

e-Diagnostics International SeMaTech Project

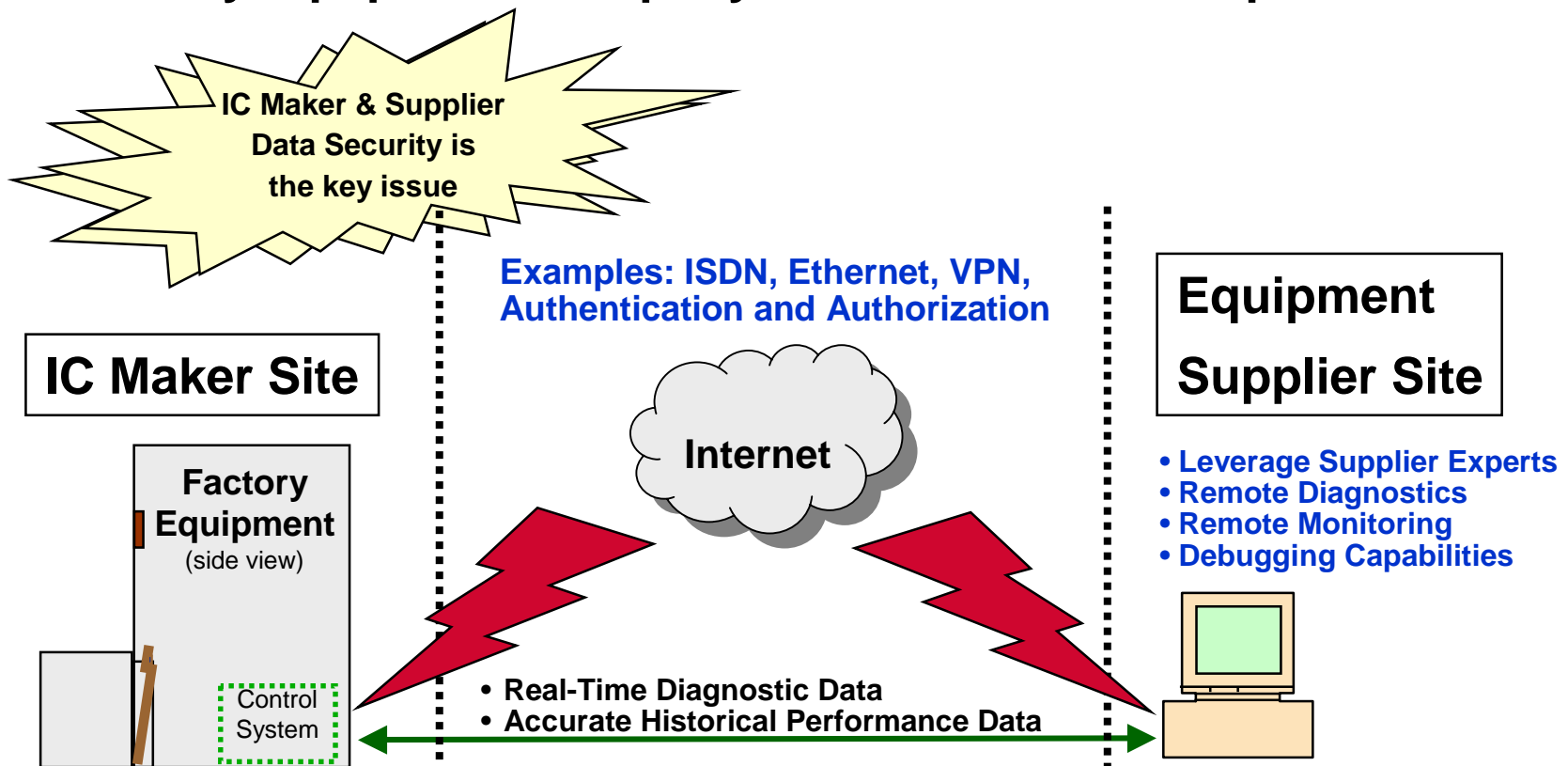
www.sematech.org/public/resources/ediag/index.htm

Harvey Wohlwend, International SeMaTech
harvey.wohlwend@sematech.org, 512.356.7536

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e-Diagnostics Overview

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



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e-Diagnostics Project Summary

Background: The internet is revolutionary productivity enhancer. Semiconductor fabs have not yet broadly incorporated its advantages due to concern for security, lack of standards, and diverse and inadequate supplier support. Many ad hoc implementations are being initiated.

Objectives:

Focus on e-Diagnostics first: Create guidelines, best practices, prototypes, compliance assessments, and drive commercialization of open, internet-based access for suppliers to monitor their equipment. This should provide improved uptime, optimized predictive maintenance, and faster repair. Project can add scope per MC direction.

Stakeholders:

- Primary: Fab equipment engineers and operations managers; equipment suppliers
- Secondary: Infrastructure software suppliers

Competitive Benefit: Member companies create industry-leading direction for driving suppliers to support a new generation of data gathering in fabs. Assured common supplier implementations (to reduce cost and enable data analysis applications) and encourage competition around standardized approaches. Leverages value from other ISMT investments in automated data collection (TP2™), sensors (AEC/APC), and SW interface standards.

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e-Diagnostics Workshop Summary - 6/29

Objectives:

- 1) Approve the e-Diagnostics Guidelines (Requirements)
- 2) Identify roadmap steps needed to establish e-Diagnostics
- 3) Identify data elements necessary for effective e-Diagnostics

Actions:

Publicize Guidelines: Press release, ISMT (Resources for the Industry) web site, Semicon West briefing packet.

Working Groups focused on:

- 1) definition of data needed
- 2) model for bandwidth requirements
- 3) capabilities definition
- 4) definition of data transfer protocols
- 5) resolution of single wire guideline
- 6) implement security, with Security Council support

Summary:

Strong agreement on:

- 1) need for e-Diagnostics
- 2) initial steps include basic infrastructure improvement

e-Diagnostics Workshop (65+ Participants)

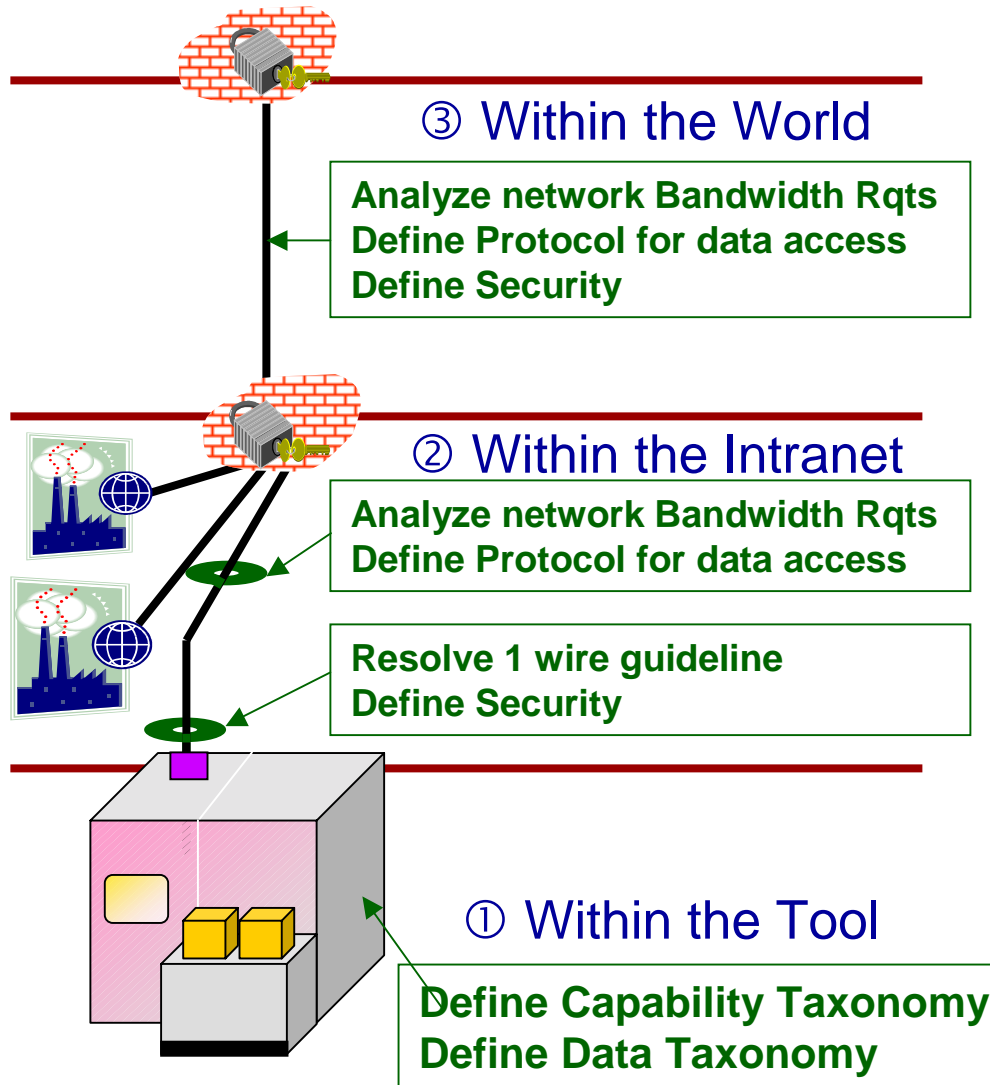
Member Companies

AMD
Conexant
HP
Hyundai
IBM
Intel
Lucent
Philips Semiconductors
ST
TI
TSMC
ISMT

IEF Suppliers

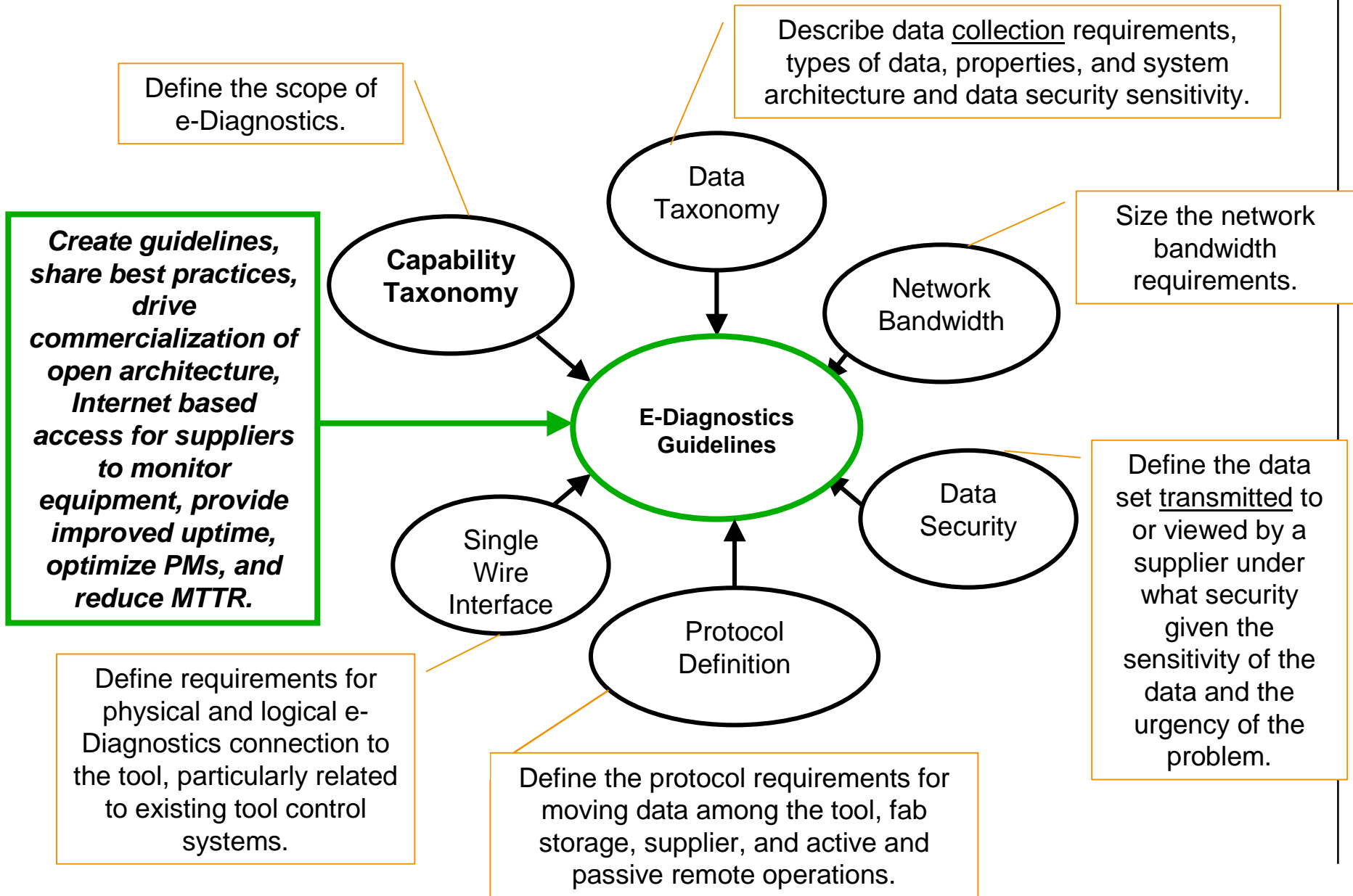
Applied Materials
Axcelis Technologies
DNS Electronics
Hitachi
KLA-Tencor
Lam Research Corporation
Nikon Precision
Novellus
PRI Automation
SVG
Tokyo Electron America
Varian Semiconductors
SISA

e-Diagnostics Capability Definition



- ③ Predictive / Preventative Maintenance
 - Automatic identification of pending failures by the process tool
 - Automatic action of tool to fix the issue
- ② Proactive Monitoring
 - Monitor leading indicators / summary data
 - Some external system or people analyze the data and predict future tool behavior
- ① Reduce MTTR
 - Basic remote access to tool data
 - Equipment experts can review and analyze 'raw data' from anywhere in the world

How do the Teams fit?



e-Diagnostic Teams

Team	Leader	Members
Network Bandwidth Requirements	Harvey Wohlwend (ISMT)	ISMT Reza Bonabi (KLA-T) Juan Bocanegra (AMAT) Anant Raman (Intel) Kirbey Hess (AMAT)
Capability Taxonomy	Gary Viviani (Varian) Dave Bloss (Intel)	Bill Ramus (IBM) Bob Wiggins (IBM) Shay Assaf (AMAT) Scott Smith (Nikon) Roger Eastvold (KLA-T) Chris Stambaugh (Schlumberger) Ray Peterson (TEL) Frank Kennedy (Teradyne) Chris Saso (Avantcom)
Data Taxonomy	Ed Kaz (AMAT) Nick Nikolic (KLA-T)	Ray Bunkofske (IBM) Shay Assaf (AMAT) Dave Busing (KLA-T) Regina Qiu (KLA-T) Scott Smith (Nikon) Ray Peterson (TEL) Patrick Splinter (Axcelis)
Single Wire Resolution	Dave Bloss (Intel)	Reza Bonabi (KLA-T) Dave Busing (KLA-T) Jim Chalmers (KLA-T) Ray Bunkofske (IBM) Bob Wiggins (IBM) Juan Bocanegra (AMAT) Shay Assaf (AMAT) Margaret Pratt (ISMT) Neil Frank (AMAT) Frank Kaplan (AMAT)

Team	Leader	Members
Protocol Definition	Roger Eastvold (KLA-T) James Martin (Intel)	Anjali Sridhar (KLA-T) Melvina Mazin (KLA-T) Nick Nikolic (KLA-T) Shay Assaf (AMAT) Michael Laine (Axcelis) Ben Bergarian (Nikon) Ray Bunkofske (IBM) Scott Smith (Nikon) Frank Kennedy (Teradyne) Robert Brandom (Schlumberger) Helmut Klotzsch (Schlumberger) Neil Frank (AMAT) Frank Kaplan (AMAT) Pete DelMastro (SVGL) Jacques G. Matteau (Lam) Chris Saso (Avantcom)
Data security model	Piero Fioravanti (Intel) TBD (IBM)	Reza Bonabi (KLA-T) Anjali Sridhar (KLA-T) Roger Eastvold (KLA-T) Shay Assaf (AMAT) Juan Bocanegra (AMAT) Gerry McMahon (Teradyne) Kirbey Hess (AMAT) Claude Baudoin (Schlumberger)
IT Security Council	Michael Sigman (ISMT)	Debbie Christofferson (Intel) Elaine Cole (Motorola) Greg Herbst (TI) Richard Hnath (Lucent) Carol MacNaughton (ISMT) Greg Nelson (AMD) Joe Norman (STMicroelectronics) Dave Reisenauer (IBM)

e-Diagnostics Workshop Summary - 9/20

Objectives:

- 1) Broaden participation and understanding of e-Diagnostics, including new Security Guidelines
- 2) Understand how XML may affect e-Diagnostics
- 3) Accelerate the e-Diagnostics working groups

Actions:

Initial working group results publicized and distributed

Briefing by SEMI XML Task Force

Planning for 1st public meeting at SEMICON SW

Working Groups focused on: 1) Definition of data transfer protocols, 2) Resolution of single wire guideline, 3) Information security

Summary:

Attendance expanded (75) to include solution (software suppliers), Strong supplier engagement, Agreement on: 1) wide collaboration on e-Diagnostics, 2) initial steps include basic infrastructure improvement

2000 Deliverables

- **Action: Provide 2000 milestones/accomplishments**

- **Key Program Outputs**

- ✓ e-Diagnostics Guidelines, rev. 1.0 - 06/29/00
- ✓ Pre-SEMICON/West press release - 07/05/00
- ✓ e-Manufacturing included in the ITRS - 07/10/00
- ✓ Data Definition, rev. 0.1 - 07/07/00
- ✓ Data Definition, rev. 1.0 - 08/24/00
- ✓ Implementation Roadmap, rev. 0.1 - 07/14/00
- ✓ C/Network Bandwidth requirements - 08/03/00
- ✓ C/e-Diagnostics Capability Taxonomy - 08/24/00
- ✓ IT Security Council Guidelines - 08/24/00
- ✓ e-Diagnostics Workshop, approve standards - 09/20/00
- ✓ e-Diagnostics Protocol Definition, rev. 1.0 - 10/05/00
- ✓ SEMICON Southwest seminar - 10/19/00
- Validation / Proof of Concept plans - 11/00
- Data Security Model, rev. 1.0 - 11/00
- e-Diagnostics Guidebook, rev. 1.0 - 11/00
- SEMICON Japan workshop - 12/00

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ISMT e-Diagnostics Program

Program Goal

**Drive pre-competitive technology
& standards development within
the industry for e-Diagnostic
capabilities**