

# EDA Roadmap

ISMI MC / Supplier Meetings  
October 11-15, 2004

INTERNATIONAL SEMATECH



# Expected Outcomes

- **Suppliers understand ISMI MCs requirements**
- **MCs understand supplier roadmaps**
- **The gaps between ISMI MC requirements and supplier roadmaps are clearly identified**
- **Agree on next steps**

**EDA Roadmap**  
**ISMI Member Companies**

**ISMI MC / Supplier Meetings**  
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# Agenda

- **Key Messages**
- **Motivation for Change**
- **Interface Definitions**
- **EDA Role in Manufacturing**
- **Equipment Expectations**
- **EDA Design Requirements**
- **FAST II Roadmap**
- **Interface C Status**
- **Key Messages**

# Key ISMI MC Messages

1. Fully functional 300 mm standards are assumed
2. Interface A (a.k.a. DDA/EDA) is now the KEY ISMI MC focus. Interface A standardization is nearing completion and supplier community is implementing
3. The ISMI MCs are cooperating with suppliers early to assure mutual understanding and success
4. Interface A prototypes are being evaluated at ISMI
5. OEMs are deploying e-Diagnostics solutions (1000s of tools) and reporting significant benefit
  - Fabwide coverage requires Interface A and C standardization
6. ISMI MCs will require Interface A on equipment purchased starting as early as 2Q05

# Environmental Pressures and Some Motivations for Change

Large Process Complexity  
+  
2-3 Year Technology Nodes

Need to Focus Few Expert  
Resources on Solving Issues  
vs. Finding Data

Complex Equipment  
Design  
+  
Fierce Competition for  
Next Design Win

High Cost of Mis-  
Processing (100's to  
1000's of die)

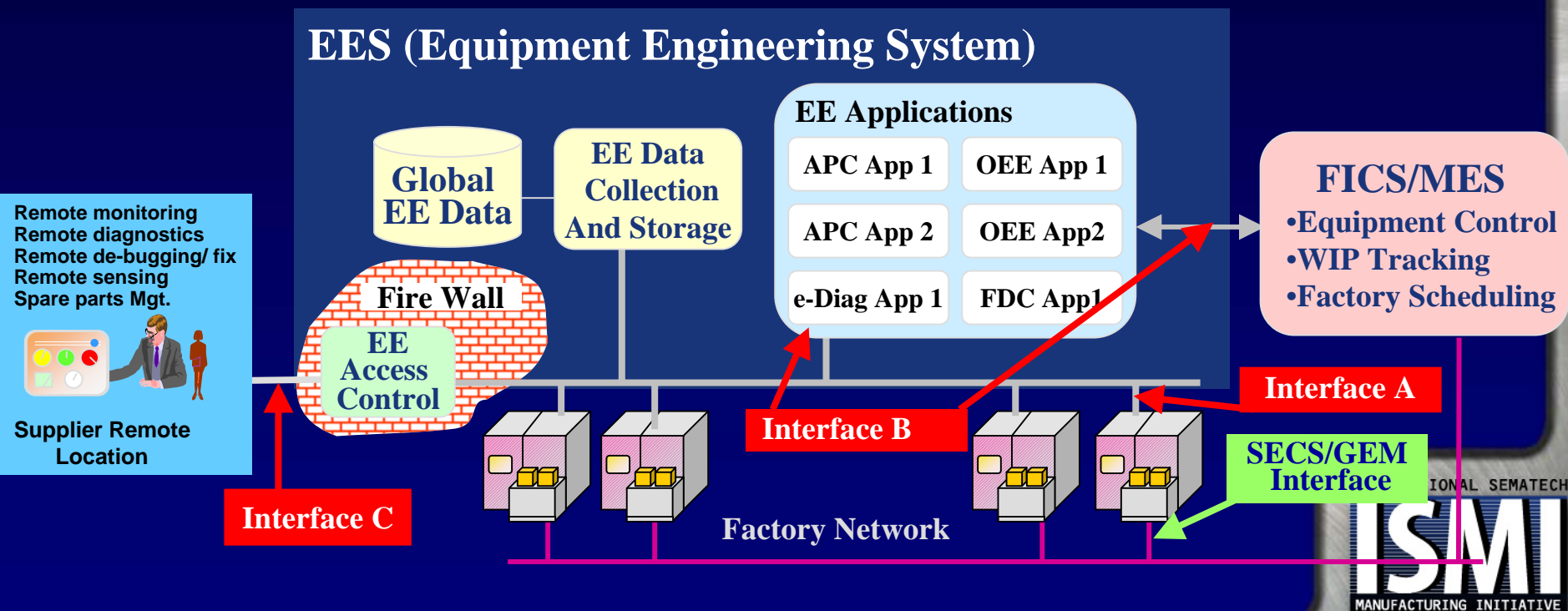
Time to Money for Install,  
Configure, & Qualification

Pay for Performance – High  
Cost of Downtime

Innovation is Needed to Get the Right Data and have the Right  
Tools to Meet the Complex Needs of Future Technology

# Interface Refresher

- **SECS/GEM** – Still the primary equipment control I/F
- **Interface A** – Equipment Engineering Data Interface
  - First Goal: More & better data from the equipment
- **Interface C** – External access to EEC (e-Diagnostics)
- **Interface B** – Among EEC applications and to FICS/MES

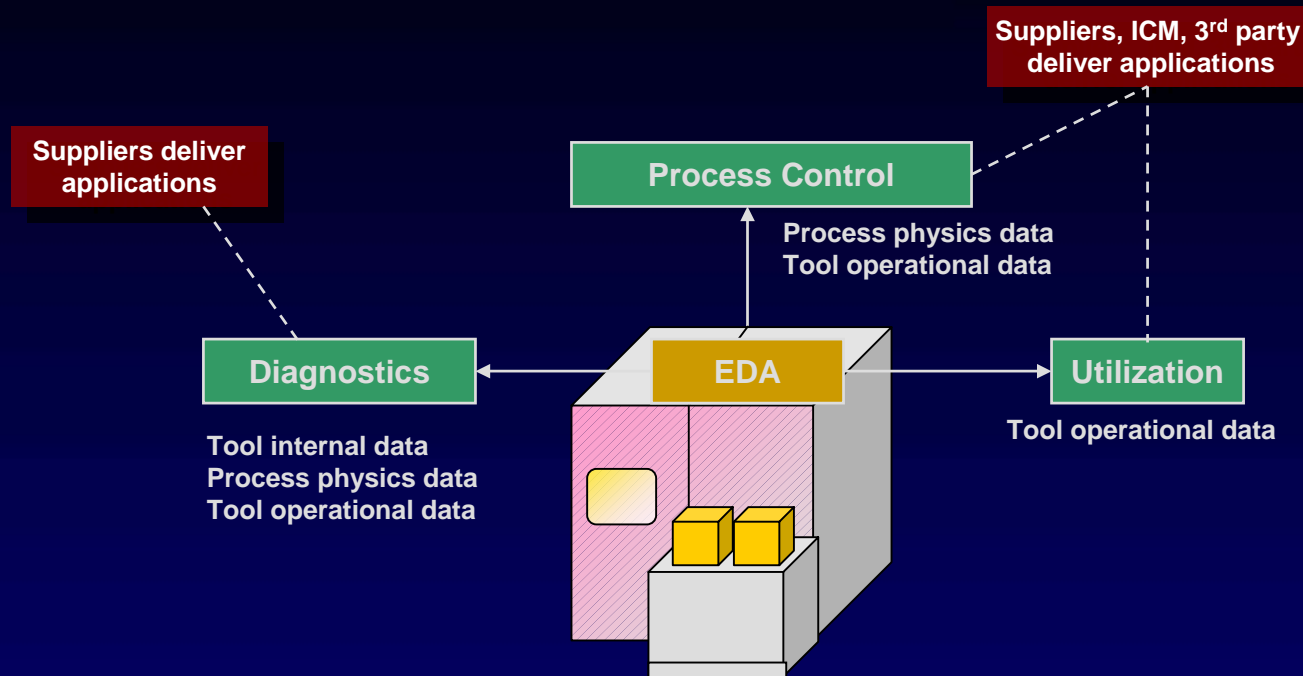


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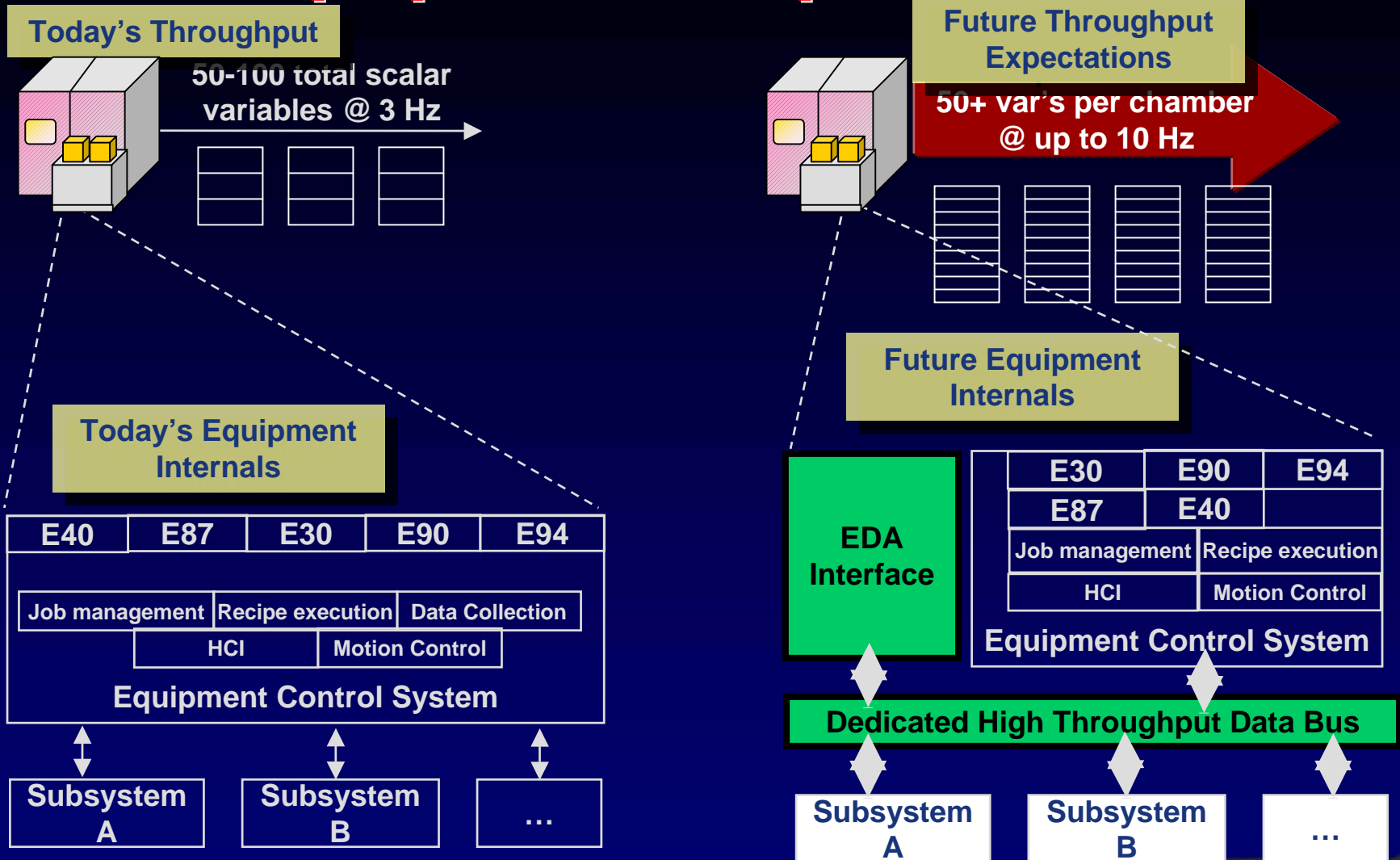
# EDA Role in Manufacturing

Diagram is Conceptual Only



- **EDA refers to SEMI E120, E125, E132, and E134**
  - Includes associated implementation specs like E120.1, 3719, 3720, 3721
  - ISMI MC's intend to use EDA as the Primary Data Pipe for all Equipment Data
  - Includes both Operational and Process Related Data
  - Includes Data Accessed Internally at the Factory and External from the Factory
- **Both Internal Factory Applications and External Supplier Applications will Leverage the EDA Interface**
  - Equipment e-Diagnostic Data Available External to the Factory will come from EDA
  - Equipment Data needed for Factory Applications will come from the EDA Interface

# Equipment Expectations

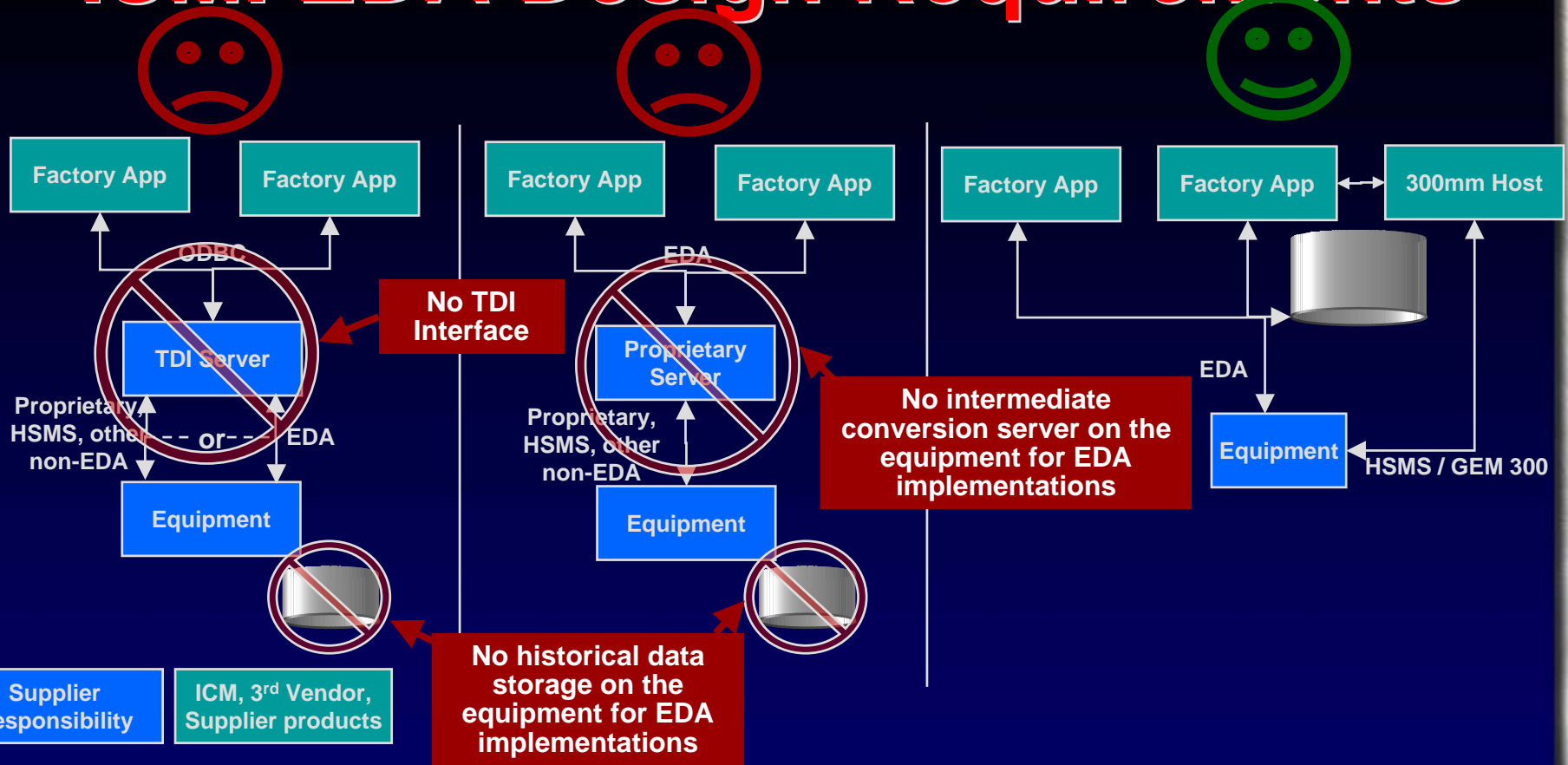


- Equipment internals behind the EDA interface must be designed to provide dedicated high-throughput data acquisition while maintaining equipment run rates
- For this reason, ISMI will be focusing on current and future generations of 300 mm tools for EDA implementation

# Equipment Expectations - Internal

- **Implementation quality is critical**
  - **EDA Interface must be integrated directly**
    - Layering atop old (e.g., SECS-II) communication will not meet performance and reliability needs
  - **Data Quality must be assured**
    - Sampling-to-reporting latency reduced
    - Time stamps accurate
    - Formatting, units, etc. correct and consistent
  - **Time Synchronization**
    - Internal Time Synch must be <10ms (sampling rate)
      - Equipment components must integrate well
        - » “Blackbox” add-ins problematic
    - NIST research has shown that equipment-factory synchronization can be easily accomplished
      - The factory provides the “master” clock

# ISMI EDA Design Requirements



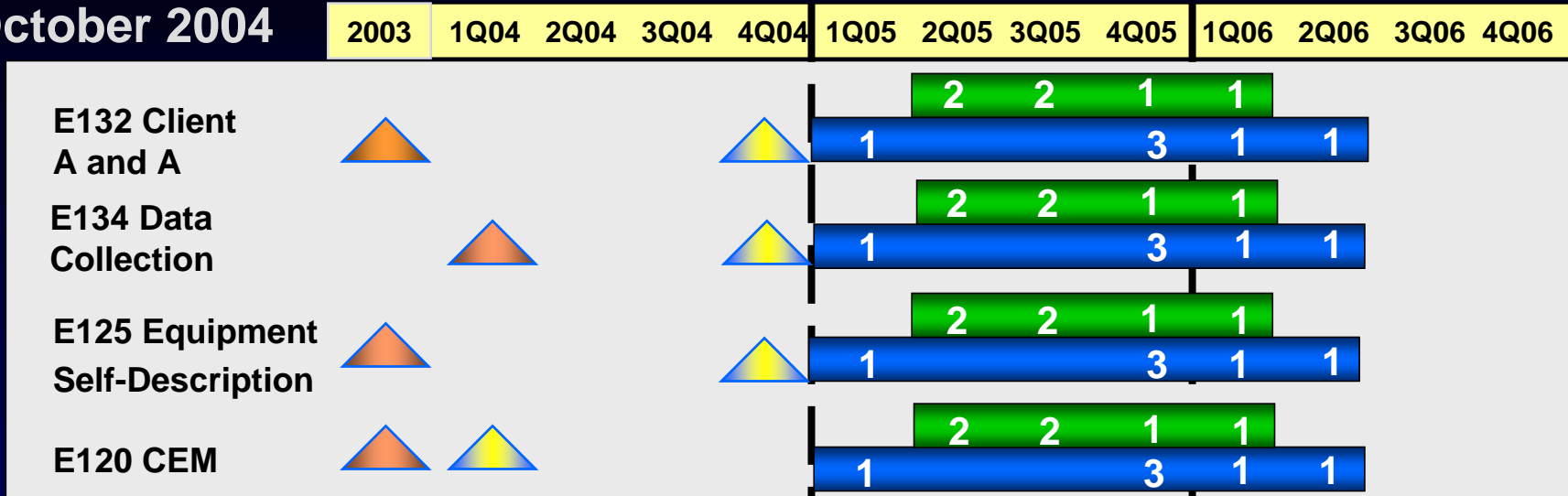
- ISMI MC's will access EDA directly from the equipment
  - No off-tool servers required in order to collect data via EDA
    - Equipment must be designed for EDA
  - TDI will not be required by ISMI
- No on-tool historical data storage
  - Per-tool database support overhead is not cost-effective

# FAST II Roadmap



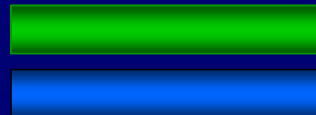
## EDA Production Software Need/Plan Dates

October 2004



- Equipment Data Acquisition (EDA or Interface “A”) remains the highest priority
- Standards targeted completion aligns with need and implementation roadmap
- Majority of suppliers are trailing device maker need dates

IC Makers Need Dates  
Suppliers Planned Dates



Standard approval date ▲

Technical Spec ▲



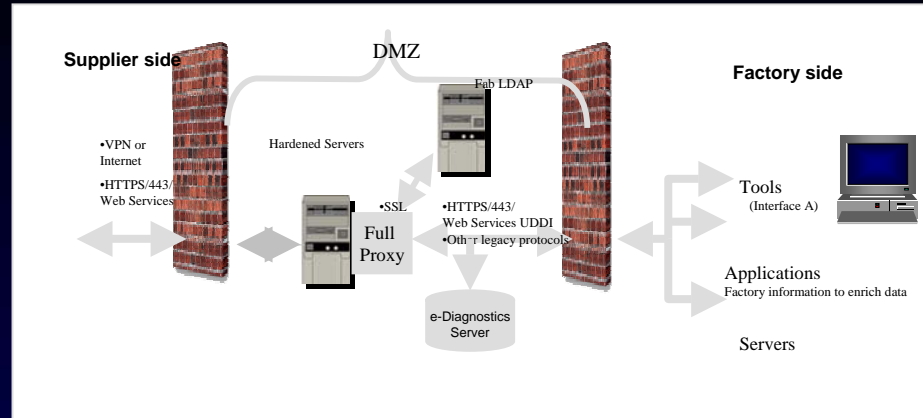
# Interface C Definition

- ISMI Working Group defined requirements for moving data securely from the factory to the supporting organization
- Working Group included IC Makers, OEMs, and 3<sup>rd</sup> party suppliers
- Requirements, Implementation Guidelines, and Assessment Checklist included in e-Diagnostics Guidebook, section 4.3.2 and chapters 11 and 12

# Interface C Requirements Summary

## Interface C shall:

- Be interoperable
  - Normalize interface from different IC Makers to different suppliers
- Protect equipment supplier and IC Maker data
  - Data Separation and Security between Equipment Suppliers and between the IC Maker and Equipment Supplier
- Guarantee data delivery
- Meet performance expectations
- Be secure
  - VPN, SSL, etc.
- Comply with the Measurement & Assessment checklist
- Enable remote equipment operation
- Support data other than that directly produced by the equipment



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# References

- SEMI EDA standards: E120, E125, E132, E134
- e-Diagnostics Guidebook,  
[ismi.sematech.org/emanufacturing/docs/guidebook.pdf](http://ismi.sematech.org/emanufacturing/docs/guidebook.pdf)
- EEC Guidelines,  
[ismi.sematech.org/emanufacturing/docs/eecguidebook.pdf](http://ismi.sematech.org/emanufacturing/docs/eecguidebook.pdf)
- EEC High-level Requirements for APC,  
[ismi.sematech.org/emanufacturing/docs/EECReqs.pdf](http://ismi.sematech.org/emanufacturing/docs/EECReqs.pdf)
- Prototyping,  
[ismi.sematech.org/emanufacturing/prototype.htm](http://ismi.sematech.org/emanufacturing/prototype.htm)
- Time Synchronization, 04094557A-ENG,  
[www.sematech.org/docubase/abstracts/4557aeng.htm](http://www.sematech.org/docubase/abstracts/4557aeng.htm)
- Usage Scenarios, TBD
- Virus Protection, 04104567A-ENG,  
[www.sematech.org/docubase/abstracts/4567aeng.htm](http://www.sematech.org/docubase/abstracts/4567aeng.htm)