E183 RITdb

ATE Standard

ATE Committee and RITdb Task Force co-leads

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STANDARDS

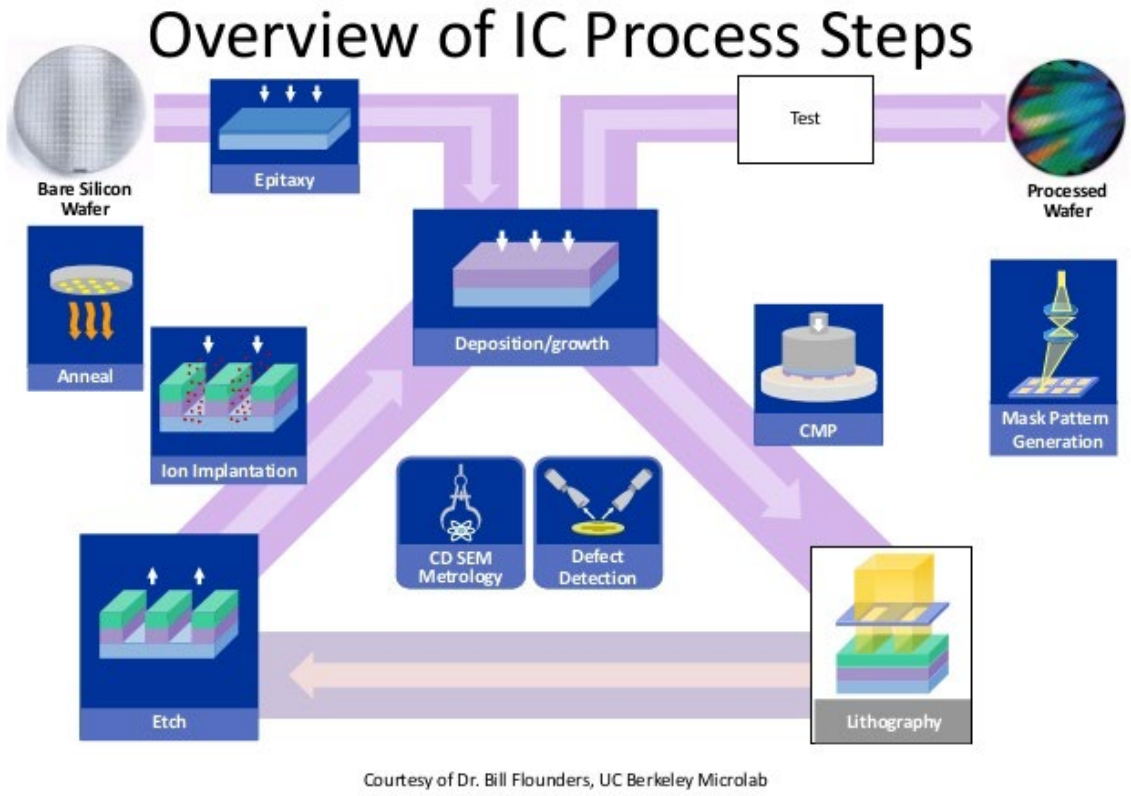
What is RITdb (E183)?

SEMI is developing a suite of standards for test which is built upon the SEMI E183 – Specification for Rich Interactive Test Database (RITdb). The RITdb Standard defines a data and event sharing and streaming methodology enabling real-time messaging.

- Enables high-speed communication machine to machine using MQTT protocol, publish-subscribe (pub/sub) model.
- Supports a collaborative decision-making model that enables different rule engines to contribute to a decision rather than relying on a single point of expertise, such as the Host/MES.
- Publishes real-time data and events with no predefined data collection plan.
- Supports messaging to control the equipment/test cell.
- Supports historical data collection and access to history via pub/sub model.
- Defines data containers for equipment information, events, logging, and data (product and equipment).
- Can be supported natively by equipment or as add-on for legacy equipment (RITdb features may be limited due to equipment capability).

Today's Standards are optimized for Fabs

- Process and Equipment Focus
- Regular flows
- Batch => wafers
- Predictable scheduling



Courtesy of Dr. Bill Flounders, UC Berkeley Microlab

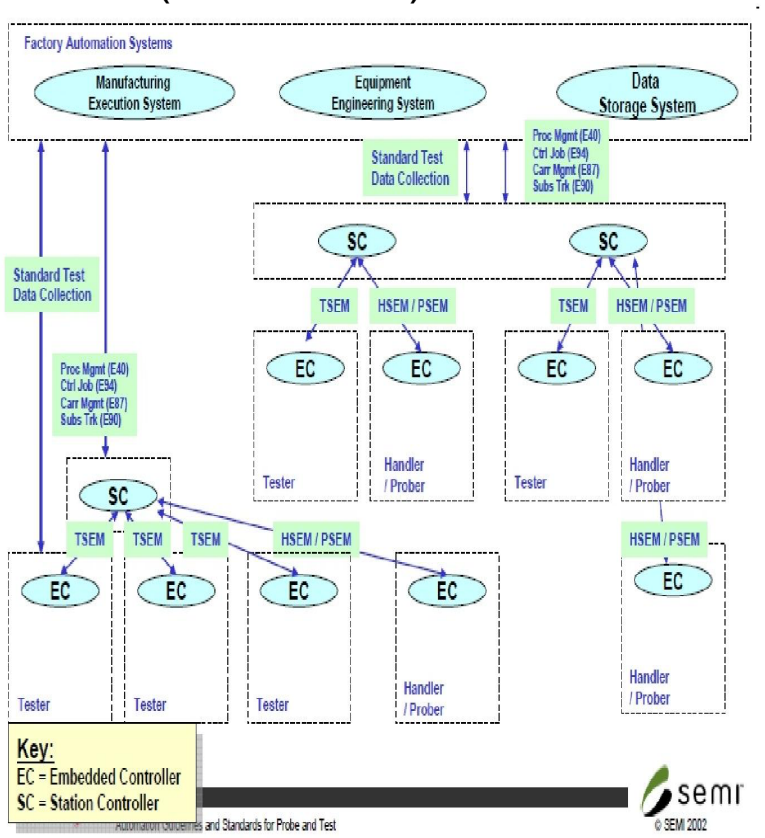
The Test Floor is Different

- Device centric
- Small lots
- Conditional flows
- Retest (in lot, end of lot, next day…)
- Data Feed Forward/Back
  - Local
  - Across facilities/entities
- Low utilization
- Interruptions – holds
- Priority changes

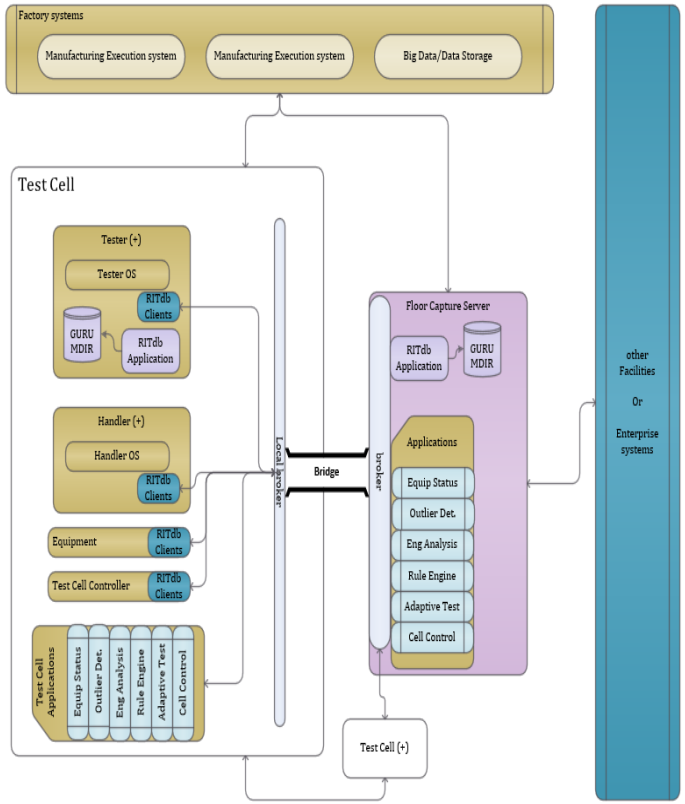
Test Requires Collaborative Communications

- Point to point vs Host-Client
- Dynamic Roles
- Many Hosts – many Clients
- Data and Control separate
- Both high and low Latency

Historical Model for ATE (Host-Client)



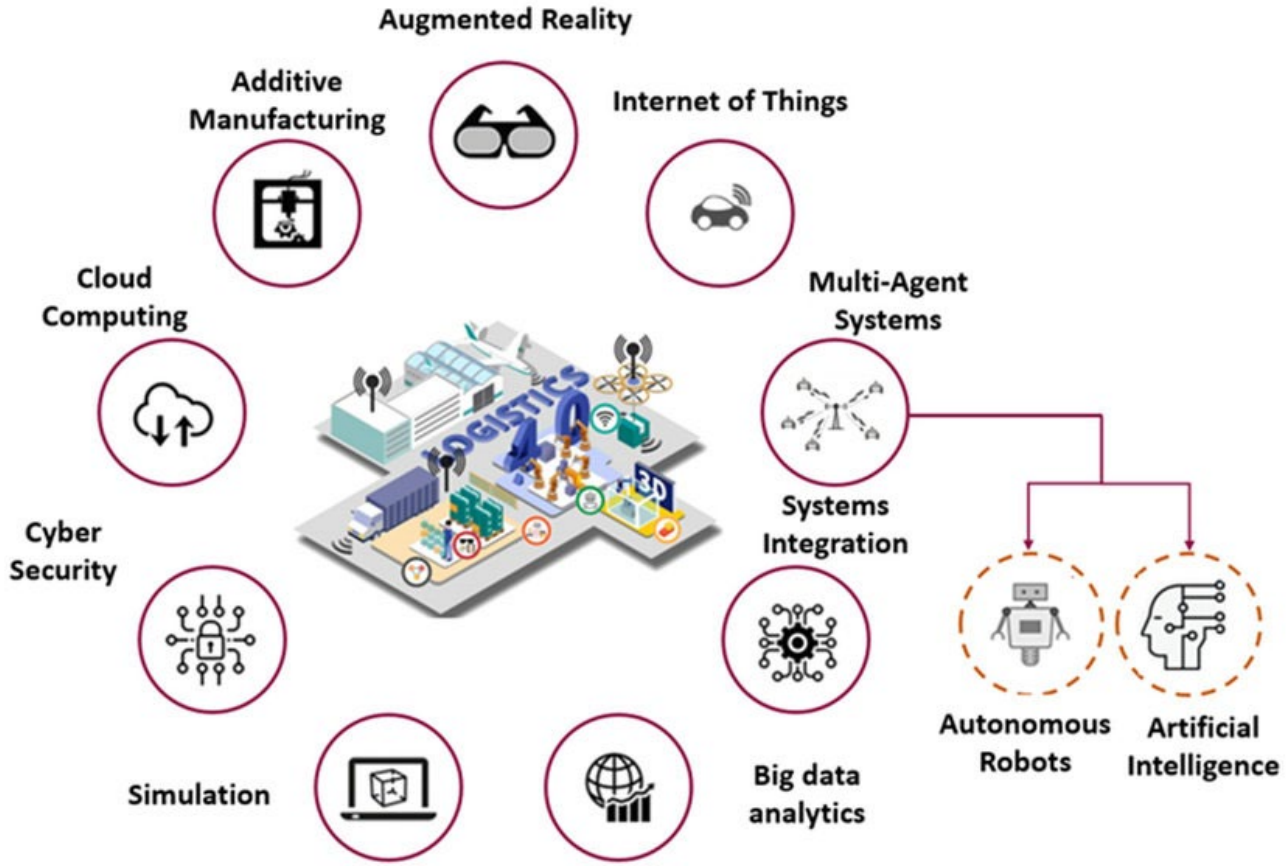
RITdb Model for ATE (point to point)



RITdb SEMI E183 – Designed For Test

Smart Factory = ever changing pool of actors

- Focus on dynamic Material Flows
- Monitoring with **Events**
- Decisions based on **Rules**
- Control via **Actions**
- History using **Containers**



E183 RITdb Resources

Published Standard: SEMI E183-1121 - Specification for Rich Interactive Test Database (RITdb)

Blogs/Articles Online Forums

Modernized IC Test Using SEMI RITdb Standards
RITdb: The Interplanetary Database for Manufacturing
New Standards on Test Cell Data and Events

Online Forum:

RITdb LinkedIn Group

Material/Training:

Implementing the SEMI E183 Standard (Rich Interactive Test Database) Bundle

RITdb Translator:

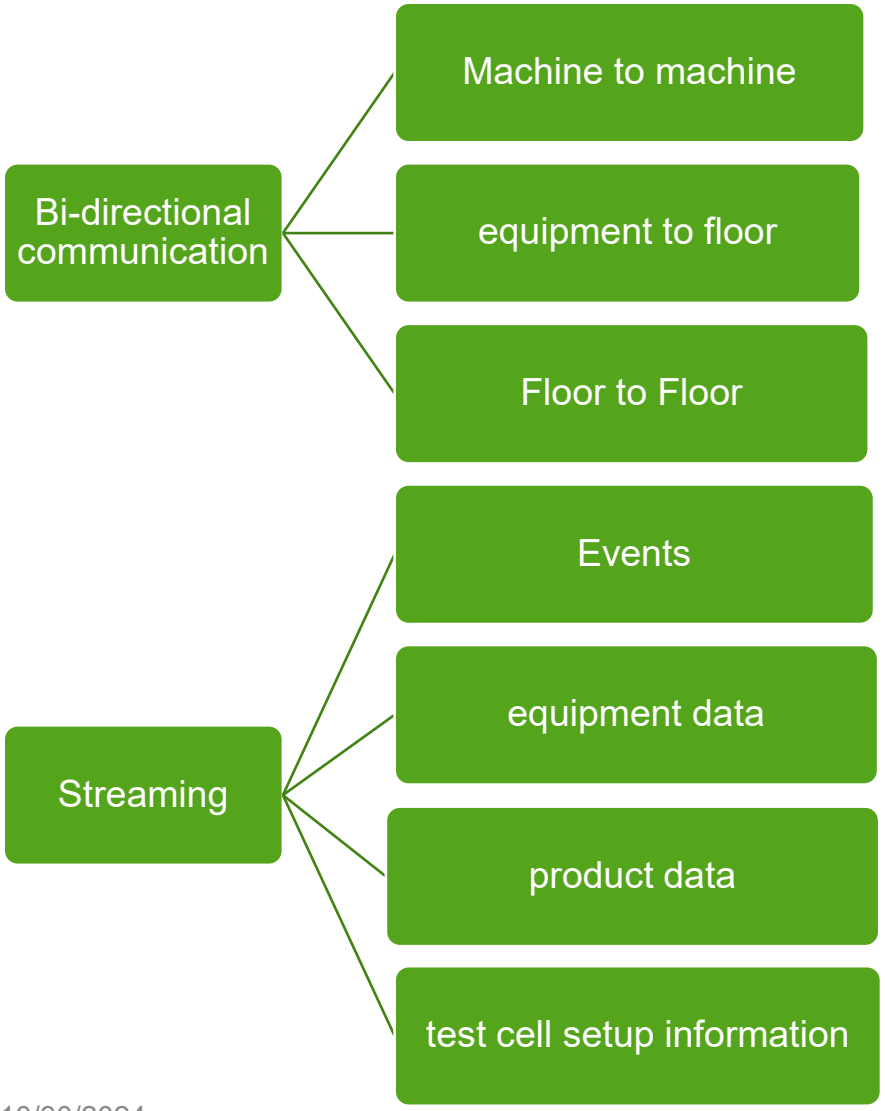
https://github.com/RITdb/ritdb.Translator

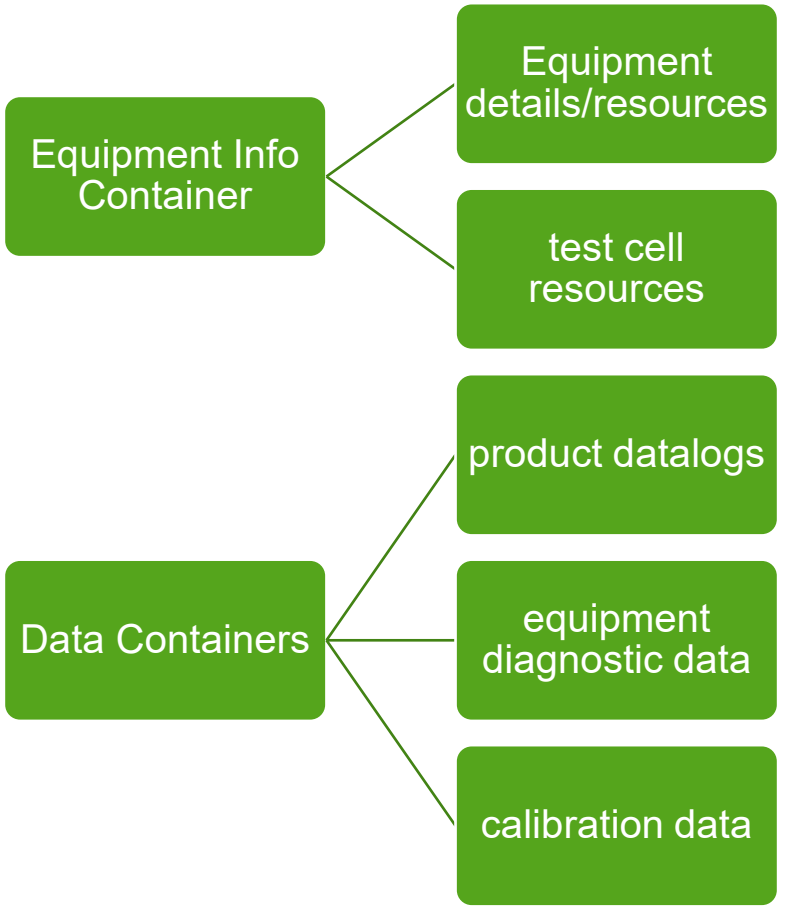
SEMI Standards Member Content:

Join RITdb Task Force Community on SEMI Connect to obtain access to additional tools/utilities, proposed standard(s), discussion forum, and more…

Additional slides

Capabilities supported by RITdb





Something for every Part

Tester

RITdb deployment:
- ❑ Deploy RITdb client across platforms/Facilities
- ❑ Migrate to Native RITdb implementations
- ❑ Add non-RITdb compliant testers

Additional streams:
- ❑ Expanded tester & handler events
- ❑ Tester diagnostics/Calibration
- ❑ datalog.* container and streaming
- ❑ Test Cell Controller events
- ❑ Prober/handler logs/settings

Tester Control:
- ❑ Test Quality
- ❑ Operational Controls
- ❑ Adaptive Test

Test Cell/ Floor

Implement rules to verify test quality and feedback to tester while lot is still loaded.

Implement Real-Time Adaptive Test at final test.

Integrate device traceability.

Integrate with Lot Dispatch systems.

Integrate with MES automation

Add sensor data stream

Add handler logs (setup, recipe, …)

Analytics

Publish to Big Data

Integrate with Industry 4.0

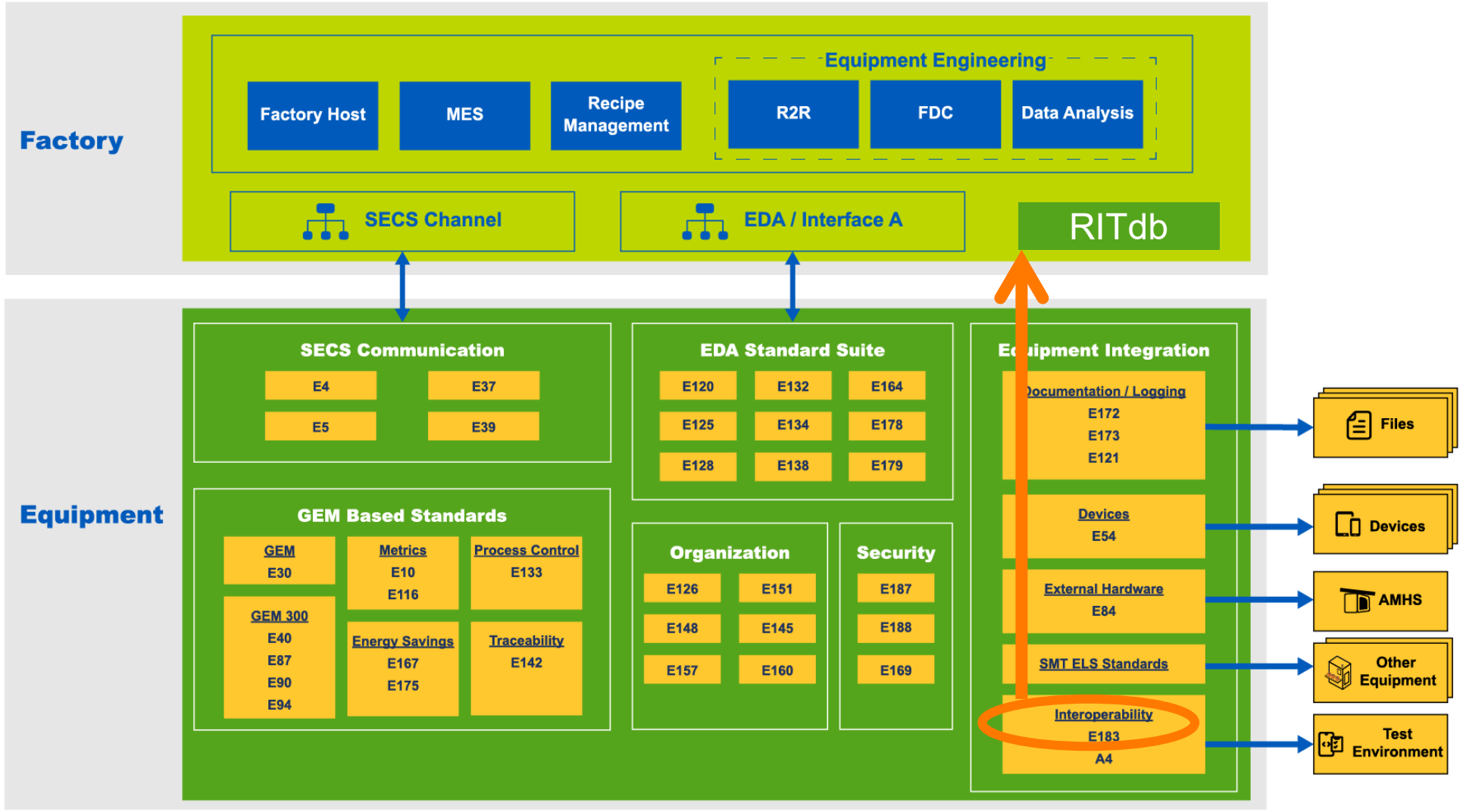
Real-Time (RT) or Near RT OEE applications/Tools

Test Cell Monitor
- ❑ **Mean time between fails**
- ❑ **Data integrity/Quality**
- ❑ **Test Cell Configuration**

Equipment Monitors
- ❑ **Tester calibration/diags**
- ❑ **Tester Resource movement**
- ❑ **Tester configurations**
- ❑ **Handler setups**

Equipment Automation Standards

Where does E183 RITdb sit?



Something for every Need

Tester

RITdb deployment:
Fan out – platforms/Facilities
Migrate to Native RITdb implementations
Add non-RITdb compliant testers using Reflectors.

Additional streams:
Expanded tester events
Tester diagnostics/Calibration datalog.* event/container
Test Cell Controller events
Prober/handler logs/settings

Tester Control:
Test Quality
Operational Controls
Adaptive Test

Test Cell/ Floor

Implement FT Rule to verify test quality and feedback to tester while lot is still loaded.

Implement Real-Time Adaptive Test at final test.

Integrate device traceability.

Integrate with FT Lot Dispatching system.

Integrate with MES automation

Add sensor data stream

Add handler logs (setup, recipe, …)

Analytics

Publish to Big Data

Integrate with Industry 4.0

Real-Time (RT) or Near RT OEE applications/Tools

Test Cell MTBF Monitor

Tester Monitor (Calibration/ diags/…)

SEMI Standards

SEMI Standards are an important element to ensuring tight and effective collaboration in the semiconductor manufacturing supply chain and Smart Manufacturing.

For more information: https://www.semi.org/en/products-services/standards

To join: https://www.semi.org/en/products-services/standards/membership-application