Datasheet

Product Version 4.0

# Trace9 4.0

# Unified Performance Monitoring Solution

IOTA SOLUTIONS PRIVATE LIMITED

## Problem Statement:

Organizations lack visibility of data and issues which causes an adverse effect and results in degradation of performance. In the market, most of the tools available are not scalable enough to cater to customers' requirements. Every business will have varied technical requirements, reviewing various metrics and setting different objectives and benchmarks. To effectively judge the behavior of the resources connected, the solution must be able to isolate the useful performance data and insights from everything else. Many monitoring tools allow focusing on specific metrics that the company wants to track, allowing to prioritize useful insights over all others.

Infrastructure monitoring solutions can help businesses in many ways, but there are also some challenges that they can face when implementing and using these solutions. Here are some of the common business challenges that infrastructure monitoring solutions can pose:

## Complexity:

Infrastructure monitoring solutions can be complex to set up and use, especially if you have a large and complex IT environment.

## Integration:

Infrastructure monitoring solutions often need to integrate with other IT systems, such as databases, applications, and networks. Integrating these systems can be challenging and may require custom development work.

## Data Overload:

Infrastructure monitoring solutions generate a lot of data, and it can be challenging for businesses to effectively manage and analyze this data. This can lead to "alert fatigue," where employees are overwhelmed by the number of alerts and notifications they receive.

## False Positives:

Infrastructure monitoring solutions may generate false positive alerts, which can be time-consuming and frustrating to deal with.

## Cost:

Infrastructure monitoring solutions can be expensive, especially if you have a large and complex IT environment.

## Security And Privacy:

Infrastructure monitoring solutions may collect sensitive data about your IT systems and applications, and it's important to ensure that this data is stored and transmitted securely

Overall, infrastructure monitoring solutions can be very beneficial for businesses, but they also pose some challenges. It's important for businesses to carefully evaluate these challenges and ensure that the chosen solution meets their specific needs and requirements.

# Overview:

**Keep your infrastructure running smoothly with our Trace9 4.0 Unified Monitoring Solution.**

Trace9®4.0 - Unified monitoring solution uses industry-leading monitoring frameworks & technologies to monitor and manage the health and performance of the entire IT infrastructure across physical, virtual, and hybrid IT environments. It enables organizations to keep track of and observe the performance of their networks, servers, databases, cloud, and all other IT assets in their environment.

The Trace9 4.0 solution monitors networking devices, computing systems, virtual environments, storage, applications, databases, and cloud environments. Moreover, it supports industry-wide protocols and practices for monitoring including SNMP, Traps, WMI, SSH, ICMP, NetFlow, agent-based, agentless and more. It helps quickly detect and diagnose performance issues with data analytics and visualization engine. Furthermore, it generates customized reports-on demand and via scheduler as well. Over and above that, it provides Intelligent alerting, notification, and IT help desk capabilities aligned with customers' operational workflows.

## Key Benefits

- All-in-one Monitoring Solution
- Clear & Powerful Analytics
- Real-time Dashboards
- Alerts & Notifications
- Open API Integrations
- Flexible Data Retention
- Customized Reports and Dashboards
- Multivendor Support
- Supports Industry-leading protocols

## Trace9 Features:

### Real-Time Monitoring

Trace9 provides real-time monitoring of your infrastructure, allowing you to detect and respond to issues before they impact your users.

### Comprehensive Visibility

Trace9 offers comprehensive visibility into your entire infrastructure, including cloud environments, on-premises servers, and applications.

### Customizable Dashboards

Trace9 allows you to create customizable dashboards that display the information that is most important to you.

### Integration With Third-Party Tools

Trace9 integrates with a wide range of third-party tools and services, allowing you to easily incorporate it into your existing workflows.

### Distributed & Highly Available Architecture

High availability deployment for redundancy and scalability. Master-slave architecture for seamless HA failover/switchover.

### Open API Integration

Third party open API integrations with other platforms and tools to streamline workflows.

## Role-Based Access

Control Restrict access to dashboards, reports and other features based on user's roles within an organization

## Multi-Tenant Architecture For MSPs

Monitor multiple customers' IT environments from a single dashboard. Customer-specific dashboards, alerts and reports

## Data Retention

Store data points for custom time- period to visualize long term trends and patterns.

## Multivendor Support

Monitor anything and everything that supports common protocols like SNMP, and Syslog.

## Map View

Geographical representation of IT assets on map with real time status information with different colors to represent warning, critical and healthy states.

## Intelligent Alerts

Trace9's intelligent alerting system notifies you of issues that require attention, allowing you to quickly respond and resolve issues.

## Clear & Powerful Analytics

Trace9 offers powerful analytics capabilities that allow you to gain insights into your infrastructure and applications.

## Reporting

Pre-built, customizable reporting templates and delivery schedule. Separate reports for Management and IT teams

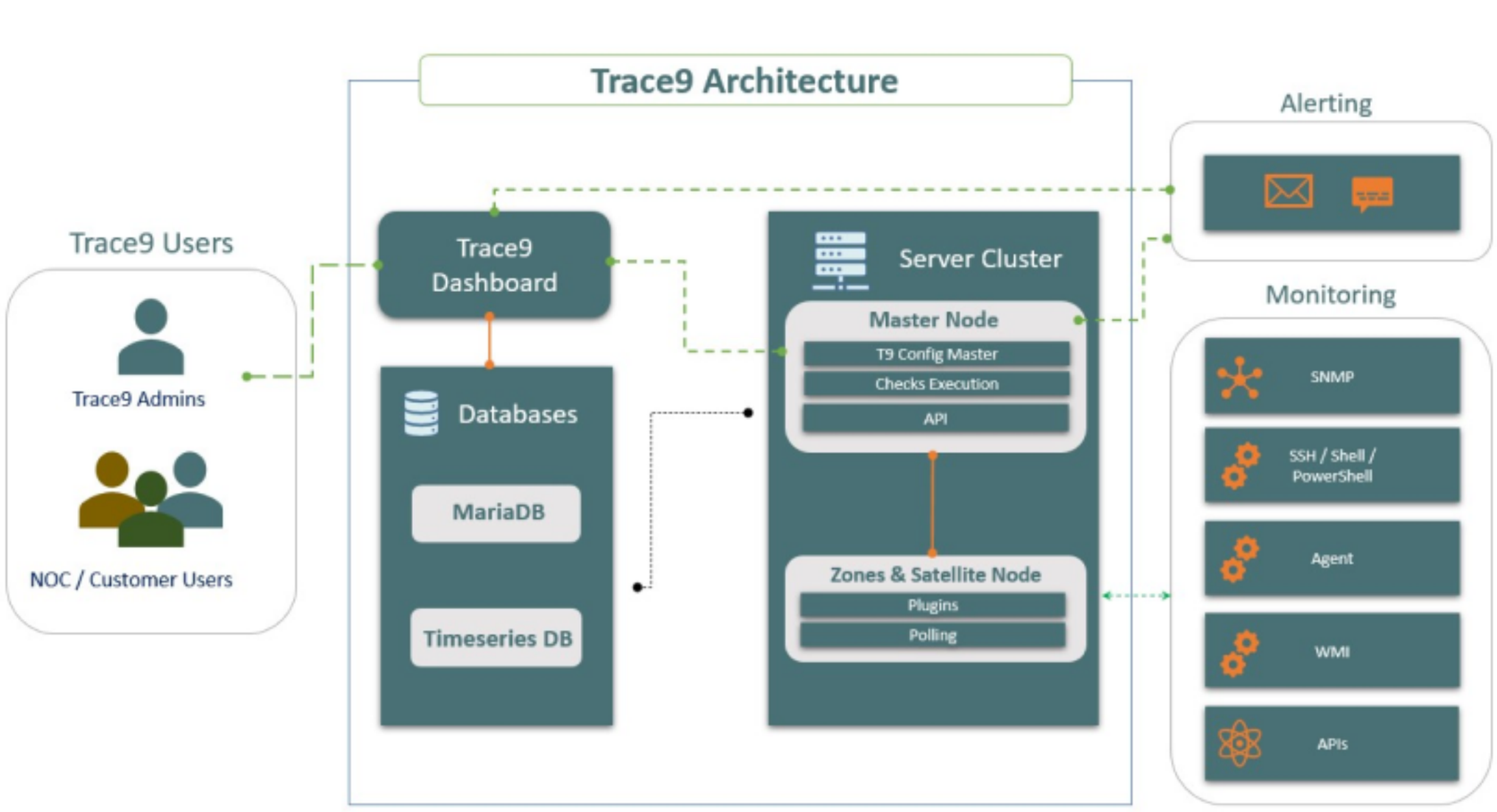
## Audit Log

Track users' actions to see who did what and when.

## Flexible Licensing

Perpetual and Subscription based licensing models.

## Trace9 Architecture:



# Use Cases

## Single Source Of Truth:

Without a comprehensive view of the infrastructure, IT teams struggle to identify the root cause of issues, leading towards longer resolution times and increased frustration for users.

Trace9 offers comprehensive monitoring of networks, IT assets, and applications in a single pane of glass, allowing IT teams to proactively anticipate, recognize, and mitigate performance issues before they cause downtime.

## SLA Monitoring:

Without SLA monitoring, organizations have not clear visibility into how their IT infrastructure is performing, which can lead to poor service delivery and suboptimal performance.

Trace9 SLA monitoring collects performance metrics, such as response time, uptime, and availability, monitors your SLA compliance, and compares your SLA's performance targets closely. It allows organizations to take corrective actions and to prevent any further degradation of service and generates real-time alerts if the system's performance falls below the agreed-upon level.

## Conditional Monitoring:

Without conditional monitoring, organizations are likely to be reactive rather than proactive which means that issues are only identified after they have already occurred, which leads towards service disruptions, downtime, and other negative impacts on the business. In today's modern world,

Trace9 provides Conditional monitoring to proactively monitor the real-time KPIs for critical IT applications and services based on the condition of underlying infrastructure. It helps organizations to identify and resolve issues quickly, reduce downtime, and improve the overall performance and availability of your IT infrastructure.

## Power Vs Link Failure Detection:

Are you currently experiencing Network downtime? When did your downtime occur? Have you made any recent changes to the network infrastructure? What is causing Link failure? What required actions should you take? How can you prevent downtime?

Hold on, Relax. You are at the right place. Trace9 resolves all your power & Link failure detection problems in one go.

Trace9 enables IT operations teams to proactively detect issues and troubleshoot faster with accurate root cause analysis of power & link failure detection. It ensures the availability and reliability of network devices, prevents downtime and disruptions. Trace9 generates device SLA reports and makes sure that the network operates smoothly in the event of failures or outages.

## Event Correlation:

Are you unable to find the root cause of your actual problems?

Trace9 corelates event with two or more devices to determine the root cause, Trace9 dependency mapping will help you to define your own event correlations & and Trace9 have xx amount predesign rules for IT environments.

Most medium to large enterprises are focused on their business and overlook capacity or performance constraints, resulting in disaster and severe cost effects.

Trace9 provides capacity monitoring to identify capacity concerns that you can address in your forthcoming budget with proper explanations.

Monitoring Modeling: Do you want to make your own process-based dashboards? Notifications at the process or sub-process level? On a single screen, provide a rapid top-level view of thousands of components? That is why this module has been created!

You run a large cloud and want to get rid of the monitoring noise caused by your auto-scaling platform while still having accurate information at your fingertips in case you need it? You'll adore this tiny value chain monitoring!

Services Visibility: Do you need service visibility for your IT environment? Trace9 provides true/holistic service visibility to reduce conflicts between two or more separate islands) to determine the actual availability of any services e.g. (Billing, ERP, CRM, and any essential Services).

## Service Visibility

Do you need service visibility for your IT environment? Trace9 provides true/holistic service visibility to reduce conflicts between two or more separate islands) to determine the actual availability of any services e.g. (Billing, ERP, CRM, and any essential Services).

# Network Performance Monitoring NPM:

## Overview

Trace9 4.0 monitoring solution monitors the performance of your networks, identify, and troubleshoot issues, and optimize the network performance. It provides real-time and historical performance data for network devices, interfaces, and applications, and helps to identify and resolve issues before they impact end-users.

Trace9 4.0 is a flexible and scalable monitoring solution that provides administrators with a comprehensive view of their network. It collects data from various sources, including SNMP, WMI, NetFlow, sFlow, and packet capture, and provides customizable alerts, reports, and integration options.

## Benefits

The key features of Network Performance Monitoring include:

### Early Detection Of Issues:

Trace9 4.0 Network performance Monitoring provide insights into network performance metrics such as packet loss, latency, and bandwidth utilization. These insights help IT teams optimize network performance and improve user experience.

### Proactive Maintenance:

With Trace9 4.0 Network performance Monitoring, IT teams can monitor network devices, applications, and servers and take proactive steps to prevent issues. This proactive maintenance approach helps minimize downtime and keeps the network running efficiently.

### Capacity Planning:

Trace9 4.0 Network performance Monitoring provides insights into network usage and performance trends, allowing IT teams to make informed decisions about capacity planning and resource allocation.

### Compliance And Security:

Trace9 4.0 Network performance Monitoring provides visibility into network traffic, which can help IT teams identify security threats and maintain compliance with industry regulations.

## Features

The key features of Network Performance Monitor include:

### 1. Network Device Monitoring:

Trace9 4.0 Network performance module provides real-time monitoring of network devices such as routers, switches, and firewalls, and helps to identify issues related to device health, performance, and configuration.

### 2. Interface Monitoring:

Trace9 4.0 Network performance module allows administrators to monitor the traffic, utilization, errors, and discards on network interfaces and helps to identify issues related to network congestion and bottlenecks.

### 3. Application Performance Monitoring:

Trace9 4.0 Network performance module provides deep packet inspection to monitor application performance and helps to identify issues related to slow application response time, packet loss, and latency.

### 4. Network Topology Mapping:

Trace9 4.0 Network performance module automatically discovers and maps the network topology and provides visibility into the connectivity between devices, interfaces, and applications.

## 5. Alerting And Reporting:

Trace9 4.0 Network performance module provides customizable alerts and notifications for network events and issues, and generates reports for network performance, availability, and utilization.

## 6. Integration With Other Tools:

Trace9 4.0 Network performance module integrates with other network monitoring and management tools, such as Network Configuration Manager and Server & Application Monitor, to provide a comprehensive solution for network management.

## Technology Supported, Protocols, Devices

SNMP v2 / SNMP v3, SSH, ICMP, CDP, LLDP, SNMP Traps

## Module Dependency

Trace9 4.0 Network Performance Monitoring module is dependent on various components, including network devices, polling engine, network topology, database, Integration with other tools, and the Network Infrastructure. All these components must be functioning properly for Trace9 4.0 NPM to collect accurate performance data and provide effective network monitoring.

## Scalability

Trace9 4.0 Network Performance Monitoring is very scalable, and it can handle Networks of various sizes. It supports a distributed polling architecture, customizable polling intervals, performance optimization, hardware scaling, and customization. All these features allow Trace9 4.0 NPM to provide effective network monitoring for networks of all sizes.

## Dashboards

# ITSM Integration

## Overview

Trace9 4.0 is a flexible monitoring solution that seamlessly integrates into your existing infrastructure. You can stick to your preferred tool landscape, as it allows for seamless communication between the Trace9 4.0 monitoring solution and your ITSM platform. Whenever an issue is detected by Trace9 4.0, it will automatically create an incident ticket in the ITSM platform, assign it to the appropriate team or individual, and track its progress until it is resolved.

- Use existing data to feed Trace9 with configurations
- Automate your workflows and integrate with existing processes
- The Trace9 4.0 monitoring solution selects the best option to maintain monitoring configurations
- Track all changes and roll back at any time
- Connect with Jira and other issue tracking and ticketing systems
- Build custom integrations with almost anything in your environment
- Leverage existing data

Monitoring every piece of infrastructure requires a lot of perseverance and discipline. Trace9 4.0 monitoring solution reduces the error rate due to missing information by connecting to existing databases and fetching available information, whether it is a CMDB, private cloud, public cloud, or a custom-built internal tool that holds the information about your physical and virtual servers.

Trace9 4.0 collects the data automatically and converts it to a valid monitoring configuration with many options to transform the information and create an optimal workflow that fits your organization.

- Import your server information, such as name, IP address, device ID, and others
- Synchronize your contacts for alerts with Active Directory or LDAP
- Automatically monitor your services based on collected server metadata
- Integrate with automated workflows for data import, synchronization, and configuration deployment
- Track every single change and roll back at any time

## Benefits

### Integrate With External Platforms

External platforms provide value to your operations team by handling specific daily tasks. Whether it's incident management, data collection, correlation of data or asset management. Trace9 4.0 solution connects to many different platforms and embeds the monitoring process in your daily workflows.

- Connect Trace9 4.0 with incident management tools such as PagerDuty, OpsGenie, VictorOps and more
- Synchronize Trace9 4.0 monitoring data with ServiceNow
- Attach Trace9 4.0 to public cloud providers, such as AWS, Azure or GCP
- Create custom integrations by using Trace9's open APIs

### Connect Your Ticketing System

Emails are not always sufficient to track alerts and errors for critical infrastructure. Especially for teams a ticketing system is indispensable. Trace9 4.0 can send notifications directly to your existing ticketing system and resolve the issue automatically once the problem is solved.

The Trace9 4.0 Web interface provides direct links to relevant tickets in your systems, so you don't have to search for them.

### Integrate With Jira

The Trace9 4.0 integration with Jira allows you to send notifications directly to Atlassian's Jira Software. It creates a Jira issue either for all, or only for some of your Trace9 hosts and services.

The Trace9 4.0 Monitor interface gives a quick overview of all Jira issues created by Trace9 4.0, so you don't have to switch tools. The overview includes information about the related project, the issue type and its current state. Additionally, you can see the description and all comments within the issue. For quick access, direct links to Jira Software are embedded.

## Integrate With Digital Workflows

Trace9 4.0 comes with multiple options to maintain its configuration, giving you the choice on how to integrate it with existing processes and workflows.

You can choose your preferred way to configure Trace9 4.0 whether it's through plain configuration files, configuration management tools (via the web interface) or with automated tasks to pull data from third party databases. Trace9 does not force you to change your existing workflows. On the contrary, it integrates flawlessly into your infrastructure and extends it with more options.

## Integrate With Your Self-Made Tools

Trace9 4.0 provides APIs and many other ways to create custom scripts, modules and features. Whether it's custom dashboards, ticketing systems, event hubs, CMDBs or something else. There are almost no limits when it comes to connecting Trace9 4.0 with your existing tools.

## Technology Supported, Protocols, Devices

There are a variety of technologies, protocols, and devices that can be used to support ITSM integration in Trace9 4.0 monitoring solution. Here are a few:

### APIs:

Trace9 4.0 monitoring solution offers APIs that can be used to integrate with ITSM platforms which allow APIs data to be shared between different systems, enabling automated processes and real-time updates.

### Webhooks:

Webhooks are automated messages sent from an application to another application when a specific event occurs. In the context of ITSM integration, Trace9 4.0 monitoring solution can use webhooks to send notifications to the ITSM platform when an issue is detected.

### SNMP:

Simple Network Management Protocol (SNMP) is a standard protocol used for managing and monitoring network devices. Trace9 4.0 monitoring solution supports SNMP, which allows them to collect data from network devices and send it to the ITSM platform.

### Agents:

Trace9 4.0 monitoring solution use agents, which are software programs that are installed on servers, network devices, or other endpoints. Agents collect data from the endpoints and send it to the Trace9 4.0 monitoring solution, which can then integrate with the ITSM platform.

Overall, the specific technologies, protocols, and devices used for ITSM integration in Trace9 4.0 monitoring solution will depend on the specific tools and platforms being used.

## Module Dependency

Module dependencies for ITSM integration in Trace9 4.0 monitoring solution will vary depending on the specific tools and platforms being used. However, here are some common modules that may be required:

### Integration Module:

This module enables communication between the Trace9 4.0 monitoring solution and the ITSM platform which may include APIs, webhooks, or other protocols that allow for data sharing and real-time updates.

### Incident Management Module:

This module allows the Trace9 4.0 monitoring solution for the creation and management of incident tickets within the ITSM platform. It includes features such as ticket creation, assignment, tracking, and resolution.

## Notification Module:

This module allows the Trace9 4.0 monitoring solution to send notifications and alerts to the ITSM platform. Notifications may include alerts, warnings, or other messages related to issues detected by the Trace9 4.0 monitoring solution.

## Data Collection Module:

The Trace9 4.0 ITSM Integration module is responsible for collecting data from network devices, servers, and other endpoints. It may include agents or other software programs that are installed on the endpoints to collect and transmit data.

## Reporting Module:

The Trace9 4.0 ITSM Integration module generates real-time reports and analytics related to the performance of the IT infrastructure. It may include features such as dashboards, trend analysis, and historical data.

Overall, the specific module dependencies will depend on the functionality and features required for ITSM integration in the Trace9 4.0 monitoring solution.

# Scalability

Here are some factors to consider when assessing the scalability of an ITSM integration:

## Volume Of Data:

As the volume of data being monitored increases, the Trace9 4.0 monitoring solution is much more scalable with ITSM integration to handle the increased load. This may require additional resources, such as more powerful hardware or cloud-based services.

## Number Of Endpoints:

As the number of endpoints increases, the Trace9 4.0 ITSM integration scale accordingly to ensure that all endpoints are being monitored effectively.

## Frequency Of Data Collection:

The frequency of data collection impacts scalability. Trace9 4.0 monitoring solution collects data frequently to process and store the data for more resources.

## Redundancy And Failover:

To ensure high availability and minimize downtime, Trace9 4.0 the ITSM integration has redundancy and failover mechanisms in place. This ensures that if one component fails, another component can take over without disrupting the monitoring process.

## API And Data Processing Limits:

Some ITSM platforms have limits on the number of API calls or data processing that can be performed within a certain period. It's important to ensure that these limits are not exceeded, and that the integration can handle the volume of data being processed.

# Dashboards

motorway LRR category All subcategory All

**Tickets Detail - Motorway & Category Wise**

| | IP Address | Complaint Date & Tin | Resolution Date & Tir | Outage Duration | Ticket Duration | Category | Sub-Category ↓ | RCA | Ticket ID |
|---|---|---|---|---|---|---|---|---|---|
| th1-PC | 192.168.52.10 | 2023-02-20 19:51:22 | 2023-02-20 19:54:03 | 00:02:41 | 00:18:15 | Power | Voltage Fluctuation | Relay tripped | 395536 |
| | 192.168.63.251 | 2023-02-20 18:27:22 | 2023-02-20 18:30:07 | 00:02:45 | 00:43:07 | Others | Planned Activity | Civil work activity | 395523 |
| -PC | 192.168.63.13 | 2023-02-20 13:00:06 | 2023-02-20 13:03:09 | 00:03:03 | 04:19:58 | Others | Planned Activity | Civil work activity | 395492 |
| | 192.168.50.11 | 2023-02-20 20:06:13 | 2023-02-20 20:15:16 | 00:09:03 | 00:09:33 | Hardware | PC Issue | PC hanged up | 395537 |
| oth1-PC | 192.168.51.12 | 2023-02-20 16:42:19 | 2023-02-20 16:51:05 | 00:08:46 | 00:22:08 | Hardware | PC Issue | PC restarts automa... | 395516 |
| | 192.168.61.10 | 2023-02-20 20:12:11 | 2023-02-20 20:21:20 | 00:09:09 | 00:29:58 | Others | Miscellaneous | Unintentionally off | 395540 |

# Log Management

## Overview

Trace9 4.0 Monitoring solution collects, analyzes, and store system and application logs generated by various sources such as servers, applications, network devices, and security systems. Logs are records of events that occur in a system, and they contain information such as the time of the event, the type of event, the source of the event, and other relevant details. Nobody likes to keep making the same mistakes. Our Trace9 4.0 monitoring solution identify patterns to identify reoccurring issues and integrate check results, metrics, and logs in a single web interface, then use that extensive information to simplify your life.

Our Trace9 4.0 monitoring solution monitors, analyzes, and responds to system events in real-time. By collecting and analyzing log data, organizations can improve system performance, enhance security, and meet regulatory requirements

## Features

### Centralized Log Collection:

Trace9 4.0 Log Management module collects logs from different sources such as servers, applications, network devices, and cloud platforms, and stores them in a centralized location.

### Log Retention:

Trace9 4.0 monitoring solution provides long-term log retention capabilities, which allows organizations to maintain a complete record of system activity over time. This can be useful for forensic analysis and trend analysis.

- Collects, measure, combine, and know with greater confidence.
- It gathers data and looks for trends in your log files and log management software.
- Collects and saves the measurements in time-series databases by using integrated writers, such as Elasticsearch.
- It observes log files or uses Elasticsearch to search log databases.
- It creates objects in Trace9 4.0 automatically based on logs by using our Logstash plugin.
- By utilizing Trace9 4.0 solution, you gain a better understanding of logs, and metrics in a single interface. Its intuitive visuals make it easier to evaluate historical data, accelerate debugging, and improve capacity and resource planning.
- Visualize your metrics stored in Graphite in the Trace9 4.0 Monitor interface.
- Use the rich set of templates or create your own.
- Display logs collected with the ELK stack in Trace9 4.0 Monitor.

### Base Alerts On Metrics And Logs

With your collected data stored and structured it's easy to automate checks and notifications. Detect problems automatically and stay in the loop.

- Trace9 4.0 Monitoring solution creates special checks for metrics and logs that trigger alerts based on the results.
- Creates notification rules on any metric or log stream.
- Trace9 4.0 Monitoring solution takes all the available data into account for alerting.
- Always stay informed and confident at any time.

### Real-Time Monitoring:

Trace9 4.0 Log Management module provides real-time monitoring of logs allows IT teams to detect issues as soon as they occur, investigate their root cause, and take proactive measures to prevent future occurrences.

## Advanced Search Capabilities:

Trace9 4.0 Log Management module provides advanced search capabilities that enable IT teams to search logs across multiple sources using keywords, filters, and regular expressions.

## Correlation And Analytics:

Trace9 4.0 Log Management module correlates log data from different sources and performs analytics to identify patterns, anomalies, and trends. This capability can help IT teams gain insights into the overall health and performance of the infrastructure.

## Alerting And Notification:

Trace9 4.0 Log Management module generates alerts and notifications based on predefined conditions, such as error messages, critical events, or security breaches. This feature enables IT teams to take immediate action in response to critical events.

## Compliance And Auditing:

Trace9 4.0 Log Management module provides auditing and compliance capabilities, allowing IT teams to track and report on access to sensitive data, changes to configurations, and other activities.

# Benefits

## Improved Security:

Trace9 4.0 monitoring solution enables security teams to monitor and analyze system logs to detect security threats and vulnerabilities. By tracking and analyzing system logs, security teams can identify unusual activity and respond to potential security breaches in a timely manner.

## Enhanced Troubleshooting:

Trace9 4.0 monitoring solution allows IT teams to quickly identify the root cause of system issues by analyzing log data. This can help reduce downtime and minimize the impact of system outages on business operations.

## Compliance And Auditing:

Trace9 4.0 monitoring solution can help organizations meet regulatory requirements by providing an audit trail of system activity. By keeping a record of all system activity, organizations can demonstrate compliance with regulations and industry standards.

## Improved Performance:

Trace9 4.0 monitoring solution enables IT teams to monitor system performance and identify areas for improvement. By analyzing log data, IT teams can identify performance bottlenecks and optimize system performance.

## Centralized Log Storage:

Trace9 4.0 monitoring solution provides a centralized location for storing logs from multiple sources, which makes it easier for IT teams to manage log data and quickly retrieve relevant information.

## Real-Time Alerts:

Trace9 4.0 monitoring solution generates real-time alerts based on predefined criteria. This can help IT teams quickly identify and respond to critical system events.

# Technology Supported, Protocols, Devices

There are various technologies, protocols, and devices available for Trace9 4.0 Log management. Here are some examples:

## Trace9 4.0 Log Management:

Trace9 is designed to collect, store, and analyze logs generated by various systems and devices.

## SNMP:

Trace9 4.0 monitoring solution supports SNMP (Simple Network Management Protocol) used for monitoring and managing network devices. It also collects logs from devices such as routers, switches, and firewalls.

## Log Collectors:

Trace9 4.0 monitoring solution supports log collectors, devices that are installed on servers or network devices to collect and forward logs to a central log management system. Examples of log collectors include rsyslog, syslog-ng, and Fluentd.

## Cloud-Based Log Management Services:

Trace9 4.0 monitoring solution supports Cloud-based log management services such as AWS CloudWatch, Google Cloud Logging, and Azure Log Analytics provide a scalable and costeffective way to collect, store, and analyze logs in the cloud.

# Module Dependency

In order to implement Trace9 4.0 log management effectively, you will need to consider the following module dependencies:

## Log Collection Module:

This module is responsible for collecting log data from various sources, including servers, applications, and network devices. It may use various log collection protocols such as syslog, SNMP, or agents to collect log data.

## Log Parsing And Normalization Module:

This module is responsible for parsing log data and normalizing it into a consistent format so that it can be easily analyzed and correlated with other log data. It may also perform data enrichment, such as adding metadata and contextual information to the log data.

## Log Storage Module:

This module is responsible for storing log data in a centralized location, such as a log database or a data lake. It should be able to handle large volumes of data and provide fast retrieval and search capabilities.

## Log Analysis Module:

This module is responsible for analyzing log data to identify patterns, trends, and anomalies that may indicate issues or potential security threats. It may use various techniques such as machine learning, anomaly detection, and correlation analysis to identify issues.

## Alerting And Notification Module:

This module is responsible for alerting system administrators or other stakeholders when log data indicates an issue or potential security threat. It may use various notification channels such as email, SMS, or slack to notify stakeholders.

Overall, Trace9 4.0 monitoring solution has all these modules working together seamlessly to provide comprehensive log management capabilities which helps organizations monitor their infrastructure effectively.

# Scalability

Trace9 4.0 Log management can be scaled to a considerable extent by using various techniques and technologies. Here are some examples:

## Distributed Architecture:

Trace9 4.0 Monitoring solution is designed with a distributed architecture that allows them to scale horizontally by adding more servers or nodes to handle the increased log volume.

## Cloud-Based Solutions:

Trace9 4.0 Cloud-based log management services offer virtually infinite scalability, as they can scale up or down as needed based on demand, without requiring upfront capital expenditure for additional hardware.

## Data Compression:

Trace9 4.0 compress log data can help to reduce the amount of storage required while still retaining the ability to search and analyze the data.

## Data Retention Policies:

Trace9 4.0 defines data retention policies that specify how long logs should be kept before they are deleted or archived and can help to reduce the overall amount of data that needs to be stored and managed.

## Automated Log Rotation:

Trace9 4.0 Automated log rotation can also help to manage log data growth by automatically archiving or deleting older logs based on predefined rules.

## High Availability:

Trace9 4.0 Log management module ensures high availability to receive and process logs even in the event of failures or outages.

## Dashboard

# OS Monitoring

## Overview

Trace9 4.0 OS Monitoring collects and analyzes data about the performance and behavior to ensure that the OS is running smoothly, identify potential issues or bottlenecks, and optimize performance. Trace9 4.0 also provides a variety of reporting and visualization features, allowing administrators to view and analyze data in a way that is most useful for their needs. It includes creating custom reports, graphs, and dashboards to track system performance over time.

There are several different types of data collected through Trace9 4.0 OS monitoring, including:

### System Resource Usage:

This includes monitoring the use of CPU, memory, disk I/O, and network I/O.

### Application Performance:

This involves monitoring the performance of specific applications running on the OS, including response times, error rates, and resource usage.

### System Logs:

These are records of system events, errors, and other important information that can be used to diagnose issues and track system behavior over time.

### Security And Compliance:

This involve monitoring the system for potential security threats, vulnerabilities, and compliance with relevant regulations.

Overall, Trace9 4.0 OS monitoring is a critical aspect of system administration, as it helps ensure that the operating system is running smoothly, identify potential issues before they become serious problems, and optimize system performance.

## Features

Here are some of the features of Trace9 4.0 OS monitoring:

### Performance Monitoring:

Trace9 4.0 OS monitoring monitors system performance metrics such as CPU usage, memory usage, disk I/O, and network traffic. This feature helps IT teams identify performance issues and optimize system performance.

### Resource Allocation:

Trace9 4.0 OS monitoring monitors resource utilization and provides insights into resource allocation, allowing IT teams to allocate resources optimally and improve system efficiency.

### Process Monitoring:

Trace9 4.0 OS monitoring monitors running processes and services, identify resourceintensive processes, and terminate or restart them as necessary.

### Security Monitoring:

Trace9 4.0 OS monitors system logs and security events, detects security threats, and alert IT teams in real-time.

### Patch Management:

Trace9 4.0 OS monitoring monitors system patches and updates, identify missing patches, and automate patch management processes to ensure system security and compliance.

## Configuration Management:

Trace9 4.0 OS monitoring monitors system configurations, track changes, and provide insights into configuration drift. This feature helps IT teams maintain system consistency and compliance.

## Benefits

There are several benefits of Trace9 4.0 OS monitoring, including:

## Improved System Performance:

By utilizing Trace9 4.0 monitoring solution resource usage, administrators can identify performance bottlenecks and take steps to optimize system performance.

## Proactive Problem Detection:

Trace9 4.0 OS monitoring can help administrators identify potential issues before they become serious problems. This allows them to take action to prevent downtime or other system issues.

## Improved System Security:

By Trace9 4.0 monitoring solution identify vulnerabilities and take steps to address them before they are exploited by attackers.

## Historical Data Analysis:

Trace9 4.0 OS monitoring allows administrators to collect and analyze historical data about system performance and behavior. This can help them identify trends and patterns that can be used to optimize system performance and prevent issues from occurring in the future.

## Customization And Flexibility:

Trace9 4.0 solution is highly customizable, allowing administrators to configure them to collect the specific data they need and analyze it in the way that is most useful for their environment.

## Real-Time Alerting:

Trace9 4.0 monitoring solution provides real-time alerts when specific thresholds or events are reached, allowing administrators to take immediate action to address potential issues.

## Technology Supported, Protocols, Devices:

**NRPE, NSClient, WMI**

Devices: Windows, Linux, MAC, CPU , CPU Sockets

## Scalability

To effectively monitor such large environments, Trace9 4.0 OS monitoring solutions is much scalable and capable to handle the increased demands placed on them.

There are several factors that can impact the scalability of an Trace9 4.0 OS monitoring module, including:

## Data Collection:

The more data that is collected by the Trace9 4.0 OS monitoring module, the greater the demands placed on the system. Trace9 4.0 OS monitoring module is scalable enough to efficiently collect and process large amounts of data from multiple sources.

## Data Storage:

As the amount of data being collected grows, so does the need for scalable storage solutions. Trace9 4.0 OS monitoring module stores large amounts of data in a way that is efficient and cost-effective.

## Performance:

Scalable Trace9 4.0 OS monitoring module is capable of handling the increased performance demands placed on them as the number of systems being monitored grows. This can include the ability to handle increased network traffic, handle large amounts of data, and process and analyze data in real-time.

## Deployment:

Scalable Trace9 4.0 monitoring solution is easy to deploy and manage across large numbers of systems. This can include the ability to deploy monitoring agents to systems automatically and manage them from a centralized management console.

To achieve scalability in Trace9 4.0 OS monitoring module, trace9 4.0 utilizes distributed architectures, where data collection and processing is spread across multiple servers or nodes. This allows the system to scale up or down as needed, depending on the number of systems being monitored.

# APP Monitoring

## Overview

Trace9 4.0 Monitoring solution collects and analyzes the data related to the performance and behavior of software applications. The goal of Trace9 4.0 application monitoring is to identify and diagnose issues that may be affecting the performance of the application, such as slow response times, errors, or other issues that can impact the user experience.

It monitors a wide range of software applications, including web applications, mobile applications, desktop applications, and more. The data collected through application monitoring can help developers and system administrators identify potential issues and take action to address them.

Some common types of data that are collected through Trace9 application monitoring which includes:

### 1. Response Time:

The time it takes for the application to respond to user requests.

### 2. Error Rates:

The frequency of errors occurring in the application.

### 3. Resource Utilization:

The number of resources, such as CPU, memory, and disk I/O, being used by the application.

### 4. User Behavior:

The actions taken by users within the application, such as clicks, searches, and other interactions.

## Infrastructure Monitoring:

Trace9 4.0 monitoring solution monitors the underlying infrastructure that supports the application, such as servers, databases, and network connections.

The data collected through Trace9 4.0 Application Monitoring can be used to improve application performance, diagnose issues, and optimize resource utilization. Organizations can quickly identify and address issues that may be impacting the user experience, improving overall application performance, and ensuring a better user experience.

## Features

Here are some features of Trace9 4.0 Application Monitoring solution:

## Real-Time Application Monitoring:

Trace9 4.0 Application Monitoring provides real-time insights into application performance, including response times, throughput, and error rates.

## End-User Experience Monitoring:

Trace9 4.0 Application Monitoring monitors the end-user experience to detect and diagnose issues that impact user experience, such as slow page loads, broken links, or other errors.

## Tracing:

Trace9 4.0 Application Monitoring provides transaction tracing to identify bottlenecks in the application and to diagnose problems that occur across different components of the application.

## Code-Level Diagnostics:

Trace9 4.0 Application Monitoring provides code-level diagnostics to identify issues that occur at the code level, such as memory leaks or performance issues.

## Alerting And Notifications:

Trace9 4.0 Application Monitoring provides alerting and notification capabilities to notify IT staff when issues occur, enabling them to respond quickly and minimize downtime.

# Benefits

Some of the key benefits of Trace9 4.0 Application monitoring include:

## Improved Performance:

Trace9 4.0 Application monitoring allows system administrators to identify and diagnose performance issues, such as slow response times, errors, and other issues that can impact the user experience. By addressing these issues, organizations can improve the overall performance of their applications, leading to better user satisfaction and increased productivity.

## Increased Uptime:

Trace9 4.0 Application monitoring can help detect issues that may cause downtime, such as server failures or other hardware problems. By detecting these issues early, organizations can take action to prevent downtime and maintain high levels of availability for their applications.

## Faster Issue Resolution:

With real-time monitoring of applications, developers and system administrators can quickly identify and diagnose issues, reducing the time it takes to resolve problems and get applications back up and running.

## Better Resource Utilization:

By Trace9 4.0 monitoring resource utilization, such as CPU, memory, and disk I/O, organizations can identify opportunities to optimize resource usage and reduce costs.

## Proactive Issue Prevention:

Trace9 4.0 Application monitoring can help identify potential issues before they impact users, allowing organizations to take proactive steps to prevent issues from occurring in the first place.

## Increased Visibility:

Trace9 4.0 Application monitoring provides a high level of visibility into the performance and behavior of applications, allowing developers and system administrators to identify trends and patterns that may not be immediately apparent otherwise.

## Scalability:

Trace9 4.0 Application monitoring solutions can be scaled to monitor large numbers of applications and systems, providing organizations with the ability to monitor their entire application portfolio from a single location.

Overall, Trace9 4.0 application monitoring is an essential process for ensuring the health and performance of modern software applications.

# Supported Protocols, Devices:

**NRPE, NSClient, WMI**

## Instances Based

## Module Dependency

Trace9 4.0 Application Monitoring module is dependent on Agents' installation on the servers.

## Scalability

There are several key factors that can impact the scalability of Trace9 4.0 application monitoring solution:

### Data Collection:

The amount of data collected from an application can increase significantly as the application grows. Trace9 4.0 monitoring solution collects and processes this data efficiently, without causing performance degradation or bottlenecks.

### Data Storage:

As the amount of data collected from an application increase, so does the need for storage. Trace9 4.0 monitoring solution large volumes of data efficiently and securely, without running out of disk space or becoming too expensive.

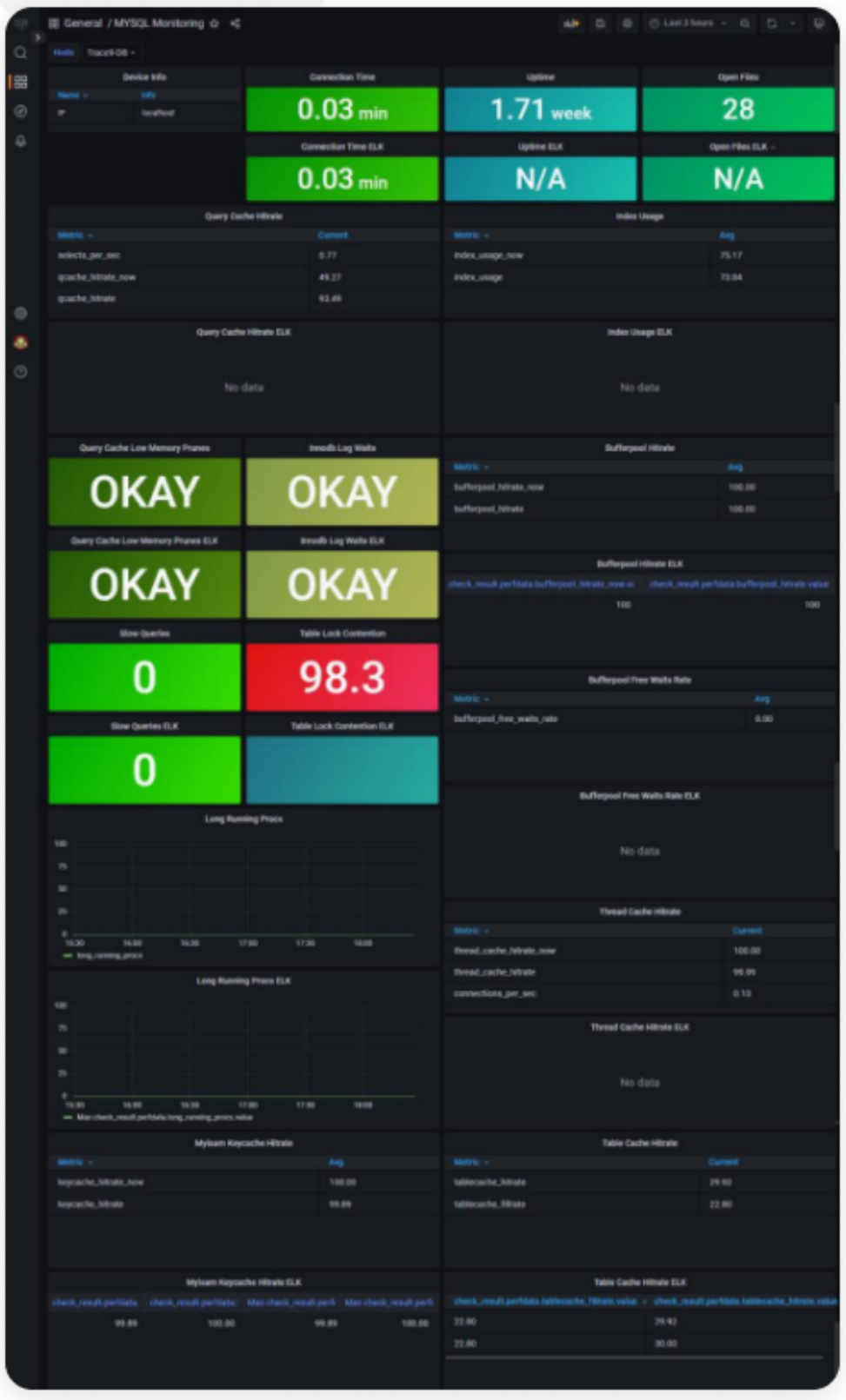
### Data Processing:

Analyzing and processing large amounts of data can be a resource-intensive task. Trace9 4.0 monitoring solution process data quickly and efficiently, without causing performance issues or becoming a bottleneck.

### Alerting And Reporting:

As the amount of data collected from an application increase, so does the need for more sophisticated alerting and reporting mechanisms Trace9 4.0 monitoring solution generates alerts and reports quickly and accurately, without becoming overwhelmed by the volume of data.

## Dashboard



# Web Server Monitoring

## Overview

Trace9 4.0 Web server monitoring tracks the performance and health of a web server to ensure that it is operating optimally and efficiently. It detects issues that may impact the server's performance or availability and to take corrective action to minimize any downtime. It observes and analyzes the various parameters and metrics related to a web server, which includes network connectivity, server uptime, resource utilization, and performance indicators.

## Features

Here are some of the features of Trace9 4.0 application monitoring:

### Performance Monitoring:

Trace9 4.0 application monitoring monitors the key performance metrics such as response time, throughput, and error rate. This feature helps IT teams identify performance bottlenecks and optimize application performance.

### User Experience Monitoring:

Trace9 4.0 application monitoring monitors user interactions with the application, such as page load times, transaction times, and error messages. This feature helps IT teams understand user experience and identify issues that affect user satisfaction.

### End-To-End Monitoring:

Trace9 4.0 application monitoring monitors the entire application stack, including application servers, databases, network components, and third-party services. This feature helps IT teams identify issues that span multiple components and take corrective action.

### Code-Level Visibility:

Trace9 4.0 application monitoring provides code-level visibility, allowing IT teams to trace application performance issues to specific lines of code. This feature helps developers optimize code performance and improve overall application performance.

### Alerting And Notification:

Trace9 4.0 application monitoring monitors generates alerts and notifications based on predefined conditions, such as slow response times, errors, or system downtime. This feature enables IT teams to take immediate action in response to critical events.

### Analytics And Reporting:

Trace9 4.0 application monitoring provides analytics and reporting capabilities, allowing IT teams to gain insights into application performance trends, user behavior, and system usage.

## Benefits

There are numerous benefits and features of Tracee9 4.0 web server monitoring, including:

### Improved Server Uptime:

Trace9 4.0 Web server monitoring ensures that any issues that might cause server downtime are detected and resolved promptly, thereby improving server uptime.

### Faster Issue Resolution:

Trace9 4.0 Web server monitoring provides quick and accurate visibility into the performance and health of the server, which can help in faster resolution of issues, before they escalate into more significant problems.

## Better Server Performance:

Trace9 4.0 Web server module monitors the server's performance metrics such as response time, network latency, and server load can help in optimizing server performance, leading to faster and more reliable web pages for users.

## Enhanced Security:

Trace9 4.0 Web server monitoring helps in detecting potential security threats and breaches and takes timely corrective actions, thereby enhancing server security.

## Efficient Resource Utilization:

It monitors the resource utilization such as CPU, memory, and disk space and can help identify opportunities for optimization and improved server efficiency.

## Technology Supported, Protocols, Devices:

**NRPE, NSClient, SNMP, ICMP**

## Module Dependency

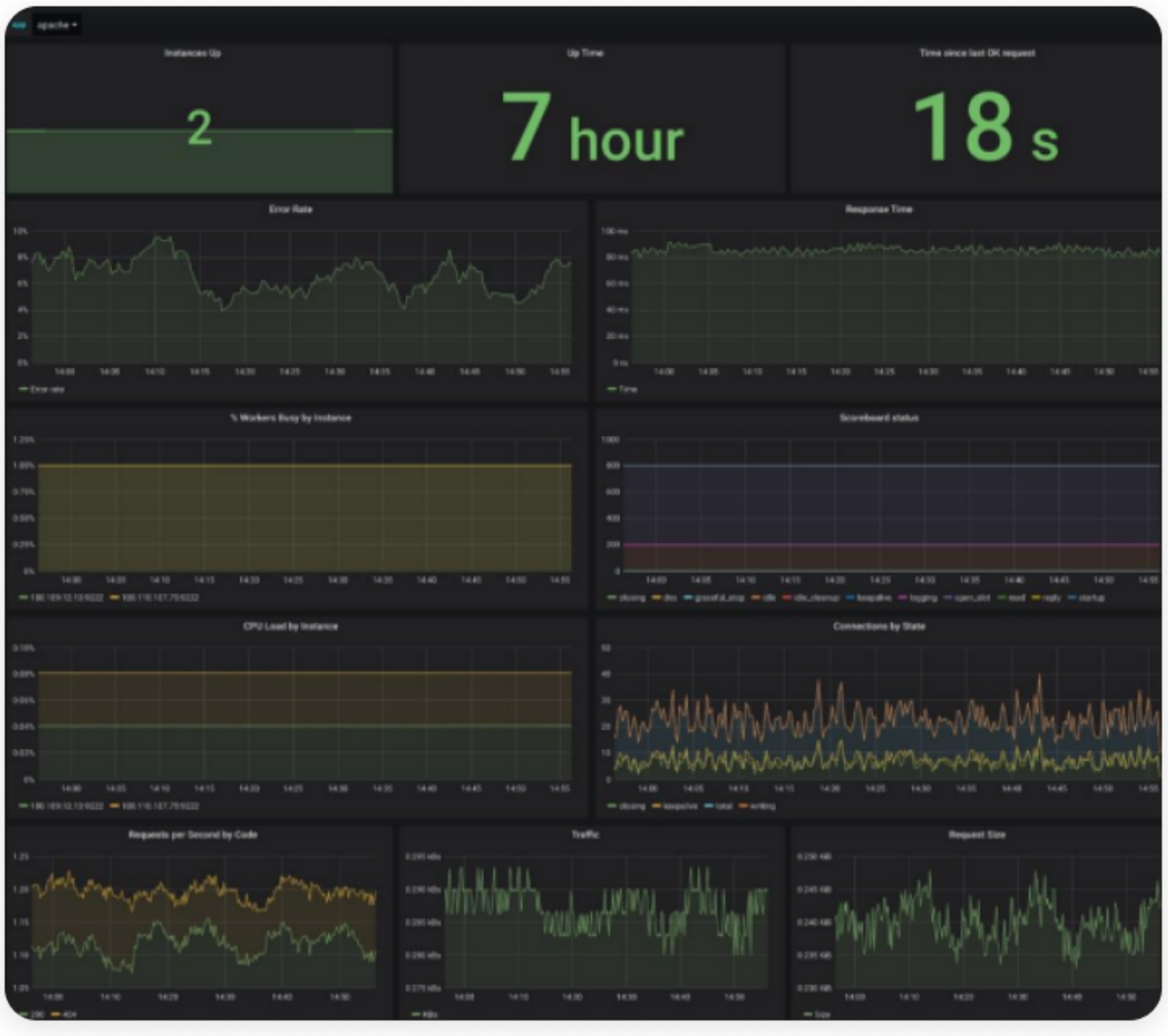
Trace9 4.0 Web Server Monitoring module is dependent on NRPE Agent.

## Scalability

To achieve scalability in web server monitoring, Trace9 is configured with scalability in mind. This includes the ability to handle large volumes of data, the ability to distribute the monitoring load across multiple servers, and the ability to easily add or remove monitoring nodes as needed.

In addition, Trace9 4.0 monitoring solution will provide real-time alerts and notifications to help identify and resolve issues before they impact users. It also generates reports and visualizations that provide actionable insights into the performance of the web server environment. Trace9 4.0 scalable monitoring solution ensures accurate and actionable insights into the performance of the web server environment.

## Dashboards



# DB Monitoring

## Overview

Trace9 4.0 Database Monitoring tracks the performance, health, and security of a database system. It involves tracking various metrics and events that occur within a database, such as CPU usage, memory usage, disk I/O, query performance, and other database-specific indicators. It also ensures the availability and reliability of a database system, as well as to detect and troubleshoot potential issues before they become serious problems. Trace9 4.0 Database monitoring can also help with capacity planning, as it allows administrators to identify trends and patterns in database usage and plan for future growth accordingly.

It establishes baseline metrics and thresholds, regularly reviewing and analyzing performance metrics, and taking proactive measures to optimize database performance and prevent issues from occurring.

## Features

Here are some features of Trace9 4.0 database monitoring:

### Performance Monitoring:

Trace9 4.0 Database monitoring provides real-time performance metrics for the database, including CPU utilization, memory usage, disk I/O, and query response times. This helps identify performance bottlenecks and optimize the database for better performance.

### Availability Monitoring:

Trace9 4.0 Database monitoring ensures that the database is available and accessible to users at all times. It provides alerts when the database is down or unavailable and helps identify the root cause of the issue.

### Security Monitoring:

Trace9 4.0 Database monitoring helps identify and prevent security threats, such as SQL injection attacks, unauthorized access, and data breaches. It provides real-time alerts when suspicious activities are detected and helps prevent data loss or theft.

### Query Analysis:

Trace9 4.0 Database monitoring provides detailed analysis of SQL queries and helps identify poorly performing queries, long-running queries, and other issues that can impact database performance.

### Capacity Planning:

Trace9 4.0 Database monitoring provides insights into database growth trends and helps plan for future capacity needs. It can also help identify unused or underutilized resources and optimize the database infrastructure.

### Compliance Monitoring:

Trace9 4.0 Database monitoring ensures compliance with regulatory requirements, such as HIPAA, PCI-DSS, and GDPR. It provides real-time alerts when compliance violations are detected and helps maintain audit trails and logs.

## Benefits

Here are some benefits of Trace9 4.0 database monitoring:

### Improved Performance:

Trace9 4.0 Database monitoring monitors key performance metrics such as CPU usage, memory usage, and disk I/O. This feature helps identify performance bottlenecks and optimize database performance, ensuring faster query response times.

### Enhanced Security:

Trace9 4.0 Database monitoring monitors security events and audit logs, detect anomalies, and alert IT teams in real-time. This feature helps ensure the security and compliance of sensitive data stored in databases.

## Availability Monitoring:

Trace9 4.0 Database monitoring monitors the availability of databases, detects database downtime, and alert IT teams in real-time. This feature helps ensure the availability and uptime of critical databases, reducing the risk of downtime and data loss.

## Resource Optimization:

Trace9 4.0 Database monitoring monitors resource utilization, identify resource-intensive queries, and optimize resource allocation to ensure maximum efficiency.

## Capacity Planning:

Trace9 4.0 Database monitoring provides insights into database usage trends, predicts future usage, and helps IT teams plan for capacity upgrades or migrations.

## Troubleshooting:

Trace9 4.0 Database monitoring provides detailed diagnostics and insights into database issues, making it easier for IT teams to troubleshoot and resolve database problems quickly.

# Technology Supported, Protocols, Devices:

**MySQL, MSSQL, Oracle, Redis, PostgreSQL, Protocols Supported SNMP, ICMP**

# Module Dependency

Some common dependencies for Trace9 4.0 database monitoring might include:

## Database Drivers:

To monitor a particular type of database (e.g., MySQL, Oracle, etc.), the Trace9 4.0 database monitoring has the appropriate database drivers installed. These drivers allow the Trace9 4.0 monitoring solution to communicate with the DBMS and collect data.

## Query Execution:

The Trace9 4.0 database monitoring executes queries against the database in order to collect performance data. This may require the installation of additional software components or libraries.

## Access Credentials:

To connect to the database and collect data, the Trace9 4.0 database monitoring has the appropriate access credentials (e.g., username and password). These credentials are securely stored and managed by the Trace9 4.0 monitoring solution.

## Network Connectivity:

The Trace9 4.0 database monitoring connects to the database server over the network in order to collect data. This may require firewall rules or other network configuration changes.

## Data Storage:

The Trace9 4.0 database monitoring stores the data collected from the database in a way that allows it to be easily analyzed and visualized. This may require the use of a specific type of database or data storage solution.

# Scalability

Here are some ways to ensure scalability for Trace9 4.0 database monitoring:

## Use A Distributed Monitoring Architecture:

By deploying Trace9 4.0 database monitoring agents on multiple servers, you can distribute the load of monitoring across multiple nodes.

## Implement A Data Collection Strategy:

Collecting all data from all databases can quickly become overwhelming. Instead, Trace9 4.0 database monitoring develops a data collection strategy that focuses on collecting only the data that is relevant to your monitoring goals.

## Leverage Cloud-Based Monitoring Solutions:

Cloud-based monitoring solutions can provide elastic scalability, allowing you to scale up or down based on demand.

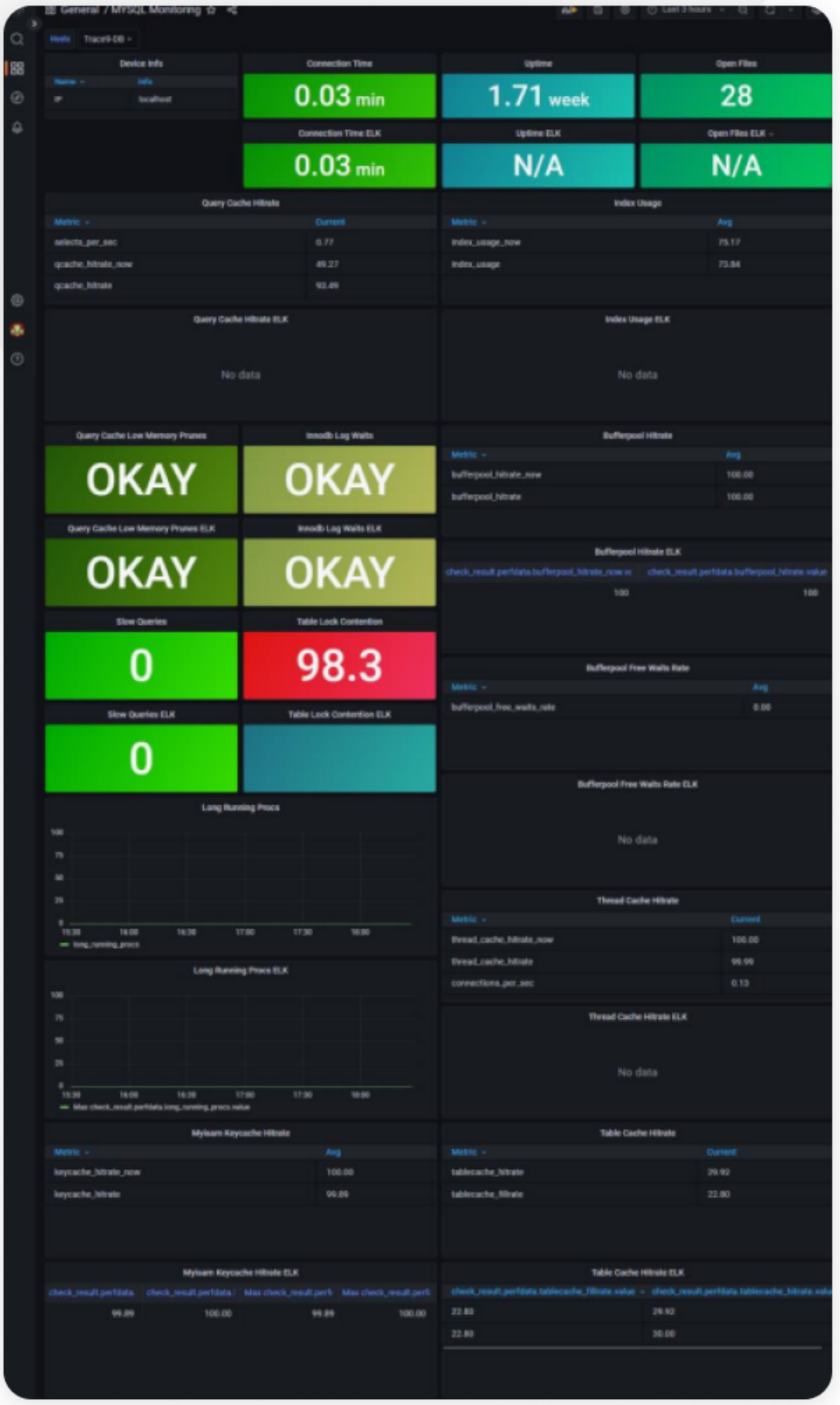
## Use A Time-Series Database:

Traditional databases may struggle to handle the high volume and velocity of monitoring data. A time-series database is specifically designed to handle time-stamped data and can provide high scalability for large volumes of monitoring data.

## Automated Processes:

As the size and complexity of your database system grows, manually managing and monitoring it becomes increasingly difficult. Trace9 4.0 database monitoring automates your monitoring processes and helps you to scale your database to ensure that you are capturing all the data you need without overburdening your team.

## Dashboard



# Cloud Monitoring

## Overview

Trace9 4.0 Cloud Monitoring observes and analyzes the performance and availability of resources and services in a cloud environment. It involves monitoring various aspects of the cloud infrastructure, such as servers, networks, applications, databases, and storage, to ensure that they are running efficiently and effectively. By monitoring these metrics, organizations can identify potential issues and take proactive measures to address them before they affect the user experience or impact business operations.

## Features

Here are some of the features of Trace9 4.0 Cloud Monitoring:

### Real-Time Monitoring:

Trace9 4.0 Cloud Monitoring provides real-time monitoring of resources and services within the cloud environment. This enables organizations to identify issues as soon as they occur and take immediate action to address them.

### Automated Alerts:

Trace9 4.0 Cloud Monitoring configure to automatically send alerts when certain conditions or thresholds are met. This ensures that administrators are notified of potential issues or performance degradation, enabling them to respond quickly.

### Resource Utilization Tracking:

Trace9 4.0 Cloud Monitoring tracks resource utilization across the cloud environment, providing insights into how resources are being used and where optimizations can be made. This can help organizations optimize their cloud infrastructure and save costs.

### Application Performance Monitoring:

Trace9 4.0 Cloud Monitoring monitors application performance within the cloud environment, providing insights into response times, error rates, and other key metrics. This can help organizations ensure that their applications are running efficiently and providing a high-quality user experience.

### Historical Analysis:

Trace9 4.0 Cloud Monitoring stores historical data about the performance and utilization of resources within the cloud environment. This enables administrators to analyze trends and identify patterns over time, providing insights into long-term performance and capacity planning.

### Scalability:

Trace9 4.0 Cloud Monitoring scales with the cloud environment, providing visibility and insights into resources and services as they are added or removed. This enables organizations to manage and optimize their cloud infrastructure as it grows and changes.

## Benefits

### Improved Reliability:

Trace9 4.0 loud monitoring helps organizations improve the reliability of their cloud infrastructure by identifying and addressing issues before they cause downtime or performance degradation.

### Faster Problem Resolution:

Trace9 4.0 Cloud monitoring enables administrators to quickly identify and diagnose issues within the cloud environment, reducing the time required to resolve problems and minimizing their impact on the business.

## Enhanced Security:

Trace9 4.0 Cloud monitoring can help organizations identify and respond to security threats within the cloud environment, improving overall security posture and reducing the risk of data breaches.

## Better Resource Utilization:

Trace9 4.0 Cloud monitoring enables organizations to optimize resource utilization within the cloud environment, ensuring that resources are being used efficiently and cost effectively.

## Improved User Experience:

Trace9 4.0 Cloud monitoring helps organizations ensure that their cloudbased applications and services are delivering a high-quality user experience, which can lead to increased user satisfaction and retention.

## Cost Savings:

Trace9 4.0 Cloud monitoring can help organizations save costs by identifying inefficiencies within the cloud environment and providing insights into how to optimize resource usage.

## Cloud Platform: **AWS, Azure, Google Cloud Platform, Oracle Cloud and Office365**

## Certificate Monitoring: **Certificate Issuer, Expiry, Public Key, Signature Algorithm and more.**

## Scalability

To ensure scalability, Trace9 4.0 cloud monitoring solutions is designed with the following considerations in mind:

## Distributed Architecture:

Trace9 4.0 cloud monitoring enables them to scale horizontally, adding additional resources and processing power as needed.

## Cloud-Native Technology:

Trace9 4.0 cloud monitoring is built using cloud-native technologies that are designed to run in the cloud environment and leverage its scalability and elasticity.

## Automation:

Trace9 4.0 cloud monitoring automates tasks such as data collection, analysis, and alerting, reducing the need for manual intervention and enabling faster response times.

## Integration:

Trace9 4.0 cloud monitoring integrates with other cloud services and tools, such as cloud orchestration platforms, to provide a seamless and integrated monitoring experience.

## Dashboard

# XFlow Monitoring

## Overview

Trace9 4.0 Network XFlow monitoring analyzes the data flowing over a computer network to understand the patterns of communication and identify potential issues or threats. It captures and analyzes a wide range of network protocols, including IP, TCP, UDP, ICMP, and many others. Trace9 4.0 XFlow monitoring analyze both packet and flow-level data to provide a more comprehensive understanding of network activity.

Trace9 XFlow monitoring identify potential security threats, such as denial of service attacks or malware infections, and to help optimize network performance by identifying bottlenecks and optimizing network resources. It can also be used to monitor network usage and provide detailed reports on network activity.

## Features

Some of the key features of Trace9 4.0 Network XFlow monitoring include:

### Real-Time Traffic Monitoring:

X Trace9 4.0 Network XFlow monitoring monitors network traffic in real-time, providing insights into network behavior, traffic patterns, and anomalies. This feature helps IT teams detect and respond to network issues quickly.

### Flow Data Analysis:

Trace9 4.0 Network XFlow monitoring collects and analyzes flow data from various sources, including NetFlow, sFlow, IPFIX, and J-Flow. This feature helps IT teams gain insights into network performance and behavior and identify issues that affect network availability and performance.

### Bandwidth Utilization Monitoring:

Trace9 4.0 Network XFlow monitoring monitors bandwidth utilization across the network, identify top talkers, and detect bandwidth-intensive applications. This feature helps IT teams optimize network performance and ensure that critical applications have sufficient bandwidth.

### Network Security Monitoring:

Trace9 4.0 Network XFlow monitoring monitors network traffic for security threats, such as malware, ransomware, and DDoS attacks. This feature helps IT teams detect and respond to security incidents quickly, reducing the risk of data loss and downtime.

### Application Performance Monitoring:

Trace9 4.0 Network XFlow monitoring monitors application performance across the network, identify application bottlenecks, and optimize application performance. This feature helps IT teams ensure that critical applications are performing optimally and meeting service-level agreements.

### Network Troubleshooting:

Trace9 4.0 Network XFlow monitoring provides detailed diagnostics and insights into network issues, making it easier for IT teams to troubleshoot and resolve network problems quickly.

## Benefits

Here are some benefits of Trace9 4.0 XFlow Monitoring:

### Comprehensive Visibility:

Trace9 4.0 XFlow monitoring provides a comprehensive view of all traffic flows across the network, regardless of protocol or port number.

### Real-Time Analysis:

Trace9 4.0 XFlow monitoring provides real-time analysis of network traffic, allowing administrators to quickly identify and respond to issues as they arise.

## Security Analysis:

Trace9 4.0 XFlow monitoring can be used for security analysis, such as detecting and preventing network attacks or identifying potentially malicious behavior.

## Resource Optimization:

Trace9 4.0 XFlow monitoring can help administrators optimize network resources by identifying bandwidth-intensive applications or users and allowing for more efficient network design and management.

## Capacity Planning:

Trace9 4.0 XFlow monitoring provides insight into network capacity utilization, allowing administrators to plan for future network expansion or upgrades.

## Historical Analysis:

Trace9 4.0 XFlow monitoring can store historical flow data, allowing for retrospective analysis of network traffic and troubleshooting of past issues.

## Cost-Effective:

Trace9 4.0 XFlow monitoring is a cost-effective monitoring solution because it uses existing network infrastructure to collect data, reducing the need for additional monitoring hardware.

## Technology Supported, Protocols, Devices: **IP, TCP, UDP, ICMP**

## Module Dependency

Trace9 4.0 Network XFlow Monitoring module is dependent on Net flow Protocol

## Scalability

The scalability of Trace9 4.0 XFlow monitoring depends on several factors, including the size of the network, the number of devices on the network, the volume of traffic, and the complexity of the network protocols.

Trace9 4.0 XFlow monitoring is highly scalable, but it requires the use of specialized hardware and software to handle the high volumes of network traffic. To scale Trace9 4.0 XFlow monitoring, it may be necessary to use distributed systems that can handle large amounts of data and distribute the processing load across multiple nodes.

## Dashboards

# HCI Monitoring:

## Overview

Trace9 4.0 HCI monitors and manage hyper-converged infrastructure (HCI) systems by integrating compute, storage, and networking into a single system, with the goal of simplifying data center management and improving scalability and performance.

It is critical for ensuring that the HCI system is functioning properly, that performance meets expectations, and that issues are identified and resolved quickly. This involves monitoring key performance metrics, such as CPU usage, memory usage, disk I/O, network traffic, and latency.

## Features

Some of the key features of Trace9 4.0 Network XFlow monitoring include:

### Real-Time Monitoring:

Trace9 4.0 HCI monitoring provides real-time monitoring of performance metrics, allowing administrators to identify issues and take corrective action quickly.

### Alerting And Notifications:

Trace9 4.0 HCI monitoring sends alerts and notifications when performance metrics fall outside of established thresholds or when issues are identified.

### Visualization And Reporting:

Trace9 4.0 HCI monitoring visualize and report key performance metrics, allowing administrators to identify trends and patterns over time.

## Benefits

Here are some benefits of Trace9 4.0 HCI Monitoring:

### Proactive Issue Identification And Resolution:

Trace9 4.0 HCI monitoring enables proactive identification of issues before they become major problems. With real-time monitoring and alerts, IT teams can take prompt action to resolve issues and prevent service disruptions.

### Improved Performance And Uptime:

Trace9 4.0 HCI monitoring ensures that the system is performing at optimal levels and that there is no degradation in performance over time. This results in improved uptime, which is critical for business continuity.

### Cost Optimization:

By monitoring HCI systems, organizations can identify underutilized resources and optimize their usage, resulting in cost savings.

### Enhanced Security:

Trace9 4.0 HCI monitoring provides insights into security vulnerabilities and suspicious activity, enabling IT teams to take proactive measures to enhance security.

### Simplified Management:

Trace9 4.0 HCI monitoring provides a single view of the entire infrastructure, simplifying management and reducing the need for manual monitoring and troubleshooting.

## Scalability

Trace9 4.0 HCI monitoring scales with the infrastructure and provides the ability to monitor many nodes or resources, where monitoring agents or probes can be deployed across the infrastructure to collect data and send it to a central monitoring server or dashboard.

To ensure scalability, Trace9 4.0 HCI monitoring have the following characteristics:

### Low Impact On The Infrastructure:

Trace9 4.0 HCI monitoring has a low impact on the HCI system's resources to ensure that monitoring does not affect system performance.

### Efficient Data Collection And Processing:

Trace9 4.0 HCI monitoring collects and processes large volumes of data efficiently, without affecting performance.

### Distributed Architecture:

Trace9 4.0 HCI monitoring is designed with a distributed architecture to enable scalability and to support the addition of new resources.

### Dynamic Scaling:

Trace9 4.0 HCI monitoring dynamically scales up or down to meet changing monitoring requirements.

### Automation:

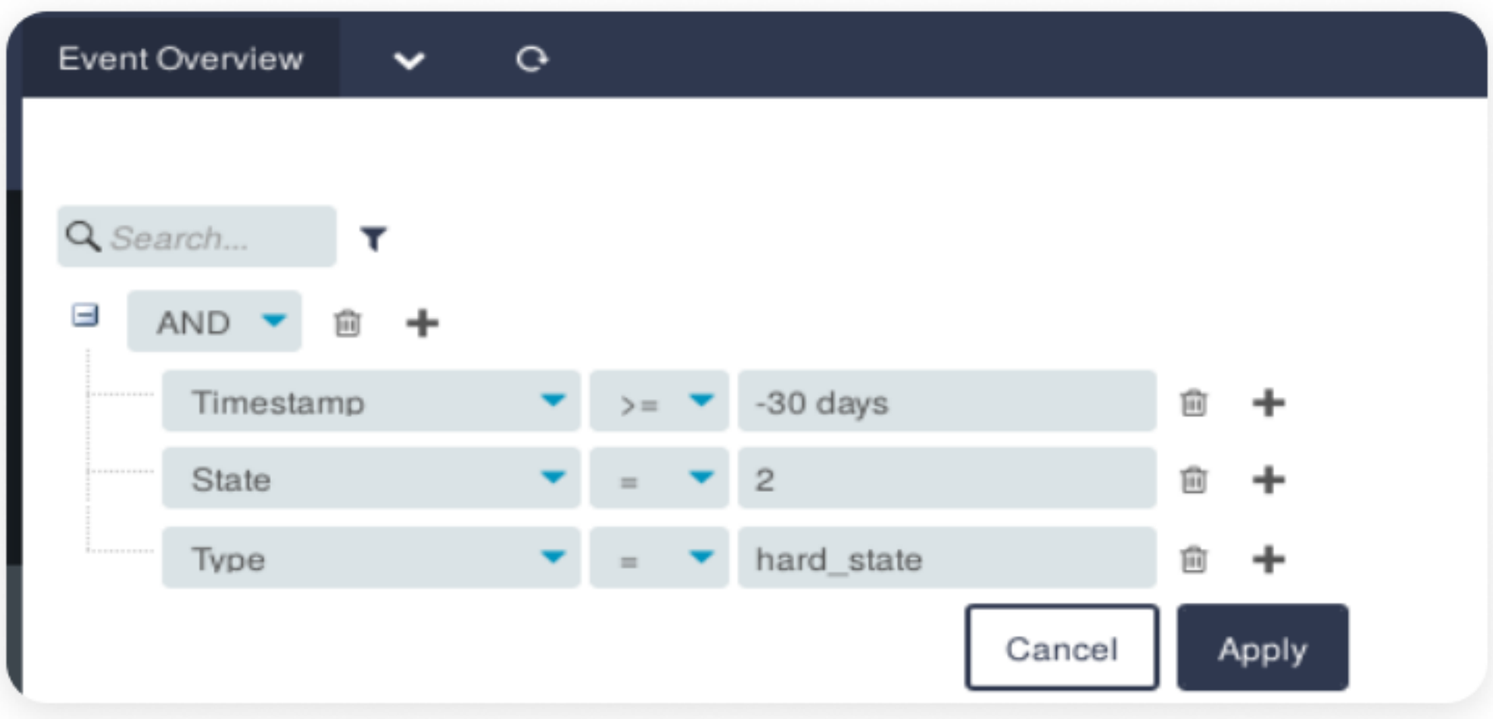
Trace9 4.0 HCI monitoring provides automation capabilities to reduce the need for manual intervention and to ensure that monitoring is consistent and accurate.

# Conditional, Correlation, Value Chain Monitoring

## Overview

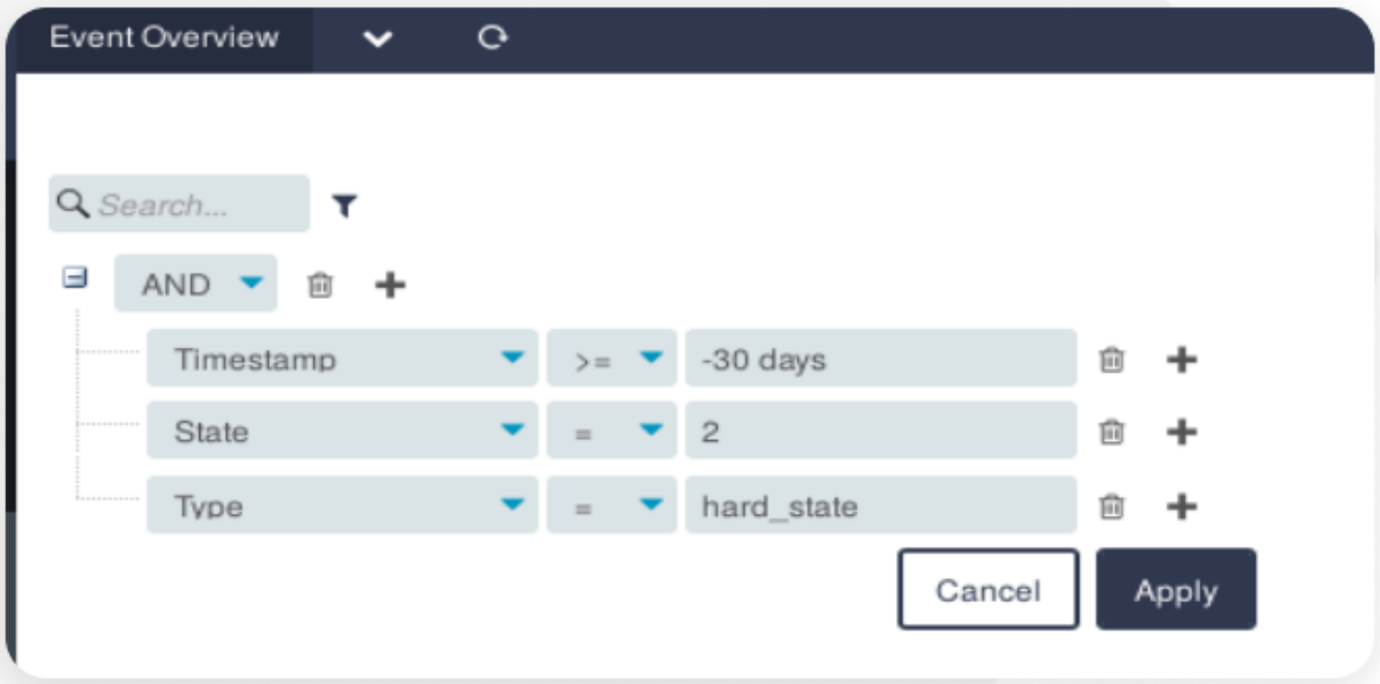
### Trace9 4.0 Conditional Monitoring:

Monitors the specific conditions or events within an IT system or infrastructure and makes triggering alerts or actions when those conditions or events occur. It is used to track a wide range of metrics and conditions within an IT infrastructure, including network bandwidth, disk usage, application performance, and more. By setting up specific conditions and actions, IT teams can proactively identify and address issues before they cause downtime or other problems and ensure that critical systems are always up and running smoothly.



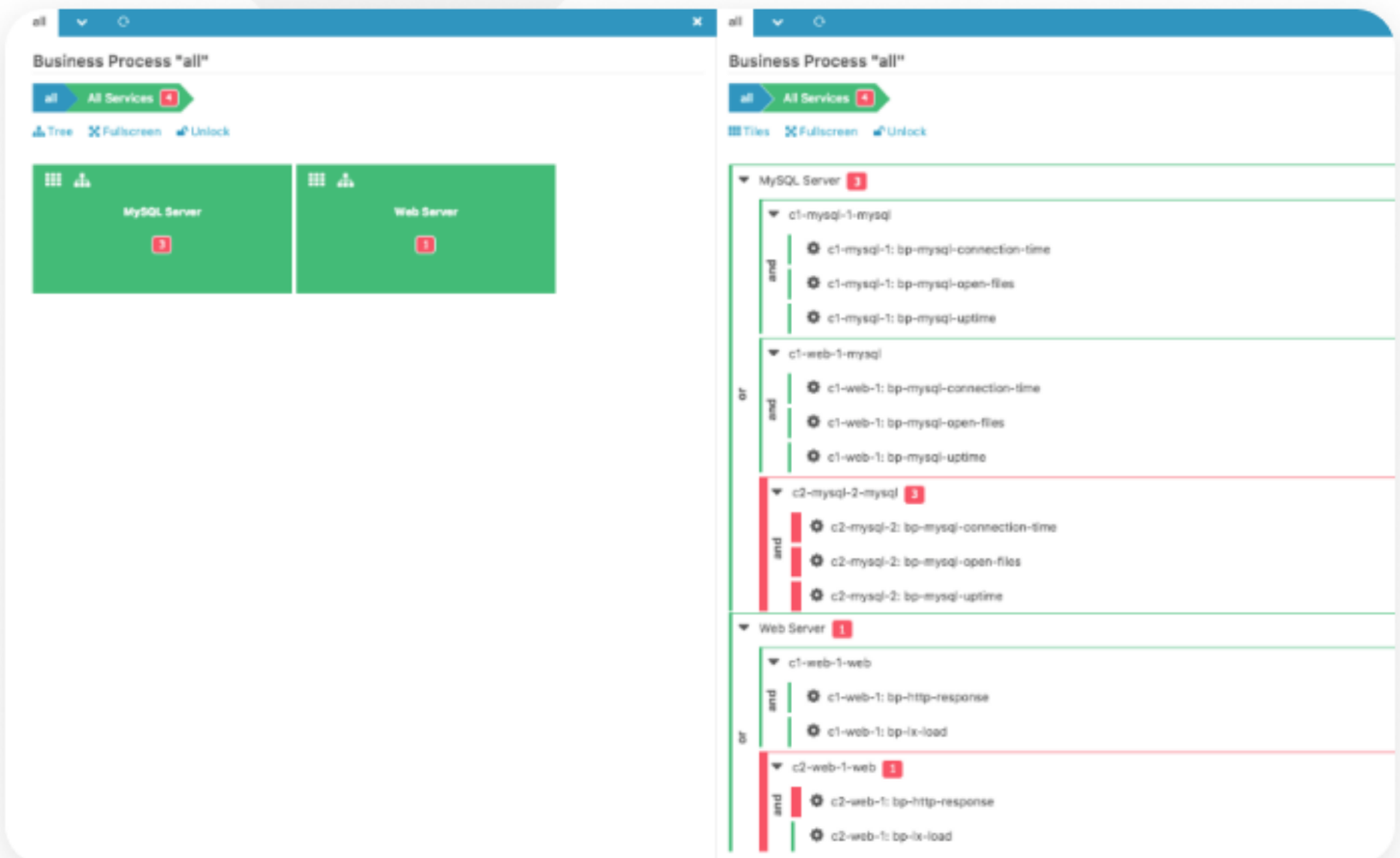
## Trace9 4.0 Correlation Monitoring:

Analyzes relationships between different metrics or events within an IT system or infrastructure, in order to identify patterns or anomalies that could indicate underlying issues. It is used to identify a wide range of issues within an IT infrastructure, including network congestion, application performance issues, security threats, and more. By analyzing relationships between different metrics and events, IT teams can gain a deeper understanding of how their infrastructure is functioning and identify issues that might not be immediately apparent from a single metric or event. This can help organizations to proactively address issues before they cause downtime or other problems.




## Trace9 4.0 Value Chain Monitoring

monitors the entire lifecycle of an IT service, from development to deployment to maintenance, in order to optimize efficiency and ensure that the service is meeting business requirements and customer needs. By monitoring the entire value chain and identifying areas for improvement, IT teams can ensure that their services are meeting business requirements, delivering value to customers, and operating efficiently and effectively.




## Features

Here are some of the features of **Trace9 4.0 Conditional, Correlation, Value chain Monitoring:**

## Conditional Monitoring:

### 1. Threshold-Based Alerts:

Trace9 4.0 Conditional monitoring sets thresholds for specific metrics or events, and trigger alerts when those thresholds are crossed.

### 2. Historical Data Analysis:

Trace9 4.0 Conditional monitoring analyzes trends and patterns in historical data to identify potential issues or anomalies.

### 3. Event Correlation:

Trace9 4.0 Conditional monitoring correlates events across different parts of the infrastructure to identify potential issues or root causes.

## Correlation Monitoring:

### 1. Cross-Metric Analysis:

Trace9 4.0 Correlation monitoring analyzes the relationship between different metrics and events to identify patterns or anomalies.

### 2. Root Cause Analysis:

Trace9 4.0 Correlation monitoring drill down into the root cause of issues by analyzing correlations between different events or metrics.

### 3. Real-Time Monitoring:

Trace9 4.0 Correlation monitoring monitors correlations in real-time, and trigger alerts or actions when issues arise.

## Value Chain Monitoring:

### 1. End-To-End Monitoring:

Trace9 4.0 Value chain monitoring monitors the entire lifecycle of an IT service, from development to deployment to maintenance

### 2. Business Metrics Tracking:

Trace9 4.0 Value chain monitoring tracks metrics that are important to the business, such as customer satisfaction or revenue

### 3. Process Optimization:

Trace9 4.0 Value chain monitoring identifies areas of inefficiency or waste in the value chain, and optimize processes to improve efficiency and reduce costs

# Benefits

There are several **Benefits** of using **Conditional, Correlation, and Value Chain monitoring** in an infrastructure monitoring solution:

## Conditional Monitoring:

### 1. Proactive Issue Resolution:

By setting up alerts based on specific conditions, IT teams can proactively identify and address issues before they cause downtime or other problems.

### 2. Reduced MTTR (Mean Time To Resolution):

By quickly identifying and resolving issues, IT teams can reduce the time it takes to resolve problems and get systems back up and running.

### 3. Improved System Performance:

By monitoring key metrics and events, IT teams can identify areas where system performance can be optimized and take action to improve performance.

## Correlation Monitoring:

### 1. Early Issue Detection:

By analyzing relationships between different metrics and events, IT teams can identify issues before they cause downtime or other problems.

### 2. Faster Root Cause Analysis:

By drilling down into the root cause of issues, IT teams can quickly identify and resolve problems, reducing MTTR.

### 3. Better Infrastructure Visibility:

By monitoring correlations across different parts of the infrastructure, IT teams can gain a deeper understanding of how their infrastructure is functioning and identify areas for improvement.

## Value Chain Monitoring:

### 1. Improved Service Quality:

By monitoring the entire lifecycle of an IT service, IT teams can ensure that the service is meeting business requirements and customer needs.

### 2. Process Optimization:

By identifying areas of inefficiency or waste in the value chain, IT teams can optimize processes to improve efficiency and reduce costs.

### 3. Better Business Alignment:

By tracking metrics that are important to the business, such as customer satisfaction or revenue, IT teams can ensure that their services are aligned with business goals and objectives.

Overall, using a combination of Trace9 4.0 conditional, correlation, and value chain monitoring helps IT teams to proactively identify and address issues in their infrastructure, improve system performance, and align their services with business goals and objectives.

# Open Shift Monitoring

## Overview

The Openshift Monitoring Module for Trace9 is designed to monitor the health and performance of multiple Openshift clusters. It collects data from all resources of the Openshift infrastructure using custom scripts that utilize the "oc" cli and sends this data to icinga for analysis and visualization in Grafana. This module requires an OCP client to be installed on the Trace9 stack/satellite.

## Features

Here are some of the features of Trace9 4.0 Openshift monitoring:

### Container Monitoring:

Trace9 4.0 Openshift monitoring monitors container resource usage, such as CPU and memory, and provides insights into container behavior, health, and status. This feature helps IT teams optimize container performance and ensure container availability.

### Application Monitoring:

Trace9 4.0 Openshift monitoring monitors application performance and availability, track metrics such as response time, throughput, and error rates, and provides insights into application behavior and issues. This feature helps IT teams ensure that applications are meeting service-level agreements and performing optimally.

### Metrics Monitoring:

Trace9 4.0 Openshift monitoring monitors system metrics, such as CPU, memory, and disk usage, and provides insights into system behavior, performance, and capacity. This feature helps IT teams optimize system performance and capacity planning.

### Alerting And Notification:

Trace9 4.0 Openshift monitoring triggers alerts and notifications when system performance or availability thresholds are breached. This feature helps IT teams respond to issues quickly and ensure system availability.

## Benefits

Here are some of the benefits of Openshift monitoring:

### Faster Troubleshooting:

Trace9 4.0 Openshift monitoring enables IT teams to quickly identify the root cause of issues by providing insights into container behavior, application performance, and infrastructure health. This helps IT teams troubleshoot and resolve issues faster, reducing downtime and improving system availability.

### Capacity Planning:

Trace9 4.0 Openshift monitoring enables IT teams to monitor resource utilization and capacity usage, such as CPU and

capacity usage, such as CPU and memory usage. This helps IT teams optimize resource utilization, plan for capacity needs, and ensure that the system can handle peak loads.

## Improved Security:

Trace9 4.0 Openshift monitoring monitors logs and network traffic and detects security threats such as malware and unauthorized access attempts. This helps IT teams detect and respond to security incidents early, reducing the risk of data loss and system downtime.

## Cost Optimization:

Trace9 4.0 Openshift monitoring monitors resource utilization and identify underutilized resources, helping IT teams optimize resource usage and reduce costs.

## Moreover,

- Monitors health and performance metrics of all resources of multiple Openshift clusters
- Provides visual representation of data in grafana
- Customizable metrics collection through use of "oc" cli
- Upcoming feature to utilize daemonsets for metrics collection
- Actively monitor the full stack of your applications and services running on open stack
- Monitor the performance of your entire IT with Trace9 OSM
- Know the status of all open stack instance in real time
- Trace9 open stack monitoring provides real-time insights into resource utilization, open stack services, availability, and log files.
- Check the availability of all connected Assets & Resources
- Provides unlimited potential for customization and cost savings offerings
- Identify your assets and keep a check on your IT resources with thresholds and alerts

## Technology Supported

- Openshift clusters of all sizes and configurations
- Linux-based environments

## Protocols Supported

- HTTPS (for connecting to OCP clients)
- SSH (for connecting to Openshift nodes)
- oc cli commands for collecting metrics

## Devices Supported

- Pods
- Secrets
- Jobs
- Containers
- Config Maps
- CronJobs
- Nodes
- Replication Controllers
- Services
- Persistent Volumes
- Deployments
- Persistent Volume Claims

## Module Dependency

Trace9 4.0 Openshift Monitoring module is dependent on OCP client installed on Trace9 stack/satellite Icinga, Grafana, and Openshift clusters.

For the in-development daemonset monitoring technique, the following dependencies will be required**:

- Kubectl
- Helm
- Node-exporter
- Daemonset objects for collecting metrics
- Prometheus
- Node.js
- NPM

**It's important to note that the specific dependencies for the daemon set monitoring technique may change as development progresses.

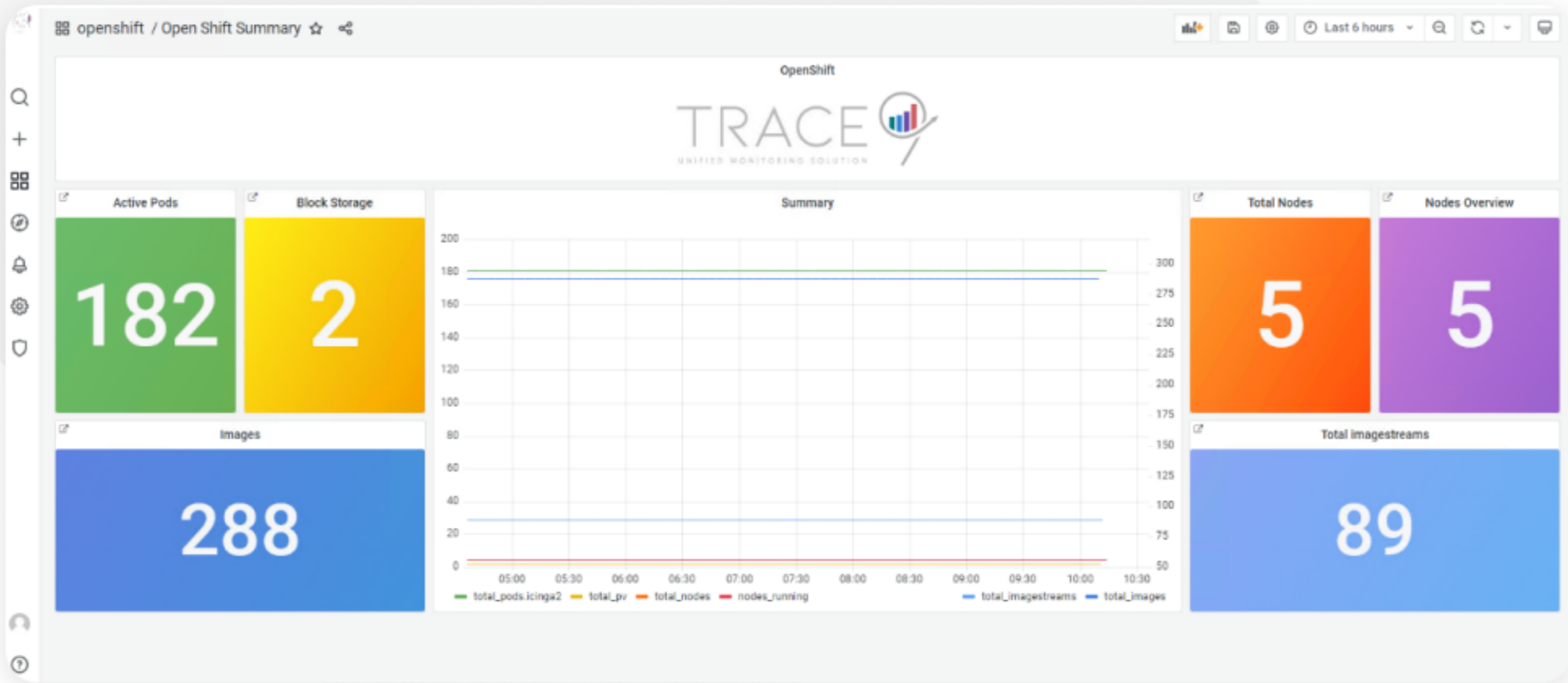
### IP/Ports Requirements:

- Port 443 (HTTPS) for OCP client connection to Openshift clusters

## Scalability

The Openshift Monitoring Module for Trace9 is highly scalable, as it is designed to monitor multiple Openshift clusters. It can handle an increasing number of resources and clusters without compromising performance.

## Dashboards




# Openstack Monitoring

## Overview

Trace9 4.0 Openstack Monitoring provides real-time monitoring and alerting for Openstack infrastructure. It collects health and performance metrics from all resources of the Openstack infrastructure and visualizes the metrics in Grafana, providing an intuitive and user-friendly interface to monitor the infrastructure.

Trace9 Openstack Monitoring collects metrics using NRPE agents, which are installed on the Openstack infrastructure. These agents call custom scripts that utilize in-built services of Openstack such as ceilometer, along with custom Openstack CLI commands, to collect health and performance metrics. The collected metrics are sent to icinga, which provides real-time monitoring and alerting.

Trace9 Openstack Monitoring collects metrics for the following Openstack **services** and **resources**:

- **Compute (Nova):** CPU usage, memory usage, disk usage, network usage, and other metrics.
- **Storage (Cinder, Swift):** Disk usage, network usage, and other metrics.
- **Network (Neutron):** Network usage, bandwidth, and other metrics.
- **Identity (Keystone):** Authentication and authorization metrics.
- **Image (Glance):** Image usage metrics.
- **Dashboard (Horizon):** User activity metrics.
- **Orchestration (Heat):** Resource usage metrics.
- **Telemetry (Ceilometer):** Usage and performance metrics for Openstack services.
- Metrics from all other Openstack services and resources.

# Features

## Infrastructure Monitoring:

Trace9 4.0 Openstack monitoring monitors infrastructure components, such as nodes, pods, and services, and provides insights into their health, status, and resource usage. This feature helps IT teams ensure infrastructure availability and performance

## Real-Time Monitoring:

Trace9 4.0 Openstack Monitoring provides real-time monitoring and alerting of Openstack infrastructure, allowing you to detect and resolve issues quickly.

## Comprehensive Metrics Collection:

Trace9 Openstack Monitoring collects health and performance metrics from all resources of the Openstack infrastructure, including computer, storage, and network resources.

## NRPE Agents:

Trace9 4.0 Openstack Monitoring uses NRPE agents to collect metrics, providing a lightweight and efficient solution for monitoring Openstack infrastructure.

## In-Built Services And Custom Scripts:

Trace9 Openstack Monitoring uses in-built services of Openstack such as ceilometer and custom scripts that utilize the "openstack" CLI to collect metrics.

## Customizable Alerts:

You can configure alerts based on thresholds and other criteria, ensuring that you are notified of issues that require your attention.

## Intuitive Dashboard:

Trace9 4.0 Openstack Monitoring provides an intuitive dashboard in grafana, allowing you to visualize the metrics in a user-friendly way.

# Benefits

Here are some of the benefits of Trace9 4.0 OpenStack monitoring:

## Improved System Availability:

Trace9 4.0 Openstack Monitoring enables IT teams to monitor the health and status of cloud resources, such as virtual machines, storage, and networking components. This helps identify issues early, allowing IT teams to take corrective action and prevent system downtime.

## Faster Troubleshooting:

Trace9 4.0 Openstack Monitoring enables IT teams to quickly identify the root cause of issues by providing insights into the behavior of cloud resources and infrastructure components. This helps IT teams troubleshoot and resolve issues faster, reducing downtime and improving system availability

## Improved Security:

Trace94.0 Openstack Monitoring monitors logs and network traffic and detects security threats such as malware and unauthorized access attempts. This helps IT teams detect and respond to security incidents early, reducing the risk of data loss and system downtime.

## Service-Level Agreement (SLA) Compliance:

Trace9 4.0 Openstack Monitoring monitors application performance metrics, such as response time and throughput, and ensures that applications are meeting SLAs. This helps IT teams ensure that applications are performing optimally and meeting user expectations.

## Cost Optimization:

Trace9 4.0 Openstack Monitoring monitors resource utilization and identify underutilized resources, helping IT teams optimize resource usage and reduce costs.

## Better Resource Allocation:

Trace9 4.0 Openstack Monitoring provides IT teams with insights into the usage of cloud resources, which helps in making informed decisions regarding resource allocation. This leads to better utilization of resources, cost optimization, and improved system performance.

## Moreover,

- Discover the whole layout of your Open shift deployments automatically
- Manage your containers and ensure that your deployed apps are constantly running at peak performance.
- Identify and troubleshoot issues quickly with Trace9 Open Shift Monitoring
- Holistic Visibility into Nodes and Pods Details
- Automated & Customized Reporting
- Modernizing application architectures toward micro services.

## Technology Supported

Trace9 4.0 Openstack Monitoring supports the following technologies:

- **Openstack:** Trace9 4.0 Openstack Monitoring is designed to monitor Openstack infrastructure.
- **NRPE:** Trace9 Openstack Monitoring uses NRPE agents to collect metrics.
- **Ceilometer:** Trace9 4.0 Openstack Monitoring uses ceilometer, which is an in-built service of Openstack, to collect metrics.
- **"openstack" CLI:** Trace9 4.0 Openstack Monitoring uses custom scripts that utilize the "openstack" CLI to collect metrics.
- **Icinga:** Trace9 4.0 Openstack Monitoring sends collected metrics to icinga, which provides real-time monitoring and alerting.
- **Grafana:** Trace9 4.0 Openstack Monitoring visualizes metrics in grafana, providing an intuitive and userfriendly interface.

## Protocols Supported

Trace9 4.0 Openstack Monitoring uses the following protocols:

- NRPE, ceilometer (OpenStack telemetry service), OpenStack command-line interface (CLI), HTTPS, SNMP, Syslog, SSH, ICMP, CDP, LLDP, SNMP Traps, and the Openstack APIs.

## Devices Supported

All OpenStack infrastructure components, including:

- Compute (Nova)
- Identity (Keystone)
- Telemetry (Ceilometer)
- DNS (Designate)
- Networking (Neutron)
- Dashboard (Horizon)
- Image Service (Glance)
- Storage (Cinder, Swift, and Manila)
- Orchestration (Heat)
- Shared File Systems (Manila)

## Monitored Devices

- Compute Instances
- Load Balancers
- Telemetry Services
- DNS Services
- Storage Volumes
- Identity Services
- Image Services
- Network Routers
- Orchestration Services
- Shared File Systems

## Module Dependency

Trace9 4.0 Openstack Monitoring module is dependent on:

- NRPE agents installed on each OpenStack node
- Ceilometer service enabled on each OpenStack node
- OpenStack CLI enabled on each OpenStack node
- Icinga monitoring system installed on each Trace9 server
- Grafana visualization tool installed on each Trace9 server
- OpenStack infrastructure installed and configured
- Network connectivity between Trace9 servers and OpenStack nodes

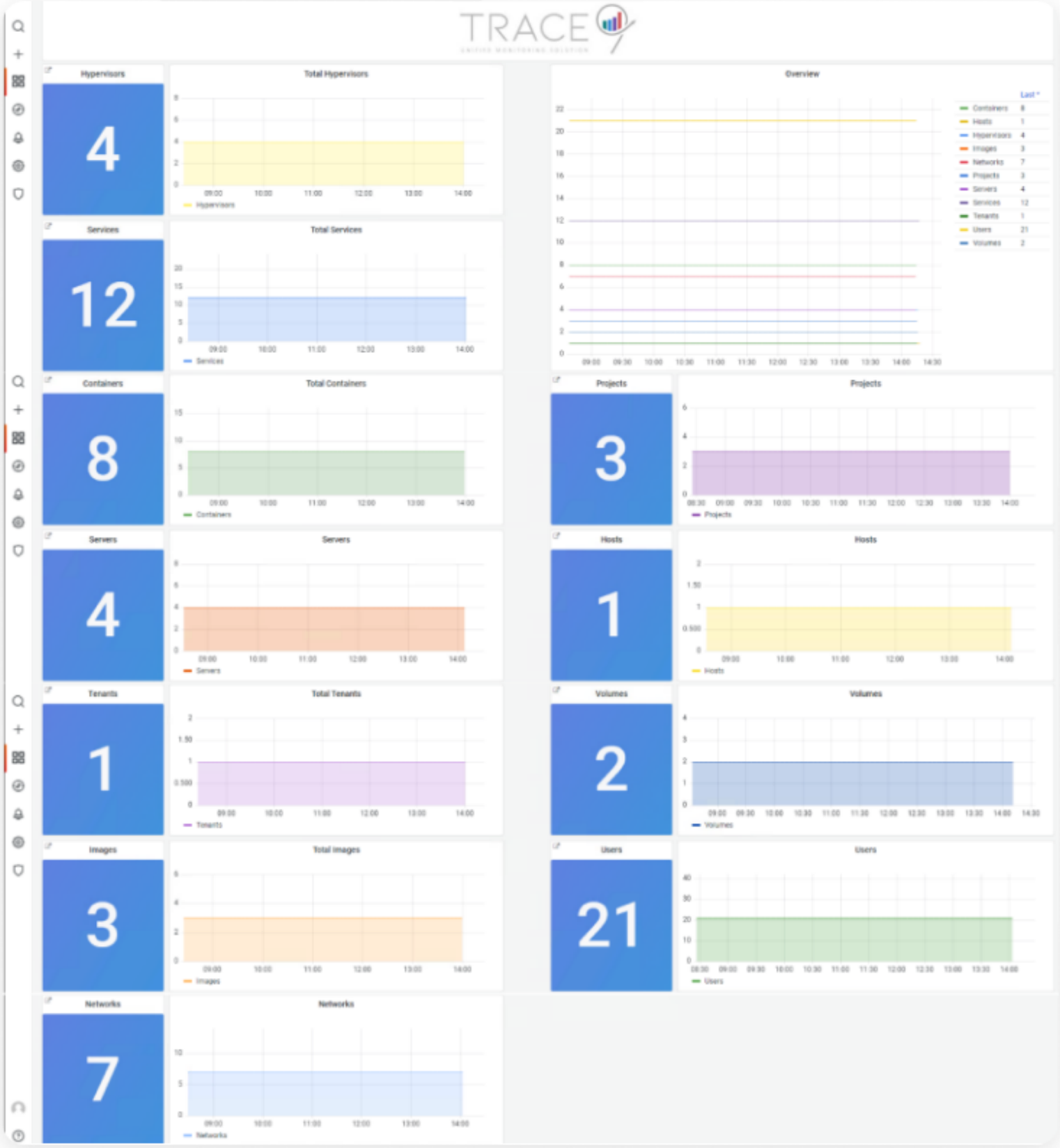
## IP/Ports Requirements

- OpenStack APIs must be accessible on the network from Trace9 servers
- NRPE agents must be able to connect to Trace9 servers on TCP port 5666
- HTTPS must be enabled on OpenStack APIs

## Scalability

- The number of monitored OpenStack nodes can be scaled by deploying additional NRPE agents and Trace9 servers as needed
- Performance may be impacted by the number of metrics being collected but can be improved by optimizing NRPE plugins and icinga configuration.

## Dashboards



# NF Virtualization Monitoring – Per Device

## Overview

NFV monitoring in Trace9 4.0 involves monitoring the virtualized network functions in the same way as physical network functions, but with additional focus on the virtualization layer. This includes monitoring the resource usage of the virtualized infrastructure, such as CPU, memory, storage, and network I/O. It also involves monitoring the performance of the virtualized network functions themselves, such as network throughput, packet loss, and latency.

To monitor NFV in Trace9 4.0, the monitoring solution needs to be able to access the virtualized network functions and the underlying infrastructure. This can be achieved through APIs provided by the virtualization platform, such as OpenStack's Ceilometer API, or by deploying agents within the virtual machines that run the virtualized network functions.

## Features

Here are some of the key features of Trace9 4.0 NFV monitoring in infrastructure monitoring solutions:

### Virtual Function Monitoring:

Trace9 4.0 NFV monitoring provides real-time monitoring of virtual network functions (VNFs), such as firewalls, routers, and load balancers. It enables IT teams to detect and troubleshoot issues quickly and efficiently, ensuring the availability and performance of VNFs.

### Resource Monitoring:

Trace9 4.0 NFV monitoring monitors the resources that VNFs use, such as CPU, memory, and storage. This helps IT teams to identify performance bottlenecks and allocate resources appropriately to optimize VNF performance.

### Performance Monitoring:

Trace9 4.0 NFV monitoring provides detailed performance metrics for VNFs, such as latency, packet loss, and throughput. These metrics help IT teams to ensure that VNFs are meeting service level agreements (SLAs) and are delivering the expected levels of performance.

### Traffic Analysis:

Trace9 4.0 NFV monitoring provides detailed traffic analysis for VNFs, including protocol and application-level analysis. This enables IT teams to identify security threats, performance issues, and other anomalies that can affect VNF performance and availability.

### Fault Management:

Trace9 4.0 NFV monitoring provides automated fault management capabilities, including fault detection, isolation, and remediation. This ensures that IT teams can quickly identify and fix issues before they affect VNF performance and availability.

## Benefits

The benefits of NFV monitoring within Trace9 4.0 monitoring solution includes the ability to correlate performance issues between virtualized and physical network functions, as well as the ability to identify issues that may be specific to the virtualization layer. It also enables network administrators to monitor the performance of virtualized network functions in the context of the broader network infrastructure, providing a more complete picture of network performance.

### Monitoring Of Virtual Machines:

Trace9 4.0 solution monitors the performance of virtual machines running NFV applications

## Real-Time Monitoring:

Trace9 4.0 solution provides real-time monitoring of network resources and virtualized network functions.

## Customizable Dashboards:

Trace9 4.0 solution provides customizable dashboards that enable users to monitor specific aspects of their NFV infrastructure.

## Automated Alerts:

Trace9 4.0 solution sends automated alerts via email, SMS, or other notification channels when a threshold is exceeded.

## Historical Data Analysis:

Trace9 4.0 solution can store historical data, enabling users to analyze trends and make informed decisions about their NFV infrastructure.

## Flexible Notifications:

Trace9 4.0 solution offers flexible notification settings, allowing users to choose when and how they receive alerts.

## Graphical Representation Of Data:

Trace9 4.0 solution presents data in a graphical format, making it easy for users to interpret and analyze.

## Centralized Management:

Trace9 4.0 solution enables centralized management of multiple NFV infrastructure deployments from a single console.

## Open-Source:

Trace9 4.0 solution is an open-source tool, making it easily accessible and customizable for users.

# Technology Supported, Protocols, Devices

## Technologies:

### 1. Virtualization Platforms:

Traace9 4.0 NFV monitoring often requires access to the virtualization platform that hosts the virtualized network functions. This can include platforms such as OpenStack, VMware, and KVM.

### 2. Container Platforms:

With the growing popularity of containerization, Traace9 4.0 NFV monitoring also need to support container platforms such as Kubernetes and Docker.

## Protocols:

### 1. OpenStack Ceilometer:

Ceilometer is a telemetry service in OpenStack that collects and stores data on the usage of virtual resources in an OpenStack deployment, including virtualized network functions.

### 2. NETCONF/YANG:

It is used to configure and monitor network devices, including virtualized network functions.

### 3. SNMP:

Simple Network Management Protocol (SNMP) is a widely used protocol for monitoring and managing network devices, including both physical and virtualized network functions.

## Devices:

### 1. Virtual Machines:

Virtualized network functions are often deployed on virtual machines, so monitoring solutions need to be able to access and monitor these machines.

### 2. Virtual Switches:

These switches are used to connect virtual machines and virtualized network functions within the virtualized infrastructure and can be monitored for performance and connectivity issues.

### 3. Virtual Routers And Firewalls:

These virtualized network functions are critical components of the virtualized network infrastructure and need to be monitored for performance and security issues.

## Module Dependency

Trace9 4.0 NFV (Network Function Virtualization) monitoring depends on several factors, including the virtualization platform being used, the network functions being monitored, and the monitoring solution being deployed.

### Virtualization Platform Dependency:

Trace9 4.0 NFV monitoring requires access to the virtualization platform APIs to collect performance metrics from virtualized network functions. Different virtualization platforms may have different APIs and data formats, which can impact the ability of monitoring solutions to collect and analyze data from virtualized network functions.

### Network Function Dependency:

The performance metrics that need to be collected and analyzed will vary depending on the specific virtualized network functions being monitored.

For example, monitoring a virtual firewall may require different metrics than monitoring a virtual load balancer.

### Monitoring Solution Dependency:

Trace9 4.0 NFV monitoring has different requirements and capabilities, such as the ability to collect data in real-time or the ability to correlate data from virtualized and physical network functions.

## Scalability

Scalability is an important consideration in Trace9 4.0 NFV (Network Function Virtualization) monitoring, as the number of virtualized network functions in a deployment can grow rapidly and require additional resources to monitor effectively.

There are several strategies that can be used to ensure that Trace9 4.0 NFV monitoring is scalable:

### Distributed Monitoring Architecture:

Trace9 4.0 has distributed monitoring architecture, where multiple monitoring nodes are deployed across the virtualized infrastructure. This allows the monitoring solution to scale horizontally, with additional nodes added as needed to handle additional virtualized network functions.

### Data Aggregation:

Rather than collecting data from every individual virtualized network function, Trace9 4.0 monitoring solutions can aggregate data from multiple functions into a single data stream. This can reduce the amount of data that needs to be processed and stored, while still providing a comprehensive view of overall performance.

### Granularity Control:

Another approach is to provide granular control over the level of monitoring detail for each virtualized network function. Trace9 4.0 NFV monitoring allows network administrators to adjust the level of monitoring based on the importance and criticality of each function, reducing the overall resource requirements of the monitoring solution.

### Cloud-Based Monitoring:

Trace9 4.0 NFV monitoring leveraging cloud resources to handle large amounts of data and processing power. This can also provide flexibility in scaling up or down as the number of virtualized network functions changes over time.

### Automation:

Automation can help to reduce the burden on network administrators by automating common monitoring tasks such as data collection, analysis, and alerting. This can also help to ensure consistency in monitoring practices across large deployments.

# Dashboards


# SD-WAN Performance Monitor – Per Device

## Overview

Trace9 4.0 SD-WAN (Software-Defined Wide Area Network) Performance Monitor is a crucial component of a network monitoring solution. It provides real-time insights into the performance of SD-WAN, which is essential to ensure the efficient and effective functioning of enterprise networks.

The Trace9 4.0 SD-WAN Performance Monitor collects data from various sources such as routers, switches, and other network devices, and analyzes it to provide visibility into the performance of the SD-WAN network. The monitor provides metrics such as packet loss, latency, jitter, and bandwidth utilization, which are used to identify and troubleshoot issues that may impact network performance.

Trace9 4.0 is an open-source web-based interface for monitoring and managing network resources. It is a powerful tool that provides a user-friendly interface for monitoring network devices and services, including SD-WAN infrastructure. Trace94 .0 is based on the Trace9 monitoring engine, which is designed to be scalable, flexible, and extensible.

To monitor SD-WAN devices, you need to install the Trace9 agent or ingrate with SD-WAN's APIs on the SDWAN devices. The Trace9 agent is responsible for collecting data from the SD-WAN devices and sending it to the Trace9 server. SD-WAN infrastructure using the Trace9. Trace9 is a powerful tool that provides a userfriendly interface for monitoring and managing network resources.

## Features

Here are some of the key features of Trace9 4.0 SD-WAN Performance Monitoring:

### Real-Time Monitoring:

Trace9 4.0 SD-WAN Performance Monitoring: provides real-time monitoring of network traffic to identify any issues that may be affecting network performance. This enables IT teams to detect and troubleshoot issues quickly, ensuring the availability and performance of SD-WAN solutions.

### End-To-End Visibility:

Trace9 4.0 SD-WAN Performance Monitoring provides end-to-end visibility of network traffic from the branch to the data center. It enables IT teams to monitor traffic across multiple WAN links, including broadband, LTE, and MPLS, ensuring that SD-WAN solutions are delivering the expected levels of performance.

### Application Visibility:

Trace9 4.0 SD-WAN Performance Monitoring provides application-level visibility, allowing IT teams to monitor the performance of critical applications. It enables IT teams to identify any issues that may be affecting application performance, such as high latency or packet loss.

### Quality Of Service (QoS) Monitoring:

Trace9 4.0 SD-WAN Performance Monitoring provides QoS monitoring capabilities, enabling IT teams to monitor the performance of different traffic classes. It ensures that traffic is being prioritized correctly, and that the SD-WAN solution is delivering the expected levels of performance.

### Centralized Management:

Trace9 4.0 SD-WAN Performance Monitoring provides centralized management capabilities, allowing IT teams to monitor multiple SD-WAN deployments from a central location. This enables IT teams to manage and troubleshoot issues across multiple sites, ensuring that SD-WAN solutions are delivering the expected levels of performance.

### Reporting And Analytics:

Trace9 4.0 SD-WAN Performance Monitoring provides reporting and analytics capabilities, allowing IT teams to generate detailed reports and analyze network performance data. This helps IT teams to identify trends and patterns, enabling them to optimize network performance and troubleshoot issues quickly.

## Benefits

Trace9 4.0 SD-WAN Performance Monitor provides several benefits to network administrators, including:

### Network Visibility:

With real-time visibility into network performance, network administrators can quickly identify and resolve issues before they impact end-users. They can also monitor network usage and identify potential bottlenecks before they become critical.

### Troubleshooting:

Trace9 4.0 SD-WAN Performance Monitor provides insights into the root cause of performance issues. By analyzing data from various sources, administrators can quickly identify the source of a problem and take appropriate actions to resolve it.

### Proactive Network Management:

With Trace9 4.0 SD-WAN Performance Monitor, administrators can proactively manage the network, reducing downtime and improving the overall performance of the network.

### Cost Savings:

Trace9 4.0 SD-WAN Performance Monitor can help administrators optimize network resources, reducing the need for

expensive upgrades or additional hardware. It can also help identify areas where bandwidth usage can be reduced, resulting in cost savings for the organization.

## Real-Time Monitoring:

Trace9 provides real-time monitoring of SD-WAN infrastructure, allowing users to track the performance of SD-WAN devices and services.

## Customizable Dashboards:

The Trace9 4.0 SD-WAN Performance monitor provides customizable dashboards that enable users to monitor specific aspects of their SD-WAN infrastructure.

## Automated Alerts:

Trace9 4.0 can send automated alerts via email, SMS, or other notification channels when a threshold is exceeded, or an issue arises in the SD-WAN infrastructure.

## Historical Data Analysis:

Trace9 4.0 can store historical data, enabling users to analyze trends and make informed decisions about their SD-WAN infrastructure.

## Flexible Notifications:

The trace monitoring solution offers flexible notification settings, allowing users to choose when and how they receive alerts related to SD-WAN performance.

## Graphical Representation Of Data:

Trace9 presents data in a graphical format, making it easy for users to interpret and analyze the performance of their SD-WAN infrastructure.

## Centralized Management:

Trace9 4.0 enables centralized management of multiple SD-WAN infrastructure deployments from a single console.

## Open-Source:

Trace9 4.0 is an open-source tool, making it easily accessible and customizable for users who want to monitor their SD-WAN infrastructure.

## Technology Supported, Protocols, Devices

The Trace9 SD-WAN Performance Monitor supports various technologies, protocols, and devices to monitor and analyze the performance of SD-WAN networks. Some of the technologies, protocols, and devices supported by SD-WAN Performance Monitors are:

## Technologies:

Trace9 4.0 SD-WAN Performance Monitors support different SD-WAN architectures such as:

### 1. Overlay SD-WAN:

Overlay SD-WAN creates an abstracted network layer over existing WAN links to provide centralized management and control of network traffic.

### 2. Hybrid SD-WAN:

Hybrid SD-WAN combines overlay and underlay architectures to provide increased flexibility and performance optimization.

## Protocols:

Trace9 4.0 SD-WAN Performance Monitors use different protocols to collect data from network devices, such as:

### 1. Simple Network Management Protocol (SNMP):

SNMP is a standard protocol used to manage and monitor network devices.

### 2. NetFlow:

NetFlow is a protocol used to collect IP traffic data.

### 3. IP Flow Information Export (IPFIX):

IPFIX is a protocol used to export flow data from network devices.

### 4. Streaming Telemetry:

Streaming telemetry is a protocol that sends real-time data updates from network devices to a monitoring solution.

## Devices:

Trace9 4.0 SD-WAN Performance Monitors support various devices used in SD-WAN networks, such as:

### 1. SD-WAN Edge Devices:

SD-WAN Edge devices are deployed at the network edge to provide secure connectivity between sites and manage network traffic.

### 2. Routers:

Routers are network devices that forward data packets between networks.

### 3. Switches:

Switches are network devices that connect multiple devices in a network.

### 4. Firewalls:

Firewalls are network security devices that monitor and control network traffic.

## Module Dependency

The module dependency of an Trace9 4.0 SD-WAN Performance Monitor can vary depending on the specific implementation and architecture of the monitoring solution. However, some common modules and dependencies of Trace9 4.0 SD-WAN Performance Monitor include:

### 1. Data Collection:

It collects performance data from various network devices, such as routers, switches, and SD-WAN edge devices. They may use different protocols, such as SNMP, NetFlow, and IPFIX, to collect data.

### 2. Data Processing:

It processes the performance data collected by the data collection modules. They use algorithms and machine learning techniques to identify trends, anomalies, and patterns in the data.

### 3. Data Visualization:

It represents the performance data and insights generated by the data processing modules in a user-friendly format, such as graphs, charts, and dashboards. They may allow users to drill down into specific areas of the network for more detailed analysis.

### 4. Database:

It is responsible for storing and managing the performance data collected by the data collection modules. They may use different database technologies, such as SQL or NoSQL databases.

### 5. Integration Modules:

It is responsible for integrating the Trace9 4.0 SD-WAN Performance Monitor with other network monitoring systems and tools. They may use APIs or other integration methods to exchange data with other systems.

### 6. User Management And Authentication:

It is responsible for managing user accounts, access permissions, and authentication for the Trace9 4.0 SD-WAN Performance Monitor.

## Scalability

Here are some factors that can impact the scalability of Trace9 4.0 SD-WAN Performance Monitor:

### 1. Architecture:

The architecture of the Trace9 4.0 SD-WAN Performance Monitor is designed to scale horizontally and vertically. Horizontal scaling involves adding more nodes to the Trace9 4.0 monitoring solution, while vertical scaling involves adding more resources, such as CPU and memory, to existing nodes. A distributed architecture that uses multiple nodes can help to distribute the processing load and improve scalability.

### 2. Data Processing:

The Trace9 4.0 SD-WAN Performance Monitor processes large volumes of data efficiently. This may involve using techniques such as data sampling, data aggregation, and data filtering to reduce the amount of data that needs to be processed. Additionally, the use of advanced analytics, such as machine learning, can help to automate the data processing and reduce the burden on human operators.

## 3. Data Storage:

The Trace9 4.0 SD-WAN Performance stores large volumes of data efficiently and cost effectively. This may involve using data compression, deduplication, and tiered storage to reduce the storage requirements. Additionally, the use of cloud-based storage can provide virtually unlimited scalability and eliminate the need for on-premises storage infrastructure.

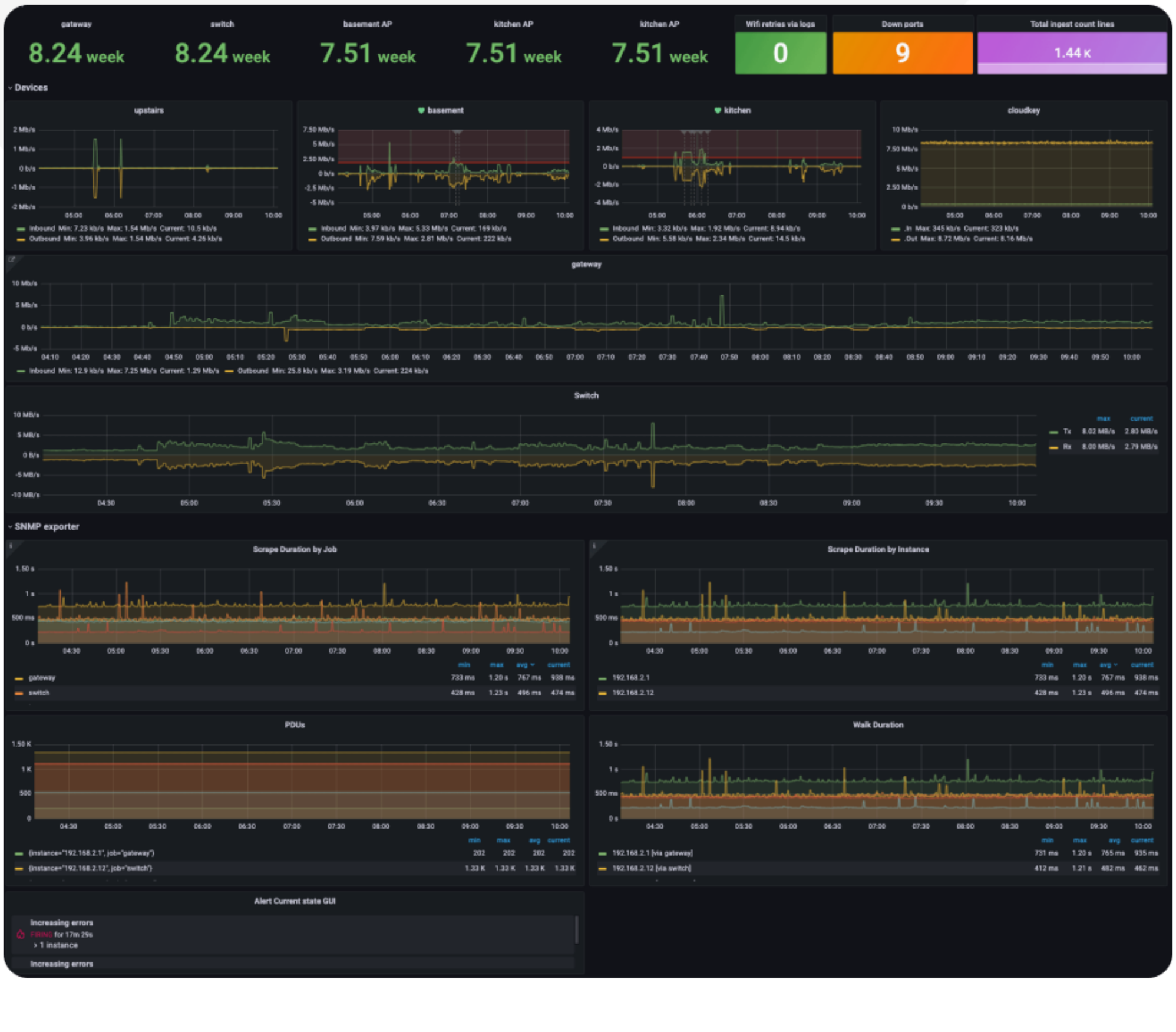
## 4. Data Visualization:

The Trace9 4.0 SD-WAN Performance Monitor represents performance data in a user-friendly format that is easy to understand and navigate. This may involve using interactive dashboards, drill-down capabilities, and customizable views to provide users with the level of detail they need.

## 5. APIs And Integrations:

The Trace9 4.0 SD-WAN Performance Monitor provides APIs and integrations that enable it to integrate with other network management systems and tools. This can help to provide a more comprehensive view of the network and improve the overall scalability of the monitoring solution.

# Dashboards



# Machine Learning – Module & Logs Mang

## Overview

Trace9 4.0 Machine Learning (ML) is a powerful module in analyzing time series data, which is data that is collected over time and represents changes or trends in a particular variable or set of variables. It automates the analysis of large and complex time series datasets.

## Features

In Trace9 time series databases, ML algorithms can be used for tasks such as:

### Time Series Forecasting:

Trace9 4.0 Machine Learning (ML) make predictions about future values of a time series. This can be useful in scenarios were forecasting the future behavior of a system or process.

### Anomaly Detection:

Trace9 4.0 Machine Learning (ML) detects anomalies or outliers in time series data. This can be useful in identifying events that deviate from the normal behavior of a system, which can indicate potential issues or opportunities for improvement.

### Clustering:

Trace9 4.0 Machine Learning (ML) groups similar time series data together based on their characteristics. This can be useful in identifying patterns or trends in data, which can help in making informed decisions about a particular system or process.

### Classification:

Trace9 4.0 Machine Learning (ML) classify time series data into different categories. This can be useful in scenarios where data needs to be classified, such as in identifying different types of signals or events.

## Benefits:

### Proactive Issue Detection:

Trace9 4.0 Machine Learning (ML) detects issues and anomalies in real-time, enabling IT teams to address them proactively before they escalate into more significant problems. This helps to minimize downtime and prevent business disruptions

### Improved Efficiency:

Trace9 4.0 Machine Learning (ML) improves the efficiency of IT teams, allowing them to focus on higher-level tasks.

### Predictive Maintenance:

Trace9 4.0 Machine Learning (ML) predicts when a device or system is likely to fail, enabling IT teams to perform proactive maintenance to prevent downtime and extend the lifespan of their infrastructure.

### Reduced False Positives:

Trace9 4.0 Machine Learning (ML) reduces the number of false positives generated by monitoring tools by identifying the root cause of issues and providing more accurate alerts.

### Better Resource Utilization:

Trace9 4.0 Machine Learning (ML) optimizes resource utilization by identifying patterns in usage and predicting future demand. This helps organizations to allocate resources more efficiently and avoid overprovisioning.

### Continuous Learning:

Trace9 4.0 Machine Learning (ML) learns from past events and adjusts their monitoring and analysis based on new data. This enables IT teams to continuously improve their monitoring and analysis capabilities.

### Enhanced Security:

Trace9 4.0 Machine Learning (ML)detects and responds to security threats more quickly, reducing the risk of data breaches and other security incidents.

## Technology Supported, Protocols, Devices

- Time Series Database,
- Scalability
- Module Dependency
- Scalable up to multiple nodes
- Elasticsearch

## Module Dependency

Some of the key dependencies of Trace9 4.0 machine Learning module are:

### Data Collection:

ML algorithms require large volumes of data to train and improve their accuracy. Therefore, data collection modules are critical to ensure that the data is collected from various sources and is of high quality.

### Data Pre-Processing:

Before feeding data to ML algorithms, it is essential to pre-process and clean the data. This module includes data cleaning, data normalization, and feature extraction.

### ML Algorithms:

A wide variety of ML algorithms are available for infrastructure monitoring solutions, such as supervised learning, unsupervised learning, and reinforcement learning. Choosing the appropriate algorithm depends on the specific use case and the nature of the data.

### Model Training:

After selecting the appropriate ML algorithm, the next step is to train the model on the data. This process involves optimizing the model parameters to improve accuracy and performance.

### Model Validation:

Once the model is trained, it is essential to validate its performance using separate validation data to ensure that the model is not overfitting the training data.

### Model Deployment:

After the model is trained and validated, it needs to be deployed into the production environment. This module includes creating APIs, integrating the model into the monitoring solution, and providing dashboards to visualize the results.

## Scalability:

To address scalability challenges, several techniques and technologies can be used, such as:

### Distributed Computing:

Distributed computing frameworks, such as Apache Spark or Hadoop, can be used to distribute the computation across multiple nodes, enabling faster processing of large datasets.

### Cloud Computing:

Cloud computing provides virtually unlimited computing resources that can be used for ML computations. By leveraging cloud computing, organizations can scale up or down their infrastructure based on demand.

### Hardware Acceleration:

Specialized hardware, such as GPUs or FPGAs, can be used to accelerate ML computations, enabling faster processing of large datasets.

### Model Optimization:

Optimizing the ML algorithms to reduce their complexity and improve their performance can also improve scalability.

## Automated Machine Learning (AutoML):

AutoML tools can automatically identify the best ML models for a given dataset, reducing the need for manual intervention and enabling faster model development.

## Dashboards

# Trace9 4.0 Integration – (REST API'S)

## Overview

With Trace9 4.0 monitoring solution you can easily integrate REST API's to gain several benefits, such as the ability to automate the monitoring of network devices, track and analyze data in real-time, and receive notifications and alerts when certain conditions are met.

## Benefits:

There are several benefits and features of monitoring with RESTful API in Trace9. Here are some of the key ones:

### Real-Time Monitoring:

By Integrating RESTful API's with Trace9 4.0 monitoring solution, you can monitor your network in real-time. This means that you can quickly detect and respond to issues as they occur, minimizing downtime and ensuring that your network is running smoothly.

### Automation:

By Integrating RESTful API's with Trace9 4.0 monitoring solution, enables you to automate monitoring tasks, freeing up time for your IT operations team to focus on other important tasks. This can help you to improve efficiency and reduce costs.

### Customization:

By Integrating RESTful API's with Trace9 4.0 monitoring solution, allows you to customize your monitoring solution to meet the unique needs of your organization. You can define the data points that you want to monitor and set up alerts and notifications based on specific criteria.

### Scalability:

By Integrating RESTful API's with Trace9 4.0 monitoring solution, allows you to scale your monitoring solution as your organization grows. You can easily add new devices and data sources to your monitoring solution without having to make significant changes to your existing infrastructure.

### Improved Visibility:

Integrating RESTful API's with Trace9 4.0 monitoring solution allows you to gain greater visibility into your network infrastructure. You can monitor a wide range of data points, including network traffic, bandwidth usage, and device performance, giving you a more complete picture of your network.

### Integration:

By Integrating RESTful API's with Trace9 4.0 monitoring solution can be easily integrated with other tools and applications, such as IT service management systems and security solutions. This can help you to improve collaboration across teams and ensure that your entire IT infrastructure is working together seamlessly.

## Technology Supported, Protocols, Devices:

**Rest API's**

# Software Licensing Monitoring

Trace9 4.0 Software licensing monitoring module typically involves tracking the usage of the software licenses, generating reports on license usage, and alerting administrators when license usage exceeds a certain threshold or when licenses are about to expire. By monitoring software licenses, organizations can ensure that they are not overusing licenses, which can result in legal and financial liabilities. It also helps to identify any license compliance issues and take corrective measures before any legal action is taken against the organization. Trace9 4.0 Software Licensing module monitors the following vendors:

| Vendors | Licensing Monitors |
|---|---|
| **Oracle** | Oracle License Management Services (LMS) |
| **VMware** | Accessing License Key Tracker tool |
| **Microsoft** | Key Management Services (KMS) , SAM & Microsoft Assessment and Planning (MAP) |

| Vendors | Licensing Monitors |
|---|---|
| **RedHat** | Red Hat Satellite |
| **IBM** | IBM License Metric Tool |
| **Cisco** | Software Asset Management System (SAM) |

## Features:

Here are some common features of **Trace9 4.0 Software Licensing Monitoring:**

### License Tracking:

Trace9 4.0 Software Licensing Monitoring module tracks and monitors License usage, License discovery, License Active Keys, License Keys History, License Usage Tracking, Subscriptions Monitoring, Consolidated License Inventory, including the number of licenses in use, available, and expired.

### Alerting And Notifications:

Trace9 4.0 Software Licensing Monitoring notifies administrators when licenses are nearing expiration or when usage exceeds the permitted limit including True Up Notifications and Delta Notifications.

### License Optimization:

Trace9 4.0 Software Licensing Monitoring module helps organizations optimize their license usage by identifying underused or overused licenses and reallocating them as necessary.

### License Compliance Monitoring:

Trace9 4.0 Software Licensing Monitoring module ensures that the organization is in compliance with licensing agreements and can identify any license compliance issues.

### Reporting And Analytics:

Trace9 4.0 Software Licensing Monitoring module provides comprehensive reports on license usage,  compliance, and optimization, and should allow for easy data analysis and visualization.

| T9 Licensing | Licensing Requirements |
|---|---|
| **T9 Licensing Types** | Perpetual or Subscription |
| **T9 Editions - Pro, Advanced or Telco Assessment and Planning (MAP)** | Key Management Services (KMS), SAM & Microsoft |
| **T9 - Software Licensing Module** | Per Server (SAM, KMS, Tracker, LMS or Any integration) |
| **SMS Notification - optional** | SMS Integration Packs |
| **Ticket System - optional** | Red Hat Satellite |
| **PS & Support** | Based base project Needs |

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