www.pipelinepub.com Volume 8, Issue 3

Ensuring Data Integrity in Integration

By:

Without data integrity, any undertaking that relies on the data in question is doomed to fail. Take a digital twin, for example. For communication service providers (CSPs), which have a highly complex hybrid network infrastructure that spans the data center, network, and the customer edge, a digital twin is a valuable tool for designing, planning, and operating the network. As a virtual replica of the infrastructure, a digital twin clones all physical assets, networks, and processes. This information can be used to run simulations to understand the impact of changes before they are made and to run what/if analyses for the better operation of the network. Such pairing of the virtual and physical worlds within a live model allows operators to analyze data and monitor systems to optimize space, capacity and connectivity management and to mitigate problems before they even occur. If the data in the digital twin is bad, so too will be the outcomes of decisions based on it.

To successfully maintain a digital twin, or any inventory, reconciliation of data is required. Automation of the reconciliation process is ideal to resolve any differences between the actual network and its representation. Otherwise, discrepancies must be investigated and resolved manually, which takes more time, costs more, and is subject to human error.

A seamless and automated alignment with the network requires the implementation of adapters to the network devices or the network management system to collect the data, which may include hardware, logical and virtual resources such as connectivity, cells, or software applications. To implement adapters that are flexible enough to adapt to new resources in the network in a fast and cost-efficient manner, the right integration framework is crucial.

The reconciliation factor

Before we can talk about integration framework, we need to address reconciliation. An inventory project's success depends on how well data discrepancies can be found and fixed. Open architecture plays an important role in this area and has become a best practice in today's complex hybrid environments. A truly open architecture will prevent vendor lock-in. This matters, because CSPs need the ability to extend their inventory management solution themselves or by a preferred integrator.

The first step for any inventory management project is the consolidation of available data. This involves the initial migration of existing data sources to the system. Ultimately, the process of uploading data and the alignment processes between the existing network and other systems for daily operations should be automated. Once the processes are automated, accurate data is available to feed rollout, planning and tracking processes, as well as coordinate the IT resources and services that make up the network. The success of such a project is entirely dependent on how efficiently the upload can be implemented. Data upload does not just mean documentation of data. It means merging, analyzing and fixing discrepancies between data from NMS southbound, east-west interworking with other databases and integration northbound with OSS/BSS. In other words—reconciliation.

Keep in mind that merging, analyzing, and fixing discrepancies between data from network devices and OSS/BSS can be cumbersome. To streamline reconciliation workflows, CSPs should utilize a unified resource model to align and automate network processes. Analysis and graphical representation systems, such as BI or GIS applications, can also help CSPs get the most benefit out of the database.

A successful integration strategy

Data integration is the most costly and complex aspect of implementing a new inventory management solution. The reason is that, in today's hybrid world, physical hardware must be managed in harmony with logical and virtual resources. This data comes from many sources and vendors. Some of them have many limitations in their integration capabilities or specific behaviors. Migrating existing data or uploading data from the network, the data center and other domains involves three important considerations.

The first is a unified data model. This provides end-to-end visibility across the entire telecommunication network, data centers, and IT infrastructure. Properly documenting and managing all assets used in the production of services via a single, dynamically updating repository that integrates with key systems can also improve operational efficiency and reduce downtime. For example, end-to-end troubleshooting over all layers in the network from the cable to the end customer service can help find root causes such as faulty cables faster to ensure a speedy service recovery and reduce mean time to repair (MTTR). Upgrades and replacements of equipment that has reached end-of-life status can also be better coordinated and tracked.

Another key consideration is the transformation of external data into the unified data model. This is where the open architecture and adapters come into play. Finally, after the data is integrated into the new unified model, reunification and reconciliation of the data must take place. This involves finding matches between different databases to achieve as reunification of data as well as reconciliation, which is the alignment of data from different sources. The result is a database that serves as a single source of truth, free of data discrepancies and faulty documentation.

Addressing these three points simplifies the complexity of the undertaking. It can accommodate changing technologies, new vendors and software systems, changing devices, interfaces and workflows. Considering these many (and unpredictable) variables, an efficient integration strategy is extremely important.

Putting it all together

Data integration is a function of reconciliation, data collection, and a framework to tie the pieces together. The right integration framework matters, but what does it look like? For starters, it requires an open architecture so adaptations can be done by the vendor, operator or any integrator.

Openness applies to not only the handling of the interfaces but also the modelling of the resources themselves. The data model should be unified, adaptable and extendable to cover the hybrid network resources, as well as the layers from cable to the customer service of the network. It must be adaptable to cover upgrades of hardware and software in the network through configuration but also extendable to support the new requirements and new technologies within the network.

Design elements are equally consequential in terms of openness, configurability and expendability. It’s the design of an inventory management system that allows for interfaces to work alone or together with integration partners, to upload and align data from various sources, and to manipulate data in the system manually, as a regularly scheduled job or an event-driven process. Out-of-the-box interface adapters are more cost-effective and timely than developing new ones for specific projects. This approach also dramatically reduces the risk that projects will fail.

In terms of configurability, generic features that allow extensions by configurations are an important element. For example, it is beneficial to have the option to download new inventory data models from the Internet and import them during runtime or to add new equipment through the interface to mapping tables solely by configuration without programming. Allowing these system changes during runtime not only saves the effort for programming by the system vendor, it also saves time and money needed for new software release cycles, change requests, and the related management overhead. Integrating adaptive interface packages can also dramatically reduce costs and allow for a fast ROI.

The integration framework matters

To successfully implement multiparty hybrid services for existing networks and upcoming technologies such as 5G, IoT, VNF, and AI, the right integration strategy is necessary. Such a strategy includes an open architecture for inventory management that facilitates reconciling data from the multiple vendors, technologies and services that make up today’s complex hybrid environments. Confidence in the integrity of the data that powers your business empowers CSPs to make the bold decisions to navigate an uncertain future.