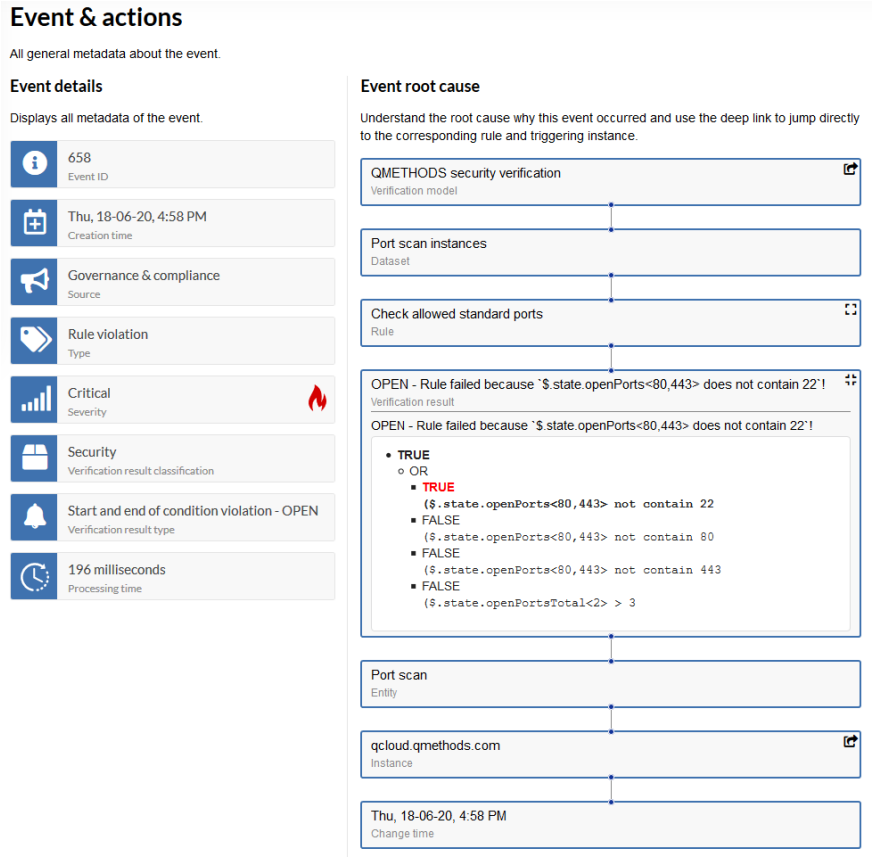


Figure 9: Detailed processing of an occured rule violation for quick identification of the cause

5.2 Cost Allocation

Allocation of costs of dynamically used resources and services

With Versio.io *Cost Allocation*, the costs of dynamically used resources (hardware, software licenses, services) can be allocated automatically based on assets and configuration items. For the simple recording of instances to be included in the cost allocation, existing topologies can be used. The topologies enable the mapping of dynamic resource utilization of the cloud.

The price calculation is based on customer-specific, definable pricing models at the level of available assets and configuration items. For the pricing (rating) of the individual topology instances, their attribute values can be included in the calculation. This allows, for example, the mapping of costs for a host depending on the available CPU processor cores and RAM.

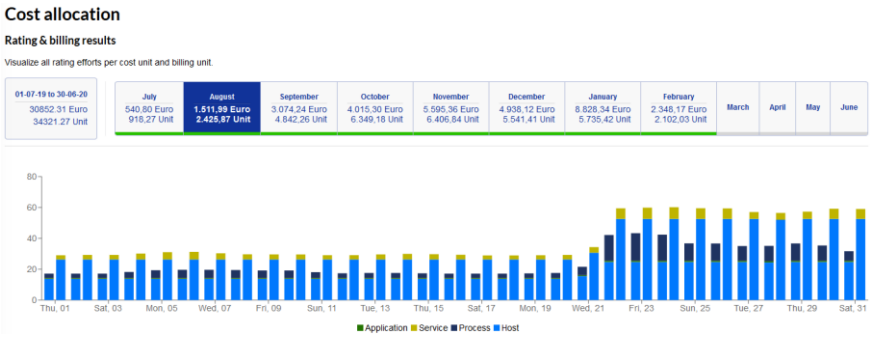


Figure 10: Fully automated cost allocation of dynamically used resources and services

Cost transparency across all aggregated levels

A visualized cost overview is provided for each cost model, taking into account time and resources used. It breaks down the aggregated cost allocation from the final price to an individual allocation period of an instance. The cost allocation data can be transferred to an external financial or ERP application for billing purposes

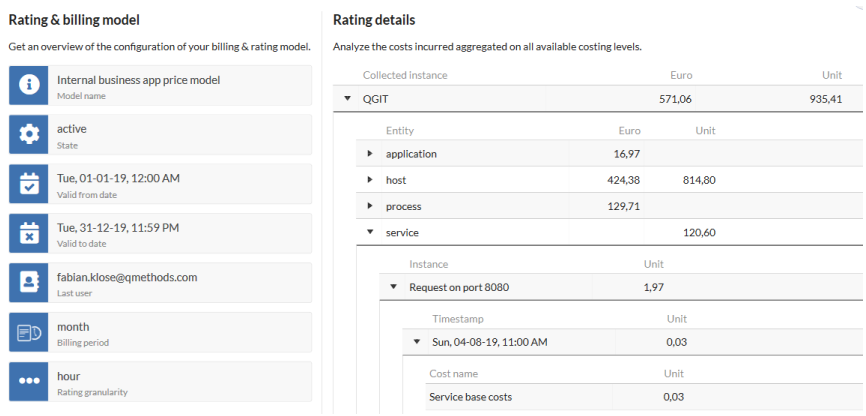


Figure 11: Cost transparency at every level of aggregation

5.3 Business Process & Job Monitoring

Mining & monitoring of business processes, batch jobs & DevOps pipelines

With Versio.io *Business Process & Job Monitoring*, business and IT processes, batch job executions and DevOps pipelines can be captured, monitored, visualized and analyzed.

Based on the asset and configuration repository data, a mining procedure collects and aggregates the following process-relevant data per process instance:

- Process steps and their call sequence
- Process variants (processes with the same execution behavior)
- Process key figures (KPIs; number and time of execution)
- Individual process key figures (amounts, types etc.)

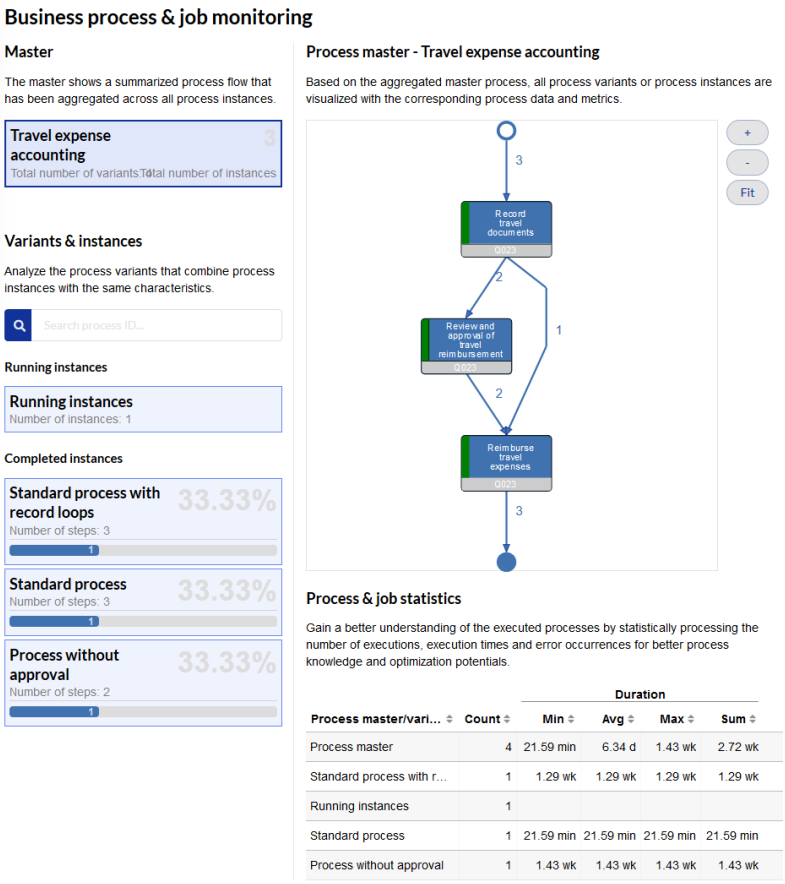


Figure 12: Transparency of processes, process steps and process key figures lead to more objective decisions

In the process model overview, the user is shown the visualized process model, all identified process variants and the corresponding process key figures. This is possible on different aggregated levels: At the master process, the process variants, and at each individual process instance.

With the Versio.io mining and monitoring approach, customers can configure and use process monitoring within minutes.

Use process flow and metrics after only a few minutes of setup

Typical usage scenarios for process monitoring:

- ITSM incident & support processes
- Business processes of the departments
  - Orders
  - Bookings
  - Authorizations
  - Accounting etc.
- Nightly batch job processing
- Backup processes
- DevOps pipeline execution

6 Versio.io Scenarios in IT

Versio.io offers a variety of deployment scenarios with its basic platform and value-added solutions. The following is a description of these solutions:

Actual Configuration Management Database (CMDB): With its *Asset & Configuration Repository*, Versio.io offers all the necessary functionalities of your actual CMDB. In addition, Versio.io extends the CMDB approach to include the historization of all configuration items and the ability to map topological relationships. Versio.io thus creates the basic prerequisite for added value in the further use of data from your actual CMDB.

IT Operations: Versio.io facilitates the operational activity of IT systems and applications by recording all changes in connection with the systems and enabling transparency and evaluation for cause analyses. Customers can define specific rules for trouble-free operation in order to promptly recognize and react to unwanted conditions (update, deployment, configuration changes).

IT Security: The Versio.io *Governance & Compliance solution* triggers appropriate actions after identifying problems like security-relevant conditions, such as weaknesses in software products (https://nvd.nist.gov - National Vulnerability Database), open ports, expiring or insufficient SSL certificates, unwanted configuration changes, etc.

IT Documentation: Documentation is unpopular with employees. Use Versio.io to create the documentation of changes for as many areas as possible, including the time of change and the person who made the change. The staff will thank you for it!

IT Architecture: The Versio.io *Asset & Configuration Repository* and especially the Inventory and Topology Analysis enable the evaluation of the actual situation on the level of the system architecture and the technologies used. In the *Governance & Compliance solution*, architects can define and control architecture and technology deployment requirements.

IT Controlling: Versio.io *Cost Allocation* supports IT controlling in charging their users for the costs of dynamic use of resources (hardware, software licenses) and services. Furthermore, the change in the profit situation can be simulated on the basis of the adjustment of price models.

IT Monitoring: In addition to mapping your actual CMDB, monitoring experts can also capture configurations for monitoring IT and application systems to provide change transparency and auditability at this level.

Process Management: Versio.io *Business Process & Job Monitoring* enables business processes, batch jobs and DevOps processes to be recorded with minimum effort. The tool does visualization with a process flow diagram and provides key performance indicators (KPI) required for optimization.

IT Support: IT support can access all registered changes in the asset and configuration repository to assist root cause analysis in resolving an incident ticket. Furthermore it can proactively address situations for high ticket volumes with real-time detection of unwanted conditions in Governance & Compliance.

List of Abbreviations

CI	Configuration Item
CMDB	Configuration Management Database
CRM	Change Request Management
DevOps	Development and IT Operations
EAM	Enterprise Asset Management
ERP	Enterprise Resource Planning
IT	Information Technology
ITIL	IT Infrastructure Library
ITSM	IT-Service Management
KPI	Key Performance Indicator
SaaS	Software-as-a-Service