

ISMI – Maturing e-Manufacturing

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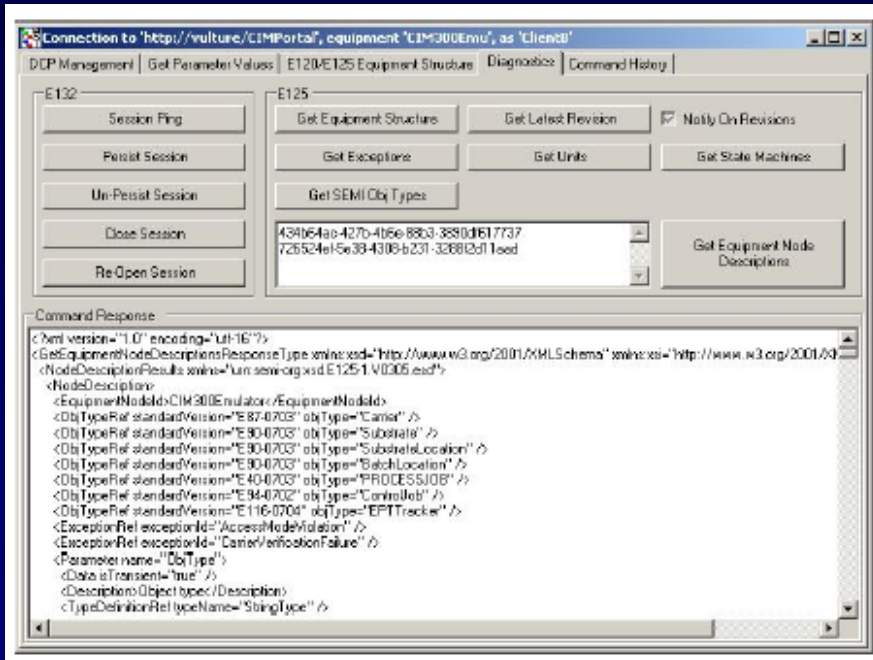


Role

ISMI is committed to the continued development and maturity of e-Manufacturing capabilities to improve factory productivity

- **Standards development**
- **EDA Client Connection Emulator**
- **EDA Evaluation Method**
- **Equipment EDA Evaluations**
- **ISMI e-Manufacturing Applications Lab**
- **Advanced Software Tester**

EDA Client Connection Emulator



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EDA Client Connection Emulator

The EDA Client Connection Emulator (ECCE) is intended to be a design reference artifact, for use during the development and implementation of commercial EDA solutions on production equipment

- **Accelerating availability:** by establishing a firm reference point, actualizing the client connection expectations, and providing an objective reference point for supplier's, solution provider's, and end user's discussions
- **Reducing variation:** provides a firm reference for expected behavior during development that will guide implementation and promote standardization
- **Functional verification:** the ECCE defined behavior is based upon the consensus of expectations for commonality (>80%) among the member company host side clients. Availability of the ECCE places the tools for managing development and first pass success into the hands of the suppliers.



Client Emulator Role

- Intended for use by equipment suppliers/OEM for development purposes
- The ECCE is intended to emulate the factory systems, including all roles expected by an EDA enabled equipment in a single or multiple client environment, as defined in the standards and ISMI EDA Usage Scenarios
- To be provided to Suppliers *at no cost* under restrictive license:
 - Licensed to a company for a defined number of instances of the ECCE under company officer signature
 - No rights of survivorship or assignation
 - Results, demonstrations, or output using the ECCE is limited to ISMI member companies only
 - As is license without warranty
- ISMI will be the exclusive distribution source
- Source code will be made open source in 2006

Description of Behavior

- The client emulator will provide reference points for multiple factory environments
 - OS platforms including Windows XP, Windows 2000, & Linux
 - Multiple SOAP packages
- Expected to be a very thin client, containing no algorithmic or processing logic that would normally be found in APC, FDC, or other client applications
- Expected to be portable, with no extraordinary hardware or environmental requirements (i.e., Can be run on a standard computer)
- References to testing are in the context of functional operation and verification, and do not imply or represent the capabilities of a software quality test tool/suite or a standards conformance tester

EDA Evaluation Method

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EDA Evaluation Method

Goal:

Establish a standard approach for evaluating basic function and 'happy path' scenarios for EDA implementations

Availability: July 2005



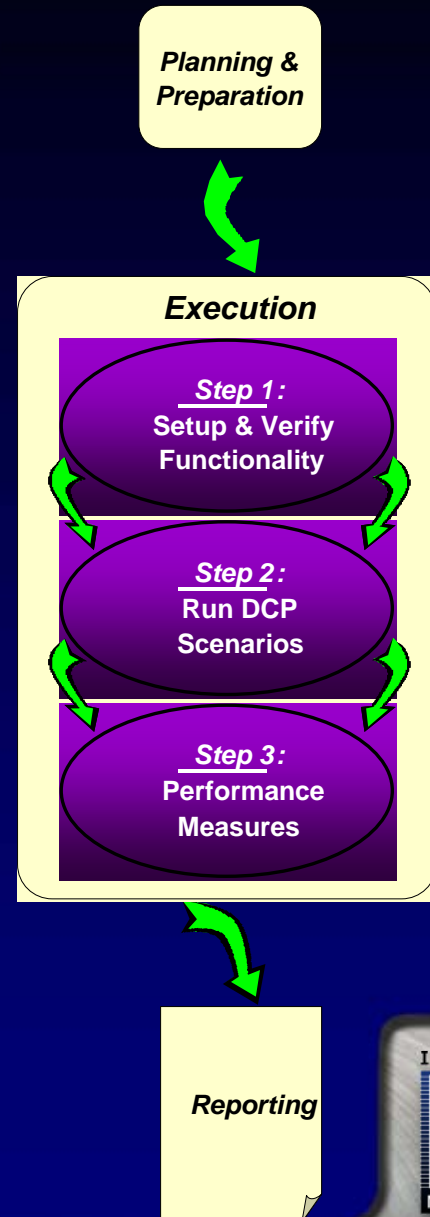
ISMI EDA Evaluation Method

International SEMATECH Manufacturing Initiative
Technology Transfer #04104579B-TR



Overview of EDA Evaluation Method

- **Process:**
 - Establishes that basic functions have been implemented and work
 - Execute 'happy path' scenarios, representing the intended use when everything is right
 - Monitor performance
- **Result:**
 - An understanding of the equipment's ability to perform the basic EDA functions
 - Measurement of the performance of the equipment EDA interface under a limited set of conditions
 - Provide subjective measures to monitor and optimize performance



Example of Evaluation Procedures

APPENDIX 1 – FUNCTIONAL EVALUATION PROCEDURES

| Feature Description | Test Procedure | Expected Result | Metric | Comments |
|--|--|--|-------------------------------------|----------|
| A. Establish Session – With SSL | | | | |
| 1) | Establish a <u>secure session</u> via the following command: a) EstablishSession() | A secure session is made with the equipment and at least one ACL entry is present. | Success / Does Not Meet Expectation | |
| 2) | Get an <u>ACL entry</u> from the equipment with an entry equal to “AnyPrincipal” using the following command: a) GetACL(AnyPrincipal) b) If the entry is not present, build an ACL file and then, install it in the equipment | | | |
| 3) | Get the <u>active sessions</u> open on the equipment by sending the following command to the equipment: a) GetActiveSessions() | A successful response | Success / Does Not Meet Expectation | |
| 4) | Using an administrative session, get the maximum sessions by sending the following command to the equipment a) GetMaxSessions() b) Determine the maximum limit of non-admin sessions that can be set on the equipment and note in the comments section at the right of this row. | A reply message with current equipment settings for maximum sessions allowed. | Success / Does Not Meet Expectation | |
| 5) | Set Maximum Sessions Setting by sending the following command to the equipment: a) SetMaxSessions() b) Set the value to 11 sessions. | A successful response | Success / Does Not Meet Expectation | |
| 6) | Verify that the maximum number of non-administrative sessions has been set correctly by sending the following command to the equipment: a) GetMaxSessions() | A reply message with current equipment settings as requested in step 3. | Success / Does Not Meet Expectation | |

- Defines the steps to be taken
- Describes required action
- Establishes the expected outcome
- Provides success criteria

Equipment EDA Evaluation

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Equipment EDA Evaluations

Goal: To characterize early production level EDA implementations to identify challenges and provide industry shared learning. The logical next step beyond prototypes.

- Targeted at production level commercial instances
- Must be performed on actual equipment
- Utilize the EDA Evaluation Method for characterization
- When? 2nd Half 2005



Invitation to Evaluate

- **An ISMI Invitation to Demonstrate will be available at our public web site this month**
 - <http://ismi.sematech.org/industry/emanufacturing.htm>
- **Joint proposals between suppliers and solution providers are acceptable**
- **Pilot demonstrations involving IC makers are highly preferred and will be prioritized**
- **The evaluation will produce a characterization report**

Who to contact : Steve Fulton



**ISMI
e-Manufacturing
Lab**

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ISMI e-Mfg Applications Lab

Charter: An applications lab capable of simulating the factory systems (of member companies) to the extent needed to support research and investigation in emerging and project activities

- Support evaluation, integration, characterization and development activities related to e-Manufacturing goals and objectives
- Provide, as needed, factory infrastructure that is substantially similar to our member companies'
- Maintain simulated equipment and factory-level capabilities with associated protocols and data structures to support high level integration and productivity improvement activities
- Leverage industry resources to acceleration research affecting interoperability, flexibility, cost burden, quality, testing, and fast ramp

Lab Intended Role

- **New technology evaluation**
- **Standards development and prototyping**
- **Product demonstrations**
- **Interoperability investigation**
- **Performance and metrics investigation**
- **Replicate issues and problems without impact to a real factory, to allow resolution**
- **Shared development environment for member companies**
- **Low risk environment for alternative strategy investigation**
- **Research efforts for high risk analysis and in support of position paper development**
- **Projects targeted at factory system level issues**

Current Activities

- **EDA implementation benchmarking**
 - Assess/improve the EDA Evaluation method using a variety of EDA clients and equipment simulators
 - EDA performance and metrics development
- **EDA solution compatibility profiling**
 - Host supplier-supplier 1on1(s) to check compatibility among the solution providers
- **TSP Protocol updates**
 - Each new release of Brooks CCS Tester requires checking/updating of ISMI TSP Protocol test content

Application Lab Characteristics

- Dedicated hardware supporting most environments used by member companies (Windows Server, Linux, Unix)
- Software solutions are primarily donated, with multiple applications per role
- Isolated sub-net, allowing high risk experimentation without enterprise impact
- Dedicated firewall available for remote access and interaction
- Designed to support rapid reconfiguration and the introduction of complex or novel strategies in hardware, netware, application relationship, or other infrastructural areas

Advanced Software Tester

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Advanced Software Tester

- ISMI has an active project to investigate the needs and opportunities for a tester
- The requirements for a Standards Conformance Software Tester are complex, perhaps even more than the standards
- The cost of development and potential market are significant obstacles to the business case for a commercial test product
- We believe it is a critical enabling technology
 - Establishes a common language and metrics
 - Provides quantitative conformance measures
 - Used properly it can significantly reduce cost for development, acceptance, and production readiness
- We will share more information when we have it