

e-Diagnostics and e-Manufacturing

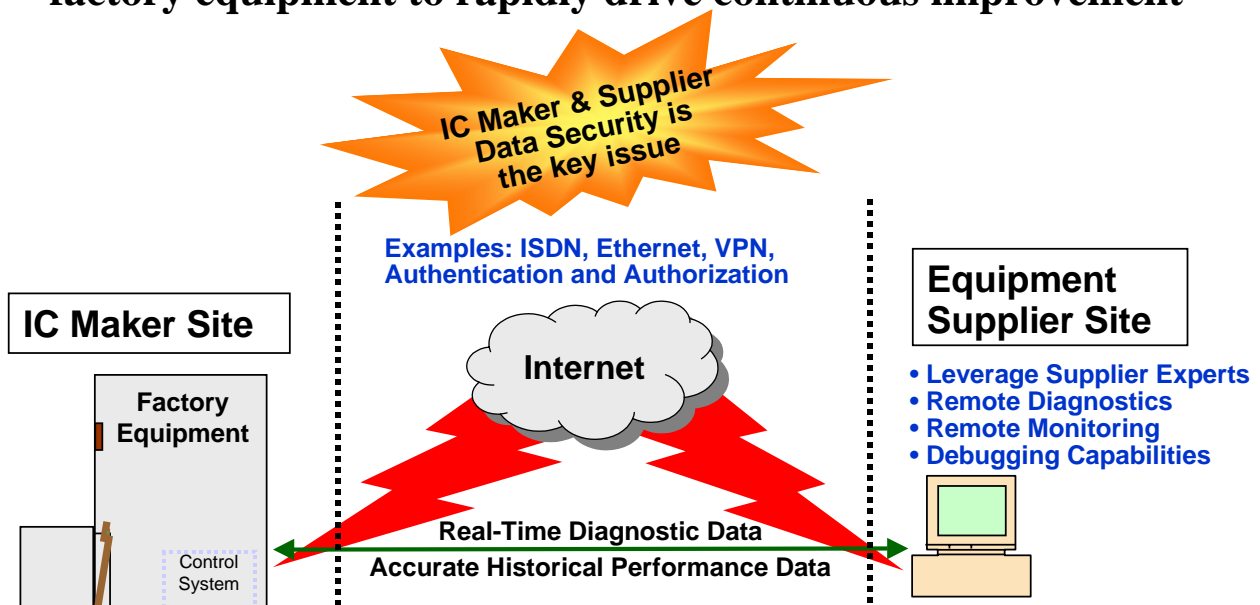
Harvey Wohlwend
International SEMATECH



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e-Diagnostics Overview

- Remote monitoring & diagnostics allow supplier experts to rapidly fix factory equipment issues from their sites
- Suppliers need accurate historical performance data from factory equipment to rapidly drive continuous improvement



MISSION:

Create guidelines

share best practices

drive commercialization of open architecture, Internet-based access for suppliers to ...

monitor equipment

provide improved uptime

optimize PMs

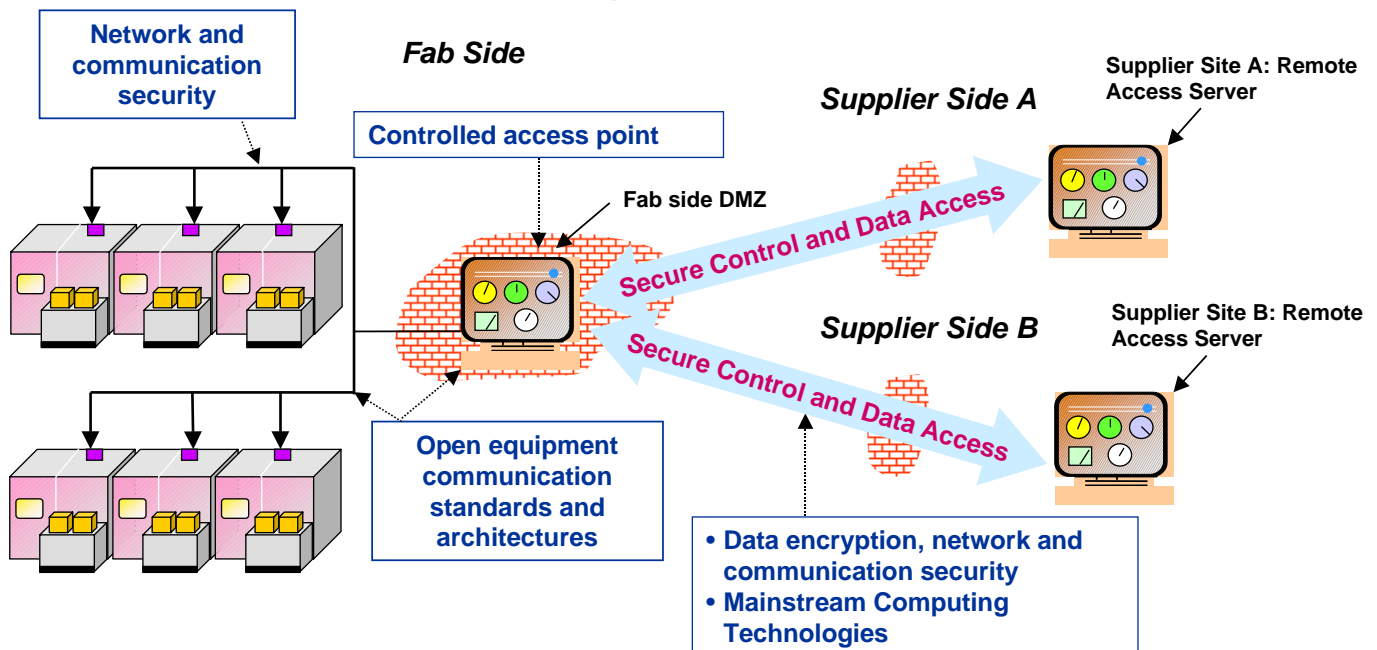
and reduce MTTR



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ISMT e-Diagnostic Guidelines



Full guideline document available at:

<http://www.semiatech.org/public/resources/ediag/index.htm>

ISMT e-Diagnostic Capability Definitions

Level 3 - Prediction:

Predictive Maintenance, Self
Diagnostics, Automated Notification

Level 2 - Analysis:

Automated Reporting and Advanced
Analysis with SPC capability

Level 1 - Collection and Control:

Remote Tool Operation, Remote Performance
Monitoring, Remote Equipment Configuration

Level 0 - Access and Remote Collaboration:

Remote connectivity to the tool and remote collaboration
capabilities (text, audio, video)

Full capability definition document available at:

<http://www.sematech.org/public/resources/ediag/index.htm>



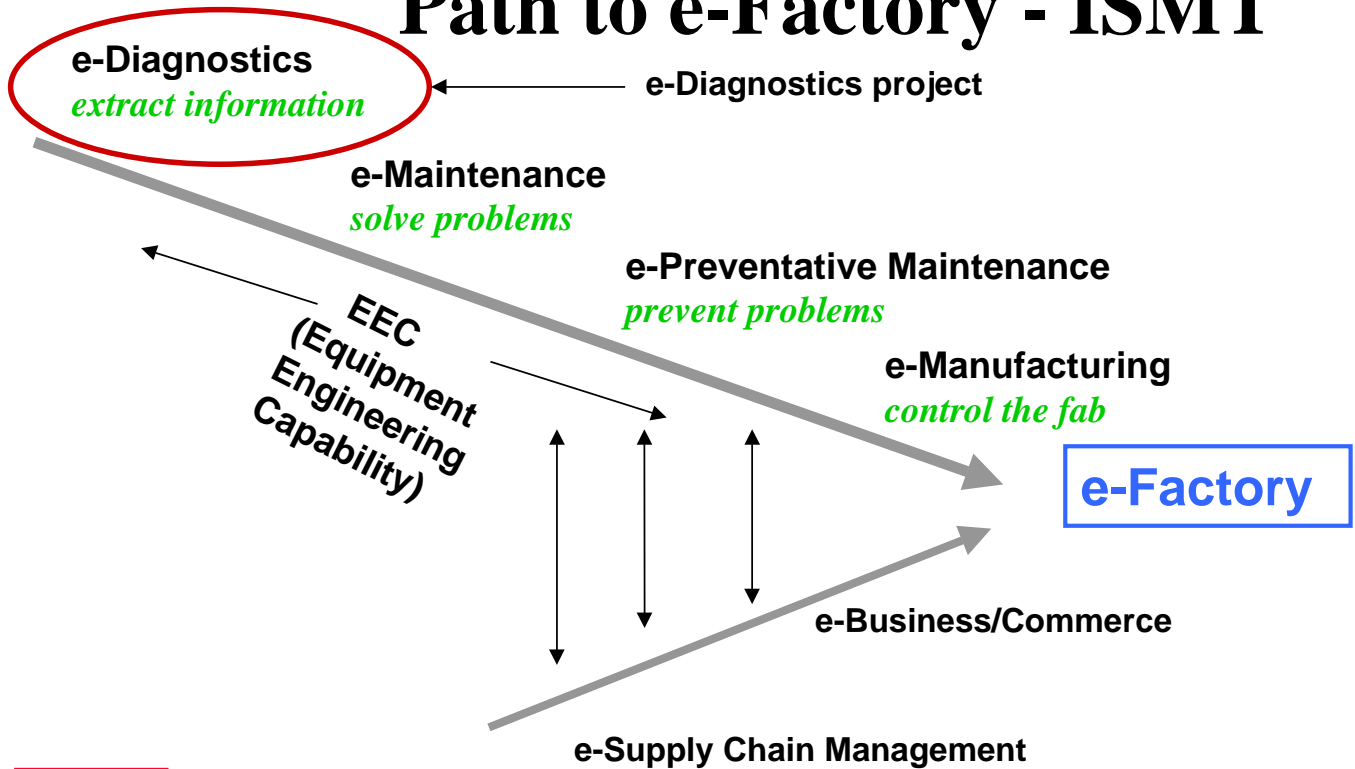
e-Diagnostics and e-Manufacturing

e-Diagnostics Deliverables

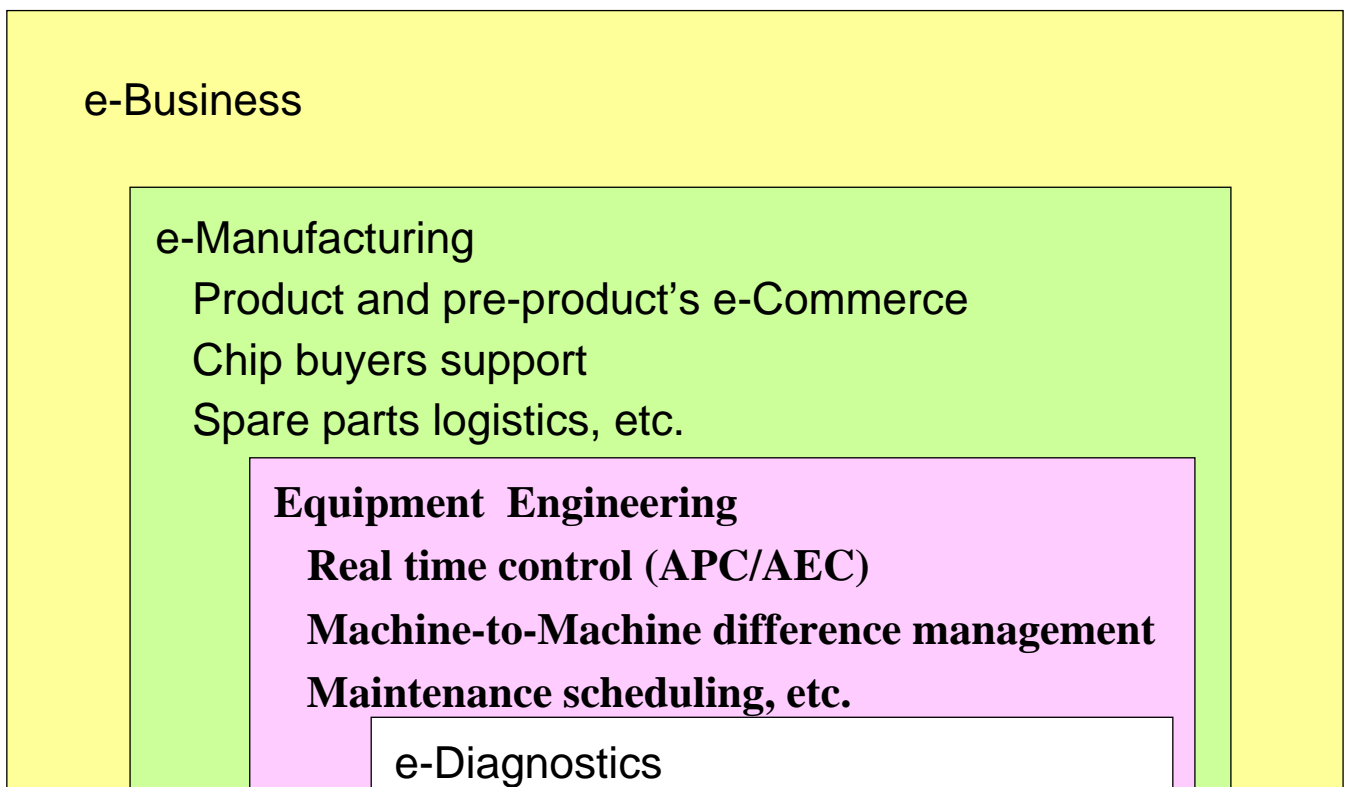
- Key Program Outputs
 - ✓ e-Diagnostics Guidelines 06/29/00
 - ✓ e-Manufacturing included in the ITRS 07/10/00
 - ✓ IT Security Council Guidelines 08/24/00
 - ✓ SEMICON SW seminar, e-Diagnostics Guidebook, rev. 0.7 10/19/00
 - ✓ Network Bandwidth requirements 08/03/00
 - ✓ Data Definition 08/24/00
 - ✓ e-Diagnostics Capability Definition 08/24/00
 - ✓ e-Diagnostics Protocol Definition 10/05/00
 - ✓ SEMICON Japan workshop 12/05/00
 - ✓ Validation / Proof of Concept plans 12/20/00
 - ✓ Data Security Model 01/11/01
 - e-Diagnostics Guidebook update 03/23/01
 - Measurement and Assessment Method 06/30/01
 - C/Prototyping at ISMT, report 09/30/01



Path to e-Factory - ISMT



EEC Collaborations - Selete



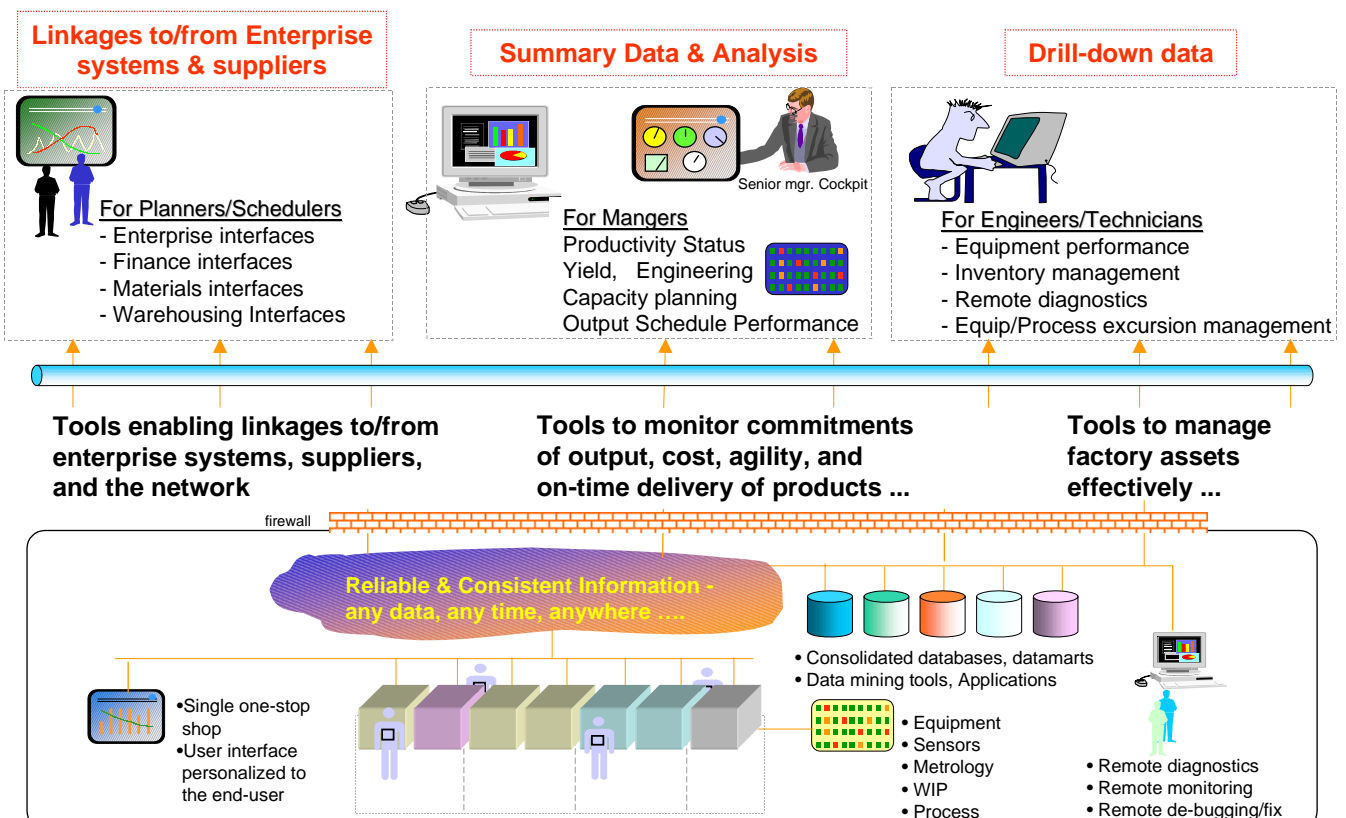
e-Manufacturing Capabilities

- **APC (Advanced Process Control)**
 - Real time process control (in-situ)
 - Feedback / Feed Forward / Run-to-Run (Wafer/Lot)
 - Usage Adjustment (Equipment)
 - Fault Detection & Classification
 - Statistical Process Control (SPC)
- **Recipe Management**
- **e-Diagnostics**
 - Tool Operations Tracking
 - Machine-to-Machine Difference Management
 - Spare Parts Management
 - Maintenance Scheduling
 - Maintenance and Trouble shooting assistance
 - Predictive Maintenance

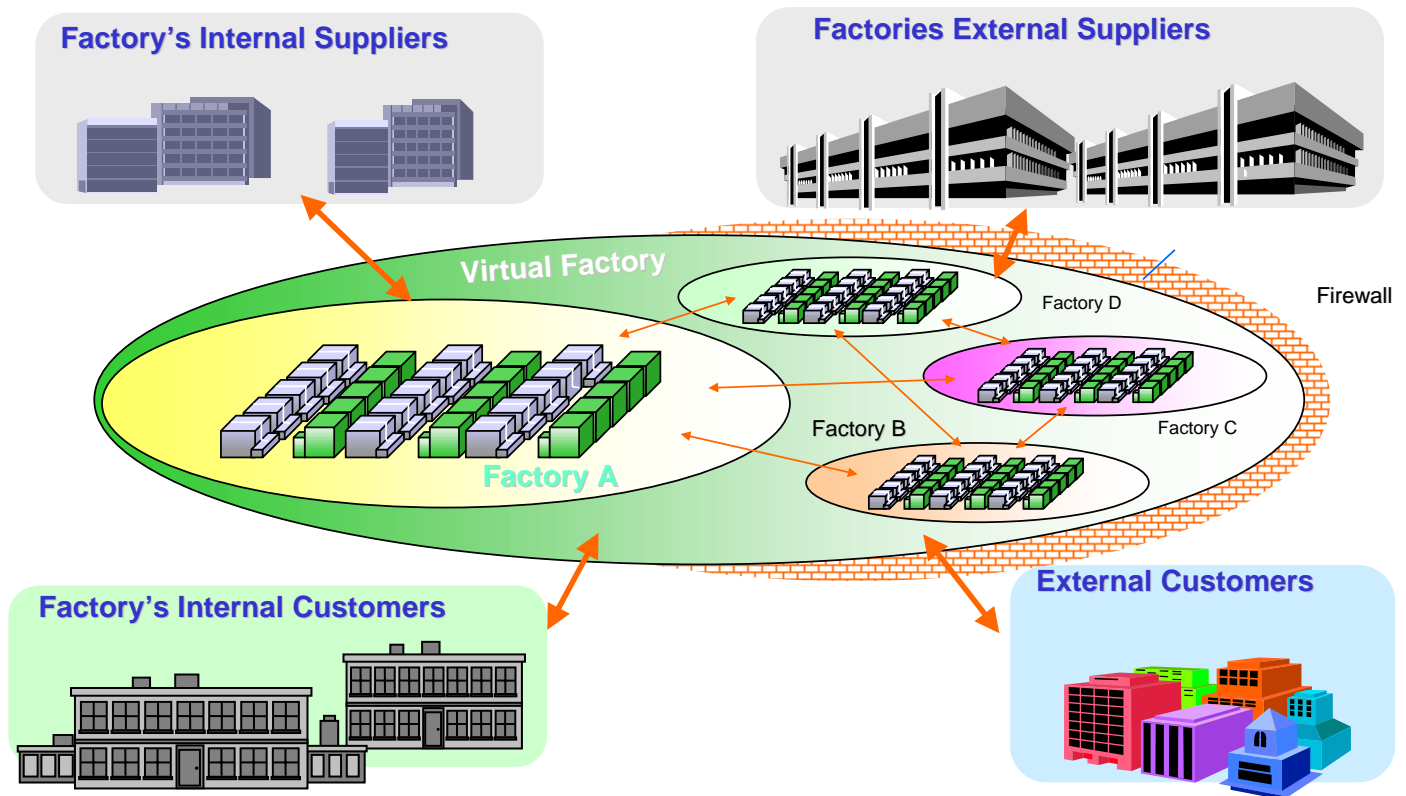


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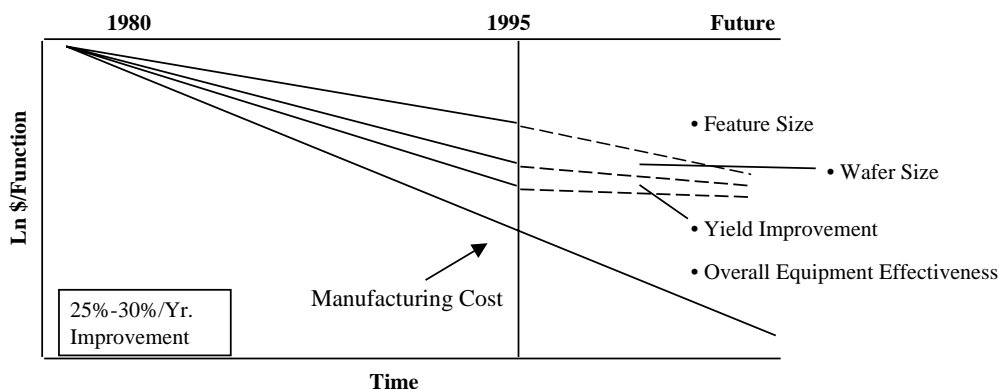
An e-Manufacturing Vision



e-Manufacturing Spaces



Keeping the Productivity Engine on Track 25-30% Cost Learning Curve requires OEE Improvement



Factor	1980	1995	Future
Shrinking feature sizes	12%	12-14%	12-14%
Larger wafer sizes	8%	4%	<2%
Yield improvements	5%	2%	<1%
Other Equipment Productivity (OEE)	3%	7-10%	>9-15%



e-Diagnostics Summary

- **300mm Standards implementation cannot be compromised by this effort!!**
- **e-Diagnostics is an outstanding ISMT example of IC makers and suppliers working together on a win-win initiative**
 - e-Diagnostic guidelines and capability definitions developed in H2'00
 - For the industry to reap the benefits, we must adhere to the Guidelines
 - e-Diagnostics solutions should follow these Guidelines
- **ISMT and Selete are collaborating on the concept of the Equipment Engineering Capability (EEC)**
 - Critical that e-Diagnostics & EEC create a unified set of requirements
 - “e” solutions should follow these guidelines
 - Future collaboration will expand the guidelines into e-Manufacturing

