Fab-wide database and floating licensing for seamless access to LayTec metrology data

This white paper introduces a transformative approach to managing and accessing data from LayTec's metrology systems – EpiTT, EpiCurve® TT, and Pyro 400 – by implementing a centralized SQL database and adopting floating network licenses. These Innovations aim to overcome long-standing challenges in data accessibility, security, and software licensing, enabling fab-wide data availability, streamlined analysis, and enhanced operational flexibility.

Introduction

LayTec's metrology systems are essential tools in semiconductor manufacturing, providing critical insights into process control. However, the data they generate is often confined to cleanroom environments, limiting its availability for broader analysis and decision-making. This paper outlines a dual-solution strategy: the deployment of a centralized SQL database and the replacement of traditional hardware dongles with floating network licenses for the EpiNet® software. Together, these solutions offer a more flexible, secure, and efficient way to manage and utilize metrology data across the entire fabrication facility.

Challenges with the current system

Currently, the EpiNet® software is often locked away in clean rooms, restricting access to the valuable data it generates. Traditional hardware dongles are required to run EpiNet® on office computers, which is cumbersome. Additionally, direct network access to measurement computers is necessary to load and use measured data, which can be inconvenient and risky. In some cases, it might even be required to export data from the measurement systems using external drives to import it on office PCs, further complicating the process. Moreover, there is no best practice in place for backing up data, which poses a significant risk to data integrity.

Understanding customer needs

LayTec's customers operate in highly controlled production environments where data security is paramount. One of their primary concerns is ensuring that measurement systems remain isolated from external networks, safeguarding sensitive production data from unauthorized access. At the same time, there is a strong demand for unrestricted internal access to all measurement data across LayTec systems. This enables engineers to perform comprehensive run-to-run and system-to-system comparisons without risking interference with ongoing measurements. Another key requirement is the ability to use the latest version of EpiNet® for data analysis without triggering the need to requalify production tools – a process that can be both time-consuming and costly.

Customers also emphasize the importance of robust data protection measures, particularly in the event of hardware failures such as hard disk crashes. Reliable backup mechanisms are essential to prevent data loss and ensure business continuity. Furthermore, there is a clear need for a centralized, single point of truth for all analysis results, which simplifies data management and enhances traceability. Finally, customers seek the convenience of accessing and analysing data from office environments, eliminating the need to enter cleanrooms and don specialized attire just to retrieve or review measurement results.

Proposed solution

To meet these needs, LayTec proposes a two-pronged solution. The first component is the implementation of a centralized SQL database that aggregates data from all LayTec measurement systems. This database, hosted on Microsoft SQL Server 2022, provides a single point of truth for all metrology data, enabling seamless access and analysis across the network. With SSD storage and a high-speed 100 Gbit network, the system is designed for performance and scalability. LayTec supplies all necessary scripts and tools for deployment, including job automation and replication configurations. The database is created using the DB-Installer included in the EpiNet® installation, and replication jobs can be customized per system to ensure efficient data synchronization.

The second component is the adoption of floating network licenses for EpiNet®. Instead of relying on physical dongles, licenses are managed centrally and can be accessed by any authorized user within the network. This approach not only eliminates the logistical issues associated with dongles but also allows users to run the latest version of EpiNet® on their office laptops or desktops. The license server is ideally hosted on the customer's existing IT infrastructure – many already operate a Sentinel server, which can be leveraged for this purpose. LayTec provides the necessary drivers and configuration files, and licenses are issued annually based on the number of LayTec tools at the customer site. While the number of seats is technically limited, it is set high enough to ensure full operational flexibility.

Implementation

To realize the benefits of centralized data access and flexible software licensing, two key components must be implemented: the floating network license system and the central SQL database. Each requires coordination with the customer's IT department and a few technical prerequisites, but both are designed to integrate smoothly into existing infrastructure.

Floating network license

The floating license model replaces traditional hardware dongles with a centralized license server, allowing users to access EpiNet® software from any authorized device within the network. LayTec provides all necessary drivers and configuration files to facilitate setup. The customer simply submits a fingerprint file of the designated server, and LayTec returns the activation and license files.

Licensing is issued on an annual basis and is tailored to the size of the customer's fabrication facility. The model is based on the number of LayTec tools installed at the site, with customers providing a disclosure of their tool inventory. Each year, customers are asked to update LayTec with a list of serial numbers for their installed tools to ensure the license remains aligned with their current setup.

Central SQL database

The second pillar of the solution is the deployment of a centralized SQL database that aggregates data from all LayTec measurement systems. This database serves as the single point of truth for all metrology data, enabling seamless access, analysis, and backup.

To implement this system, the customer must provide a server environment that meets several technical requirements. Microsoft SQL Server 2022 with SQL Server Integration Services (SSIS) must be installed, along with SQL Server Management Studio 19. The server should be equipped with approximately 1TB of storage capacity per connected measurement system. A high-speed 100 Gbit network connection is also recommended to ensure smooth data replication and access. Licensing for the SQL Server should include both the Standard Server license and the appropriate Client Access Licenses (CALs).

LayTec supplies a complete set of tools for setting up the EpiNet® Database Replication Solution. These include scripts and deployment files such as CreateAgentJob.sql, DeploySSISDB.ps1, DeploySSISSolution.cmd, and the EpiNet® DWH ETL.ispac package. Using the DBInstaller included in the EpiNet® installation directory, the database – named EpiNetDWH – is created and configured. A global job is scheduled to run hourly, with additional customization available for each individual measurement system. The replication process includes a cool-off period and can be enabled or disabled depending on whether a measurement run is active.

Data replication from all Measurement Process Computers (MPCs) to the central database is handled using standard SQL tools and infrastructure. This setup allows for high levels of customization, including the definition of specific replication jobs and timing – typically configured to run after each measurement cycle completes. Coordination with the customer's IT department is essential to ensure secure and efficient access to the MPCs and to configure the necessary permissions and network settings.

Importantly, LayTec does not charge a license fee for the central database itself. Only service hours are billed when LayTec provides assistance with the setup or customization of the system.

Advantages of the new system

- Enables data access and analysis from any network-connected location, including personal laptops
- Eliminates the need for cleanroom access to retrieve or analyze data
- Reduces reliance on hardware dongles, lowering the risk of loss or damage
- Supports the use of the latest EpiNet® versions without affecting production tool qualification
- Centralizes data storage, ensuring consistency and integrity
- Provides automated backups to protect against data loss
- Prepares the infrastructure for future connected metrology platforms (e.g., EpiX®, TRIton®)
- Offers a scalable solution that grows with the customer's tool set and data needs

Conclusion

The integration of a centralized database and floating network licenses represents a significant leap forward in the usability and efficiency of LayTec's metrology systems. These solutions not only address current operational challenges but also lay the foundation for future innovations in connected metrology. By standardizing this approach across all production customers, LayTec can ensure a consistent, secure, and future-ready data management environment. Sales and Application & Support teams are encouraged to actively promote this offering as a new standard for all production environments.

For more information, reach out to **info@laytec.de** or visit **www.laytec.de**.