NTT DATA Syntphony OSS performance manager with Red Hat OpenShift

Modern day telco networks demand full visibility and efficiency of services

The magnitude, complexity, and effect of modern networks on users force network operators to take measures to guarantee the efficiency of their network elements and the services they provide.

Red Hat OpenShift as a platform for telecommunications

Red Hat® OpenShift® is a unified, security-focused hybrid cloud application platform for innovation. It provides a foundation for modernizing existing applications, building cloud-native applications, streamlining development, adding intelligence to applications, and integrating third-party services. Red Hat OpenShift runs consistently across telecommunications (telco) service provider cloud and multicloud environments, giving organizations the capabilities needed for a successful transition to a cloud-native environment.

Together, Red Hat and NTT DATA solutions help businesses derive more value from their open source software (OSS) investments. Some key solution benefits include:

- Efficient time to value.
- Reduced complexity.
- Hybrid cloud flexibility.
- A focus on innovation and agility.
- Automated application deployment using a Red Hat OpenShift GitOps framework.

Syntphony PM: A performance management solution

Syntphony PM is an NTT DATA license-free solution designed to solve modern network problems for both 5G, conventional mobile, and fixed networks, covering multiple layers of the process, from the definition and management of the entities involved in network performance analysis, through calculation, aggregation, enrichment, management and visualization of indicators, up to the generation of performance alarms that make it possible to identify and solve problems in the network that may have repercussions for the operator and its users.

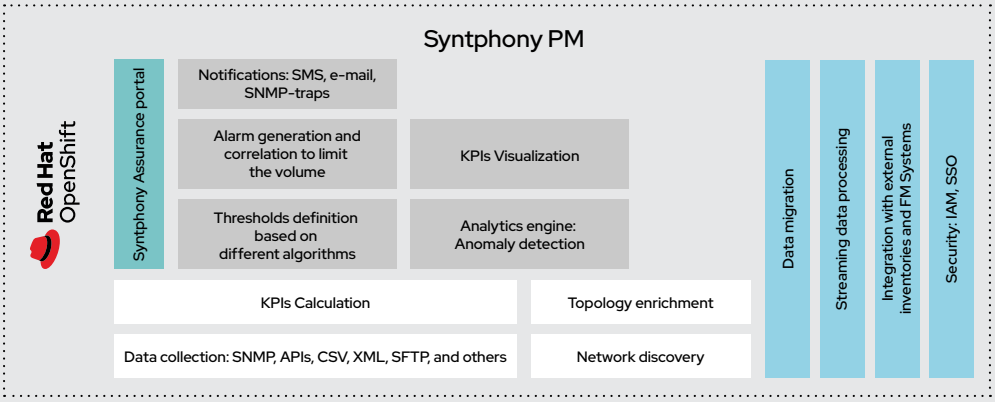

Figure 1. Syntphony PM features and integrations

The NTT DATA solution includes the following features:

- **Performance data ingestion:** Data streaming processes are in charge of ingesting the data at generation time from several platforms (OSS, network elements, or probes) and formats (xml, csv, xlsx, syslog, relational databases, time series databases) of the domains to be monitored.
- **Key performance indicator (KPI) calculation:** A mechanism to configure and calculate KPIs streaming (near real-time) based on the granularity of the data and the frequency of information generated by each data source is also provided in our solution.
- **Metrics and KPIs enrichment:** Our solution is integrated with the inventory and topology systems to enrich the performance indicators and to drill down in the analysis of the network performance and anomalous behaviors identified.
- **Performance analysis:** KPI trend analysis can be carried out through custom dashboards that support different timescale granularity and drill down on specific geographical areas or network resources, and also visual functionalities tools.
- **Threshold set-up and performance alarm:** Alarms can be triggered from threshold violations in the KPIs, anomaly detection algorithms, or complex event processing patterns identification. Performance alarms can create an incident ticket.
- **Automate network actions:** A workflow engine paired with essential applications for changes and configurations execution is provided. Changes and configurations must be defined based on a set of rules and commands, which are executed automatically through a Northbound Interface (NBI) of the OSS or directly in the network element.
- **Performance reporting:** Reports for analyzing the health of the network based on KPIs or performance alarms for a specific region or network element can be created in less time by querying data storages or accessing data using visualization tools.
- **Performance notifications:** Specific connectors to mail or application programming interfaces (APIs) are implemented to send notifications resulting from processing jobs. Normally, a message queue is used to mediate such processes.

- **Active topology:** The network auto-discovery feature can handle more than 200 network elements with the goal of helping operational teams perform their tasks with clear visibility of the network in a real-time base environment. This solution is based on a graph database, which supports understanding a complex relation between resources and services on a simple user interface.
- **Inventory catalog:** A flexible solution that adapts to the needs and models of the operator, the inventory catalog structure allows manual or automated management of network elements. The structure of the inventory of equipment and resources is supported by a graph scheme, which facilitates relationship processes between entities and the application of use cases focused on traversing the network in search of information of interest.
- **Automated deployment:** The Syntphony PM solution is implemented using a GitOps approach in a Red Hat OpenShift environment. Users can take advantage of the flexibility for hybrid environments, such as self-managed (on-premise, public or private cloud, and edge environments) or cloud-managed services, including Microsoft Azure Red Hat OpenShift, Red Hat OpenShift Service on AWS, Red Hat OpenShift on IBM Cloud, or Red Hat OpenShift Dedicated on Google Cloud Platform.

Syntphony PM components

In an open source framework that makes up the Syntphony PM solution, you can find different components carefully selected and customized to provide efficient functionality in data ingestion, processing, automation, and visualization. The integration of microservices to the solution as an interface to external systems is also considered.

Red Hat's ecosystem makes it possible to integrate components such as Red Hat AMQ for the data queuing function and operators, such as Yugabyte—which is used in the alarm and metrics storage process—to the Syntphony PM solution.

During the Syntphony PM process, 2 main flows can be identified: 1 for the collection of metrics and the other for the discovery of network resources.

The flow of collection and processing of metrics consists of the following steps:

1. Apache NiFi and the SNMP collector collect data from the network. This data can be in different formats and collected through different protocols.
2. When using Apache Flink, the metrics are processed with streaming. At this point, the metrics and thresholds are calculated, and the alarms are generated.
3. Metrics and alarms are enriched with inventory data that is in Dgraph.
4. Metrics are stored in Apache Druid and alarms in Yugabyte.
5. Metrics and alarms can be viewed through the Syntphony web portal, which has embedded Apache Superset graphs.

In parallel, there is a discovery flow, in which the Simple Network Management Protocol (SNMP) collector identifies the elements of the network and a microservice later synchronizes the data in the inventory.

With a performance management solution, the processed data can be used for additional use cases through ML algorithms with Jupyter, batch processing with Apache Airflow, and programming automatic tasks with flows in Camunda or Syntphony's Candece.

Red Hat OpenShift: The best option to deploy Syntphony PM

As part of the joint value proposition between NTT DATA and Red Hat, a deployment framework for Syntphony PM was created, which takes advantage of the key benefits of Red Hat OpenShift, including the flexibility that a client has when choosing whether to deploy the solution on their own infrastructure or use a cloud service that runs and manages the infrastructure layer.

The deployment framework applied in the main communication service providers (CSPs) uses the key services that a cloud environment provides, such as computing, container registry, and Red Hat OpenShift cloud-managed services.

In an on-premise scenario, the deployment framework uses key solutions and operators from Red Hat's OpenShift family portfolio, such as the Red Hat Quay.io solution for container registry, GitOps, and Red Hat OpenShift Pipelines operators of Red Hat OpenShift.

Red Hat OpenShift Container Platform includes a built-in and self-analyzing metrics service and aggregated logging feature that gathers hundreds of metrics about Syntphony clusters. The solution interacts with an alerting system to obtain information about cluster activity and health.

Use case: Syntphony PM ecosystem for a global tier-1 CSP

In this use case, the customer required a robust, unified performance management system to measure their core network performance, based on a unique architecture and an open source solution. This approach would need to provide an integrated end-to-end vision of telecom network resources, such as standardization of collection processes, integration, data lake structuring and presentation layer—with a main objective of supporting process-driven user areas and use cases.

The project focused on developing, implementing, and installing complete solutions involving various components, such as hardware, virtual machines, databases, and software. Red Hat OpenShift was included in the solution layer that incorporated data lakes, integration, and presentation services for use cases. Meaningful results included the capability of network and object auto discovery, and the ability to transition traditional systems into modern, integrated network elements.

Additional project highlights:

- A KPI and alarm module with creation and sending alarms that go to a fault manager
- Near real-time updates and offline data inventory modules
- Topological vision and graphical comparison
- The Red Hat OpenShift aggregated logs collection of Syntphony clusters
- The exportation of data, integration of KPIs, counters, and metrics

Syntphony PM ecosystem use case functional scope:

- Integration of more than 300 network elements types and 1 million multiprovider and multitechnical devices
- A data volume of 575GB per day in raw data and 173GB per day in summarized data
- Retention of 1 year (for raw) and 5 years (for summarized)
- Around 165 flows, connections and processes to collect and normalize data from different sources
- More than 11 inventory integrations and federations that include topology and data enrichment
- Unified portal with a graphical user interface (GUI) using Portuguese as the local language

For more information, contact our team

If you have questions about features, trials, pricing, want a demonstration, or need anything else, contact us by visiting NTT DATA Center of Excellence open networks.

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