Service Assurance

Why Service Assurance is critical for Broadcast Network Operations

The very nature of broadcasting demands a high level of reliability when it comes to delivering video and audio in the whole end-to-end media delivery workflow. Just a single dropped frame can negatively affect the viewing experience and bring the service provider into disrepute, especially if there is a delivery failure just at the most inopportune moment such as a goal being scored at a soccer match or at the final completion of a record-breaking event.

How do we ensure a continued maximum level Quality of Service? It is achieved through a series of processes, architectural designs and processes built into the end-to-end workflow to deliver on high reliability. This is known as **Service Assurance** and is built into the DNA of all of the Dimetis products and service offerings.

*What is **Service Assurance**?*

Service Assurance in the media world is a set of processes, monitoring and analytical tools to ensure that services offered over a network meet a predefined Service Level Agreement (SLA) for an optimal subscriber experience. It can include many factors from resilient systems, automatic failover and the ability to provision services on demand to meet the SLA's, especially on network broadcast requirements that can experience a wide range of differing demands to its bandwidth and encoding services. This is especially true when looking to include a wide range of formats to add emerging workflows of UHD (4K), 8K, cloud technology and to future proof against other up and coming video workflows such as those utilizing HDR (High Dynamic Range), HFR (High Frame Rate), and WCG (Wide Color Gamut).

What are the products?

Dimetis develops a range of networking management solutions specifically for the media and broadcast sector to deliver secure and reliable video and audio streams. From video contribution to playout across terrestrial TV, SAT and Cable or through OTT platforms, Dimetis can optimize on-the-fly transcoding and deliver multi-channel video to strict service level agreements across existing network infrastructure.

Dimetis' range of products includes, but is not limited to:

BOSS BROADCAST Manager™ – this is the Dimetis enterprise solution that allows the ease of management and monitoring of a large number of network devices, independent of technology or hardware manufacturer, in broadcast distribution environments.

BOSS LINK Manager OpsNGN Release – a product that allows broadcasters and carriers (Media/Communication Service Provider (M/CSP)) to optimize the performance of their network environment through dynamically applying bandwidth for different signal types such as file transfer, live video or audio.

BOSS OPERATION Manager™ – is utilized as an easy-to-use resource management system for planning and scheduling media transmission connections and required resources in a broadcast environment.

BOSS MEDIA Exchange™ – provides complete management, automation, and transfer of large media files. It includes a sophisticated GUI workflow designer and an advanced metadata manager that can collect and utilize metadata for processing files in conjunction with third-party tools such as transcoders, storage and resource scheduling tools.

The above solutions can be used in a broadcast workflow to create services for delivering channels and distributing networks. All Dimetis products have **Service Assurance** as a major part of their DNA which sets them apart from other network infrastructure technologies.

What is Service Assurance in context of the products?

The definition of Service Assurance is easier to state than it is to deliver on.

Service Assurance is delivering to specific Service Level Agreements (SLA) that is a major part of defining the requirements of a specific media delivery and distribution service. It is not just about bandwidth in terms of Gb/sec, it includes end-to-end latency, uptime and transcoding functions for compression and platform compatibility, redundancy concepts including multiple disjunctive pathfinding, root cause analysis for direct pinpointing, and resolving complex fault impacts.

Being able to monitor systems, the ability to dynamically apply extra bandwidth during peaks, and throttle back during the troughs to save costs, and the ability to self-heal are all parts of the complex environment that is **Service Assurance**. The Dimetis range of products can deliver services to strict SLA's and the tools can give a clear picture on what is being delivered, and provide alarms in the event of a slowdown, video error or failure.

What are the benefits?

The benefit is ensuring quality of service and reliability. Many of the **Service Assurance** features are automated, but the operator has a complete view on the equipment, trunk, network and software in operation, or what is available in hot-stand by, so they can manually intervene if required. They can view the end-to-end environment including the infrastructure as to whether it is utilizing virtual, legacy or private/public cloud technologies. The operator will know what is happening, where it is happening and how the system is performing at any given time and can then act on it accordingly.

What is the solution?

Dimetis uses an in-depth management system that uses a service-based approach as oppose to a device-based system. A device-based system tends to be used by competitors and only deals in device failure. A service approach not only monitors hardware, but if there was a degradation to service caused by lack of resource or a malfunction such as a video freeze, then this can be highlighted and acted upon.

A service approach works above the hardware layer, and using specially designed probes, allowing the system and operators to analyze the transport layer. It can look into the signal and any service processing data. The probes allow root cause analysis and the system can drill down accordingly whether it be an IP stream or an SDI video stream. As examples, it can analyze the DVB parameters and look into the table structure, it can see frozen video or audio, or it can ensure that sub-titles are being delivered and synced on as per the required specification. It is capable of both analysis on a compressed stream or at the baseband level.

To monitor hardware effectively, it is not suitable to only monitor an entire device. The Dimetis Management System can operate at a granular level such as the port, slot, device, path and site where it will monitor, detect and react to hardware failures or malfunctions. Full redundancy is a critical approach to failover and load balancing where it automates, or with manual override, a switch to route traffic to alternative network routes and devices. But redundancy schemes are not only for hardware but also for software features and even virtual devices and functions.

Approaches to redundancy may be 1:1 that typically offers the advantage of a single additional transparent failover in the event of component failure. But more efficient layers of redundancy such as 2+1 or 3+1 redundancy are available, for example 3+1 where 3 devices load balance and in event of failure of any of the 3 devices then there is 1 device used for failover. Redundancy can even be n:m where the 'm' dictates the number devices that can fail simultaneously for a given 'n' number of devices before it starts to impact the performance of that part of the infrastructure. Other network resilience can include the 'Hitless Merge', also known as seamless protection switching, where in its most basic form, a sender sends two identical packet streams over two separate network paths.

The level of redundancy is driven by a hardware vendors supported features as well as the customers' priority, vendor recommendation, budget and their own SLA's.

In terms of maintenance it is important to pick times when a maintenance outage can have the least impact, or ideally no impact on the SLA. All data from the system is stored in a database and can be utilized for extracting SLA reports and used as a history archive for later predictive analysis.

Using this data gives two-fold advantages. It allows predictive maintenance about potential future problems meaning operations can do proactive maintenance before problems are likely to occur. But when upgrades are necessary it also can predict the most optimum outage time for upgrades with least effect. Proactive maintenance windows are designed so that scheduled resources are rerouted to other available resources while notifying operators.

Conclusion

The Dimetis approach has always been to be vendor agnostic when it comes to deploying services and infrastructure and does not want to be limited to deploying only its own products.

However, **Service Assurance** not only includes monitoring and acting on hardware failure but should encompass services such as device provisioning, operation, monitoring, fault management, termination, and also includes a layer of preventive maintenance.

Dimetis considers analytical data from probes within networks for Quality of Service (QoS), User Experience (UE) and will then act on the results of the analysis.

The ultimate aim of Service Assurance is to maintain a high level of QoS for the service provider to ensure the service level is not degraded where it can negatively impact on end users or third-party companies in the production and delivery of media content.

About Dimetis

Dimetis is a carrier grade software development company that serves the media and service provider industry. The mission is to create solutions that simplify, optimize and secure the communication and management of video, audio and data infrastructures along the media value creation chain.

Providing solutions for over 20 years to many leading carriers, broadcasters and media service providers, Dimetis has built up a professional and trusting partnership with its loyal customer base to deliver solutions and services for a wide range of networking management platforms from video contribution to broadcast distribution. This includes expertise across ingest, post-production, playout and video distribution workflows for improved efficiency, ease of management, monitoring, futureproofing, automation and scalability.

Dimetis is a member of the SVG, RAVENNA, FKTG, IABM bodies, which are dedicated to defining functional requirements and standards for the next generation networks and emerging architectures.