Intel® Active Management Technology

Technical Overview For Desktop Enablement

Intel Developer FORUM

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Agenda

- Intel® AMT Features
- Intel® AMT Architecture
- Setup & Configuration
- Manufacturing & Validation
- Intel® AMT ISVs
- Questions

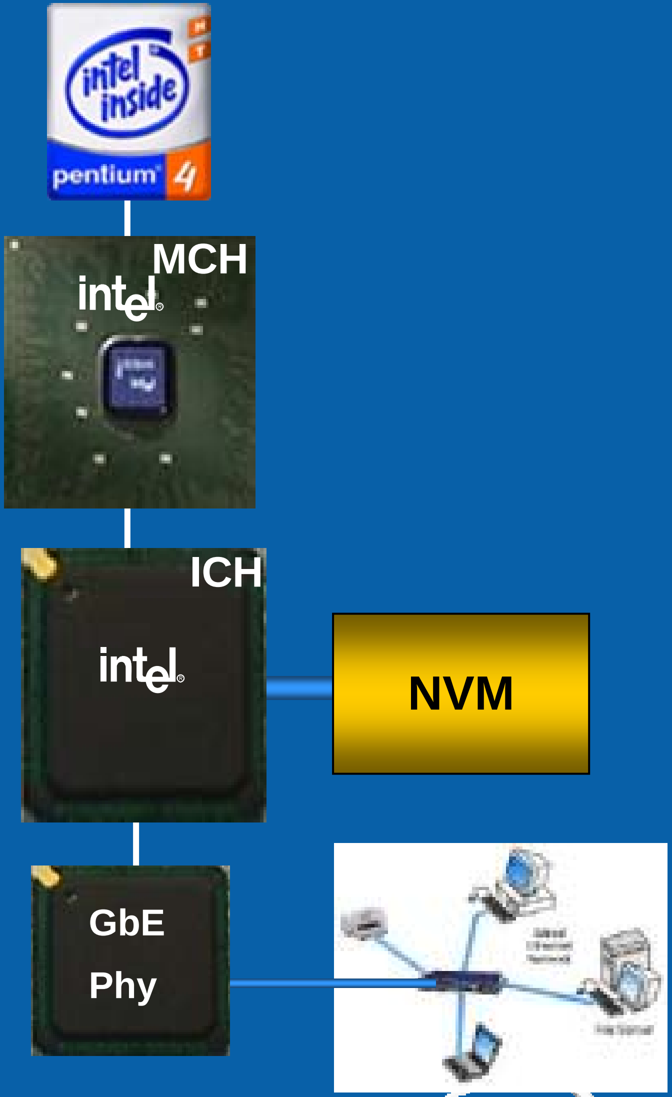
Averill Intel® AMT Overview

- Intel® Active Management Technology combines highly-available OOB remote management and network protection into an OS-independent and tamper-resistant solution to help address IT departments' top issues of network protection, asset management, and system reliability.

  Features:

  - H/W and S/W Asset Management
  - Provide OOB Diagnostics
  - *Circuit Breaker – Network Outbreak Containment (NOC) & Agent Presence (NEW)*
  - *Integrated H/W and S/W Platform Solution (NEW)*

- Intel® AMT solution is comprehensive including software support from top-tier security and management software vendors



Features at a Glance

- Discover - OOB
  - Hardware Inventory
  - Software Inventory
- Heal - OOB
  - IDE-R
  - Serial Over LAN
  - Event Management
- Protect - OOB
  - Circuit Breaker
    - Network Outbreak Containment (inbound and outbound filters on ME)
    - Agent Presence
- Infrastructure - OOB
  - Network Admin
  - Security Admin
  - Mutual Authentication

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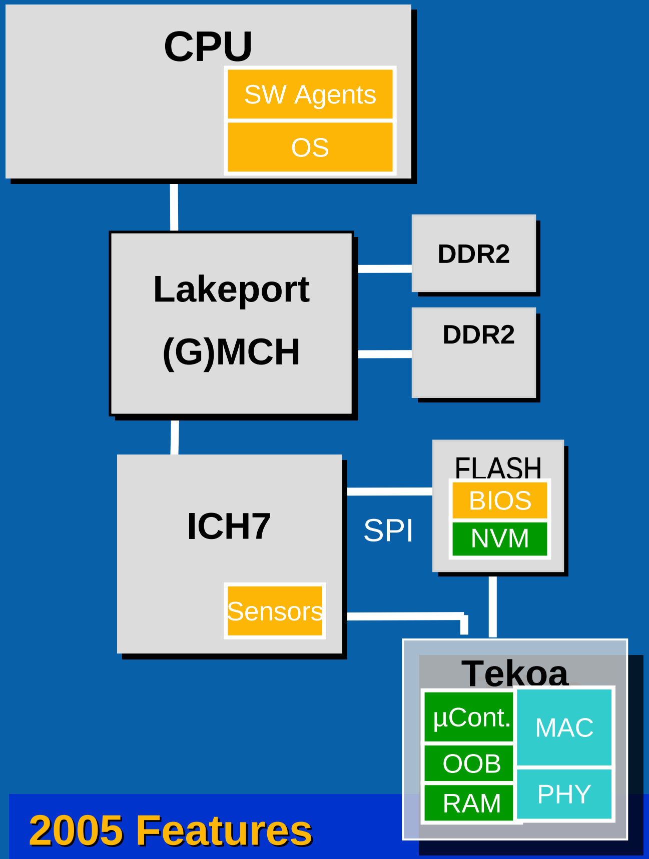
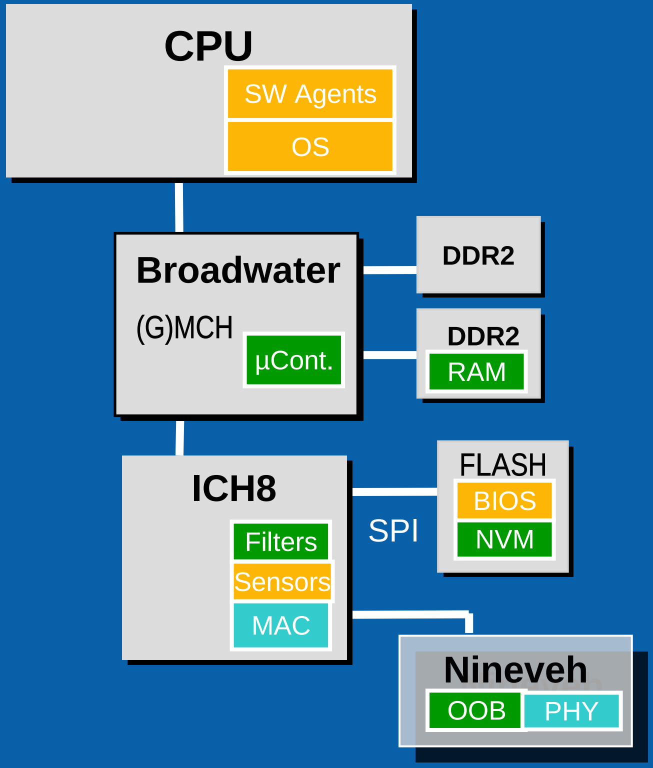
Intel® AMT Evolution





2005 Features

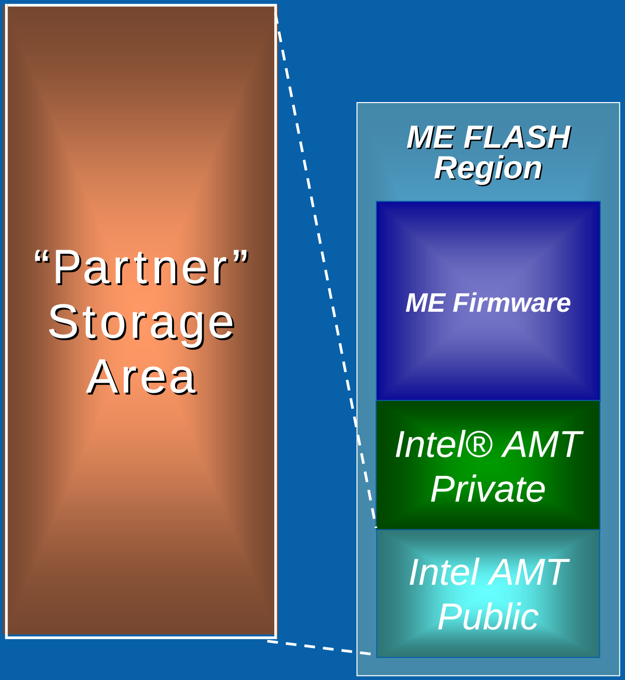
- OOB Diagnostics & Recovery
- Proactive Alerting
- Remote Asset Management
- IDE-R remote boot & SOL remote ctrl
- 3rd Party Non-Volatile Storage

2006 Features

- 2005 Features Plus…
- Uses system memory to reduce cost
- Circuit Breaker network isolation
- Agent Presence
- Increased 3rd Party Non-Volatile Storage

3rd Party Data Storage (3PDS)

Intel® AMT provides ISV applications a general purpose non-volatile data store



Intel® AMT will provide this capability through a Storage Manager implemented in the Intel® Management Engine (Intel® ME) firmware

- Accepts storage commands over local host and network interfaces
- Applications are uniquely identified using a concatenation of ISV and platform owner selected text strings plus a UUID
- Protects the space allocated by one application from other applications unless owning application grants permission
- Applications are responsible for any security mechanisms necessary to protect their stored data (e.g., encryption of sensitive data or keys)

NVM Flash Device

- Minimum Flash Size: 2MB (16Mb)
  - ~700KB reserved for BIOS & MEBx
  - The FW supports flash devices that have 4KB sector erase size.
  - Note: 64KB+ sector erase sizes not supported.
    - FW architecture uses block redundancy during data writes to ensure no data-loss in the event of a failure/corruption during the write.

Intel® ME External Memory

- A small amount of main memory is dedicated to execute ME code and store ME run-time data
  - Similar in concept to UMA for Intel® Extreme Graphics 2
  - Intel® ME code is stored compressed in Flash (no HDD access required) and loaded into UMA at bringup
- Memory used is ~.4% to .8% of a typical mainstream client memory configuration
- Utilizes channel 0 DIMM
  - MUST populate channel 0 DIMM for Intel® AMT to run
  - Host will continue to run if no channel 0 DIMM
- Chipset protects this range from access by the main CPU
  - No ability for malicious software to access this space
- Intel® ME can access its dedicated memory space in any S-state
  - GMCH can dynamically switch memory power state to allow Intel® ME access
  - Allows for low average power – since memory only "on" when needed

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Setup & Configuration

- What is Intel® AMT Setup?
  - When an Intel® AMT system is first delivered from the factory Intel® AMT is present, but "turned off"
    - Meets power regulatory guidelines
  - Intel® AMT Setup involves the steps necessary to "turn on" Intel® AMT
  - Setup is generally performed once

Setup & Configuration

- Types of Intel® AMT Setup
  - Small Business Mode
    - Can be accomplished completely using BIOS Extension interface and Web GUI interface
    - Supports HTTP Digest only (No TLS)
    - Used when enterprise infrastructure is not present
  - Enterprise Mode
    - Setup MUST be completed using a separate application running on the network (e.g. provisioning server)
    - Supports HTTP Digest and TLS security

Setup & Configuration

- What is Intel® AMT Configuration?
  - Configuration involves supplying Intel® AMT with additional information to enable various features (e.g. User ACLs, Realms)
  - Configuration happens after Setup and can performed as needed

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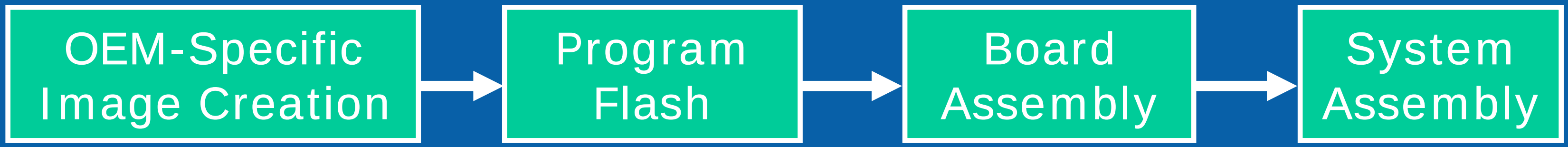
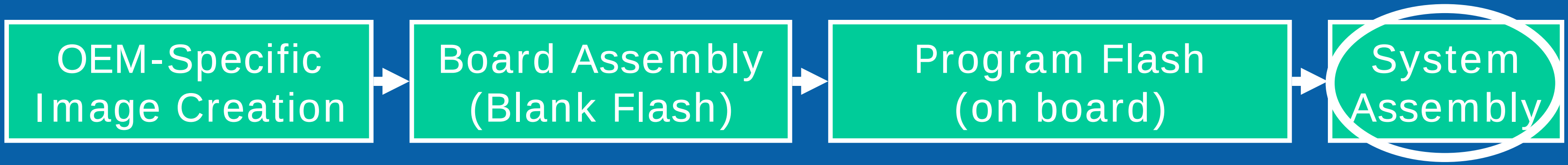
Manufacturing Flow

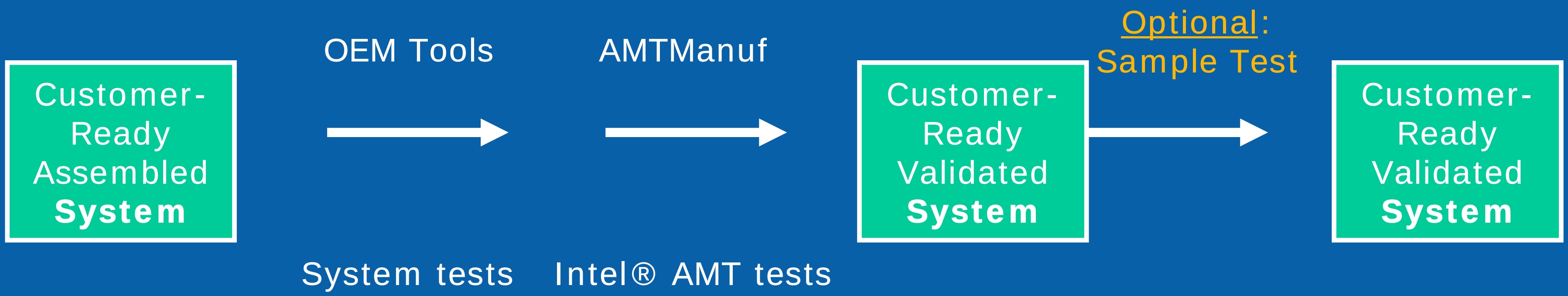


Detailed Flow in Backup

Validation



OEM-Specific Image Creation → Board Assembly (Blank Flash) → Program Flash (on board) → System Assembly



Customer-Ready Assembled **System**

OEM Tools

System tests

AMTManuf

Intel® AMT tests

Customer-Ready Validated **System**

Optional: Sample Test

Customer-Ready Validated **System**

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Intel® AMT Software

ISV	Application
Microsoft	System Management Server*
altiris intuitive > manageability	Notification Server*
bmc software	Marimba*
ca	Unicenter NSM* r11
Check Point SOFTWARE TECHNOLOGIES LTD. We Secure the Internet.	Integrity*
Cisco Systems	Network Access Control
LANDesk SOFTWARE	LANDesk Mgmnt Suite* 8.6 LANDesk System Mgr* 8.6
Novell	Zenworks* 7
StarSoftComm	StarCenter* 2.0 StarNet*
symantec.	LiveUpdate*
TREND MICRO	OfficeScan*

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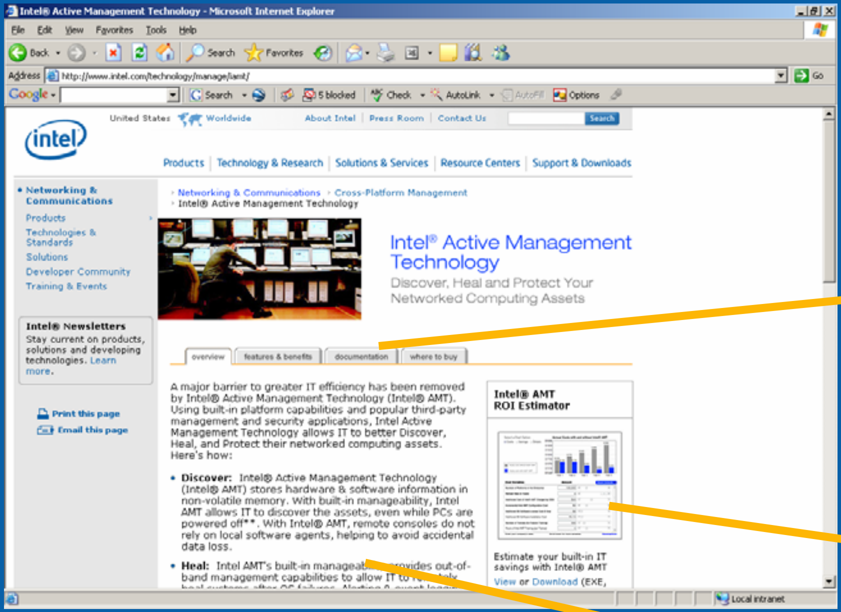
BACKUP

Where To Get More Info



Intel® Active Management Technology - Microsoft Internet Explorer

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Back Search Favorites
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Intel® Active Management Technology
Discover, Heal and Protect Your Networked Computing Assets

A major barrier to greater IT efficiency has been removed by Intel® Active Management Technology (Intel® AMT). Using built-in platform capabilities and popular third-party management and security applications, Intel Active Management Technology allows IT to better Discover, Heal, and Protect their networked computing assets. Here's how:

- **Discover:** Intel® Active Management Technology (Intel® AMT) stores hardware & software information in non-volatile memory. With built-in manageability, Intel AMT allows IT to discover the assets, even while PCs are powered off**. With Intel® AMT, remote consoles do not rely on local software agents, helping to avoid accidental data loss.
- **Heal:** Intel AMT's built-in manageab[illegible] provides out-of-band management capabilities to allow IT to re[illegible]tely

Intel® AMT ROI Estimator
Estimate your built-in IT savings with Intel® AMT
View or Download (EXE,

Documentation

CD Demo

Technology @ Intel Articles

Intel® AMT Technology Overview

Intel® AMT Whitepaper

Intel® AMT ROI Estimator

Intel® AMT ISV Solutions Briefs

Worldwide Intel® AMT Web Sites:

Taiwan: resource.intel.com/technology/manage/iamt/tc
Korea: resource.intel.com/technology/manage/iamt/kr
PRC: www.intel.com/technology/manage/iamt/sc
France: www.intel.com/cd/network/communications/emea/fra
Germany: www.intel.com/cd/network/communications/emea/deu
Italy: www.intel.com/cd/network/communications/emea/ita
Spain: www.intel.com/cd/network/communications/emea/spa
Russia: www.intel.com/cd/network/communications/emea/rus
United Kingdom: www.intel.com/cd/network/communications/emea/eng

http://www.intel.com/technology/manage/iamt/

ASF & AMT Feature Comparison

Capabilities	ASF	Intel® AMT
OOB Mgt (Any OS/power state)	No	Yes
Remote Control	Remote Reboot only	Serial Over LAN, Win EMS
Event Alerting	Yes (preset)	Yes (policy based)
Non-Volatile Storage	No	Yes
Event Logging	No	Yes
Remote Reboot	Yes (PXE)	Yes (PXE or IDE-R)
Asset Information	No	Yes
Remote BIOS Update	No	Yes
Secure Communications	Simple authentication	SSL 3.1/TLS encryption, HTTP authentication
Connection Protocol	RMCP	HTTP (web browser access)
Layer 4 Stack	UDP (often blocked by routers)	TCP (preferred routing protocol)
Broad Enterprise ISV Support	No	Yes

IT Survey Results: Top 5 Problems

2006

2005

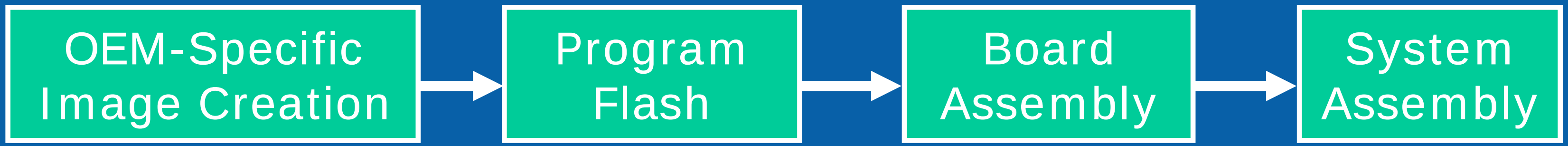
Pri	Problem	Wish list
1	**Protecting from inside:** e.g., systems bringing in many viruses	Route unknown systems to the *not ok* corral, isolate and fumigate. Need non-removable agents, to stop anomalies.
2	**Asset management:** e.g., Hard to locate systems, query basic information	Active location ID, Asset list available in any state, Non-removable agents persistent across installation of new OS images.
3	**OOB mgmt & online diagnostics:** e.g., Users remove agents. No automated FW/OS update. Can't probe a hung system. Time to repair is large	OOB mgmt, detect anomalies. Online diagnostic when the system fails Below the O/S Agent (available when system hangs, accepts updates)
4	**Application integration complexity:** e.g., Lack of standards to Integrate apps	XML Standards, self-describing objects, policies.
5	**Dynamic Resource Allocation:** e.g., Memory/CPU, etc "hard-allocated" to single apps	Support for dis-aggregation of resources.

Glossary

- ASF: *Alert Standard Format* – PC NIC-based platform instrumentation
- BMC: Baseboard Management Controller – a microcontroller embedded on the main system board to provide out-of-band access to platform instrumentation, sensors and effectors
- DTW: *Down-the-wire* – network-based remote access to systems for monitoring, managing, provisioning and troubleshooting them
- DMTF: *Distributed Management Task Force* – a standards body devoted to manageability
- EFI: *Extensible Firmware Interface* – software technology from Intel that improves on traditional BIOS firmware
- IPMI: *Intelligent Platform Management Interface* – server platform instrumentation firmware
- Intel® AMT: *Active Management Technology* – implementations arising from the Intel® Cross Platform Manageability Program
- Intel® CPMP: *Cross Platform Manageability Program* – industry-wide Intel effort to develop and market interoperable management solutions with scalable capabilities, interfaces and protocols supporting all Intel platforms
- NIC: *Network Interface Chip (or card)* – hardware that enables a system to connect to a local area network (LAN)
- OOB: *Out-of-Band* – remote access to a connected system regardless of the state of the OS or power
- PXE: *Pre-boot eXecution Environment* – enables a system to boot from the network
- SIPP: *Stable Image Platform Program* – Intel® OEMs assure that desktop & notebook chipsets & drivers remain consistent for 12 months
- SMASH: *System Management Architecture for Server Hardware* – the new name for DMTF's SMWG spec
- SMWG: *Server Management Working Group* – the DMTF group developing a spec to standardize platform management consoles and related software technology
- SOA: *Service Oriented Architecture* – event-driven solutions of loosely-coupled software components often based on XML Web services
- SOAP: *Simple Object Access Protocol* -- call-response mechanism for XML documents which operates in a client-server paradigm
- SOI: *Service Oriented Infrastructure* – a virtualized "landing zone" for SOA solutions in which hardware is managed as a utility
- TCG (TCPA): *Trusted Computing Group (formerly the Trusted Computing Platform Alliance)* -- an alliance of Microsoft, Intel, IBM, HP and AMD which promotes a standard for a more secure PC
- TPM: *Trusted Platform Module* – a hardware instantiation of the TCG (TCPA) specification for a more secure PC
- UDDI: *Universal Description, Discovery & Integration* -- a service for locating Web services by enabling robust queries against rich metadata
- WOL: *Wake-up On LAN* – to remotely boot a system on the network
- WSDL: *Web Services Description Language* -- an XML language for describing Web services using a model of what the service offers
- WS: *Web Services* – software components based on vendor-neutral specifications (XML, SOAP, WSDL and UDDI) which enable application integration and SOA solutions to run across virtually all types of systems
- XML: *eXtensible Markup Language* – a common data format used by Web services software running on any system

Manufacturing & Validation Detailed Flow

Manufacturing Flow



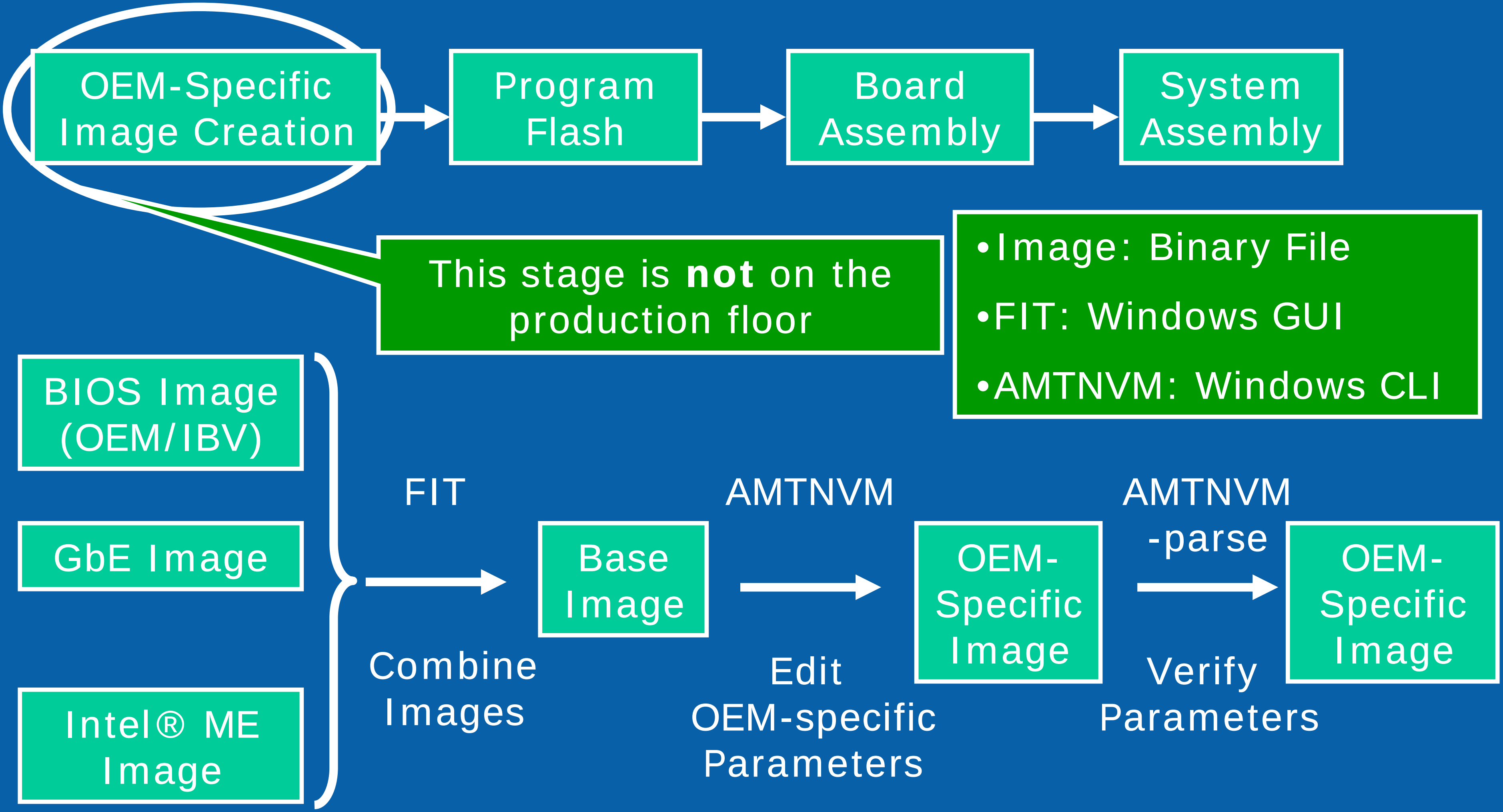
OEM-Specific Image Creation

Program Flash

Board Assembly

System Assembly

FW Image Creation



OEM-Specific Image Creation → Program Flash → Board Assembly → System Assembly

This stage is **not** on the production floor

- Image: Binary File
- FIT: Windows GUI
- AMTNVM: Windows CLI

BIOS Image (OEM/IBV)

GbE Image

Intel® ME Image

FIT

Combine Images

Base Image

AMTNVM

Edit OEM-specific Parameters

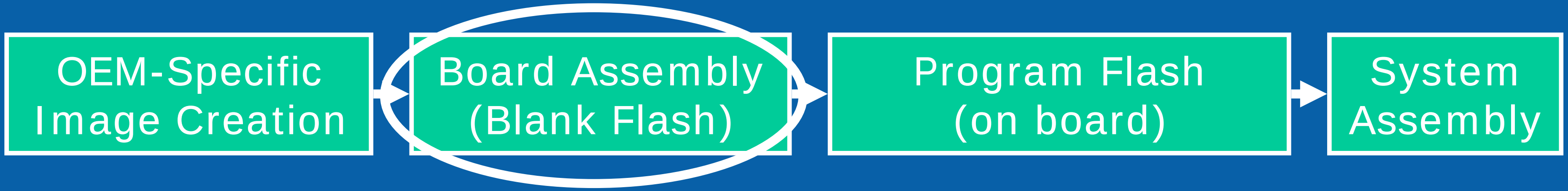
OEM-Specific Image

AMTNVM -parse

Verify Parameters

OEM-Specific Image

Board Assembly

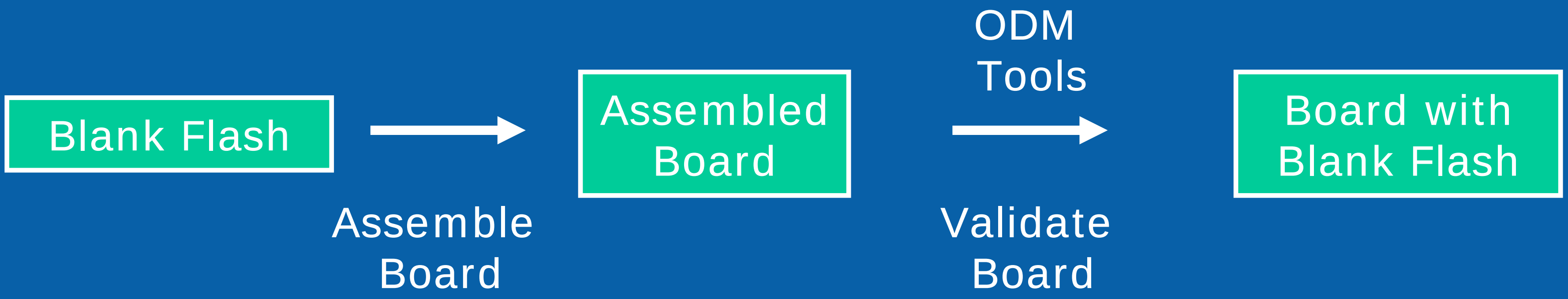


OEM-Specific Image Creation

Board Assembly (Blank Flash)

Program Flash (on board)

System Assembly



Blank Flash

Assemble Board

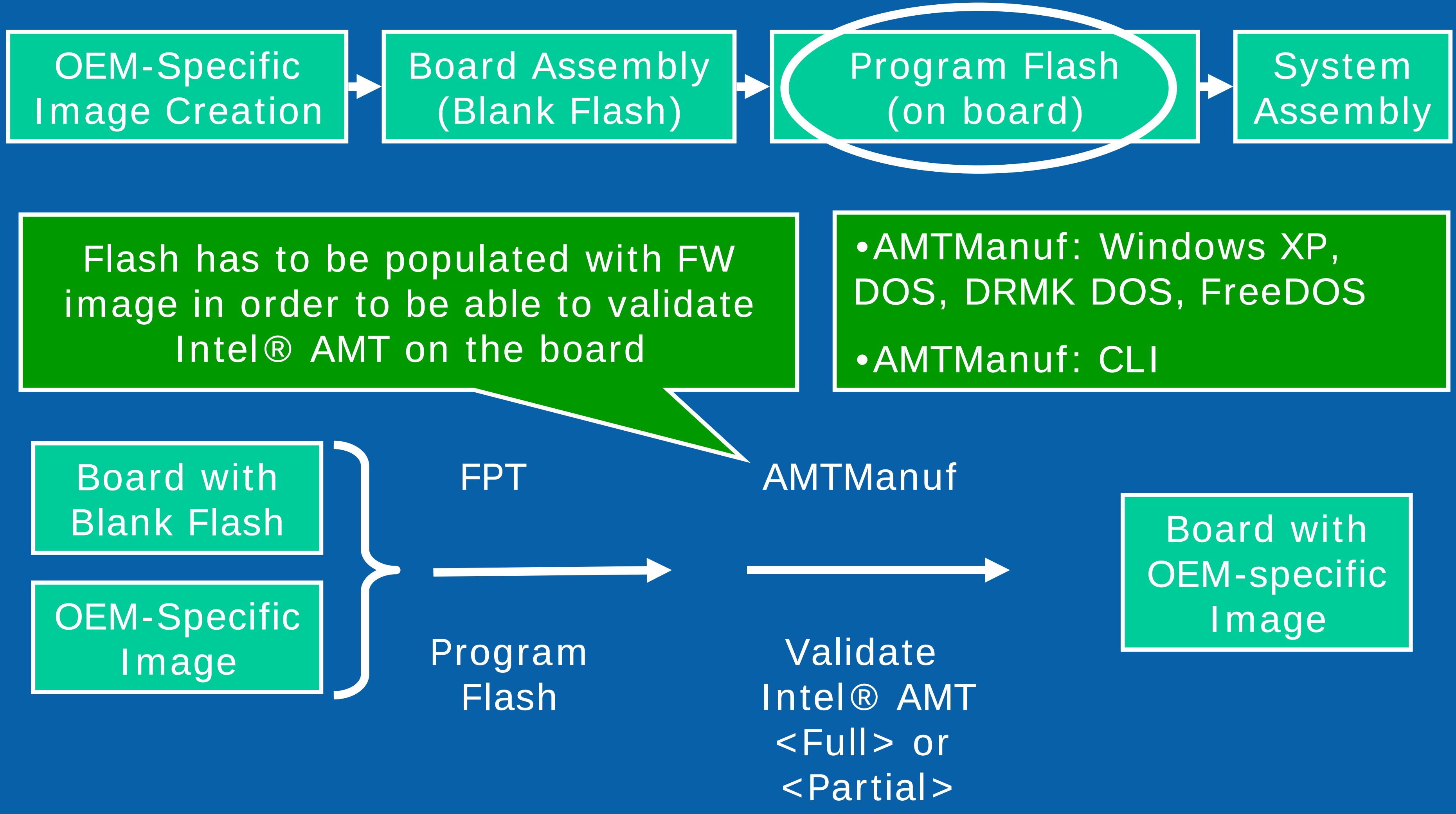
Assembled Board

ODM Tools

Validate Board

Board with Blank Flash

SPI Programming



OEM-Specific Image Creation → Board Assembly (Blank Flash) → Program Flash (on board) → System Assembly

Flash has to be populated with FW image in order to be able to validate Intel® AMT on the board

- AMTManuf: Windows XP, DOS, DRMK DOS, FreeDOS
- AMTManuf: CLI

Board with Blank Flash

OEM-Specific Image

FPT

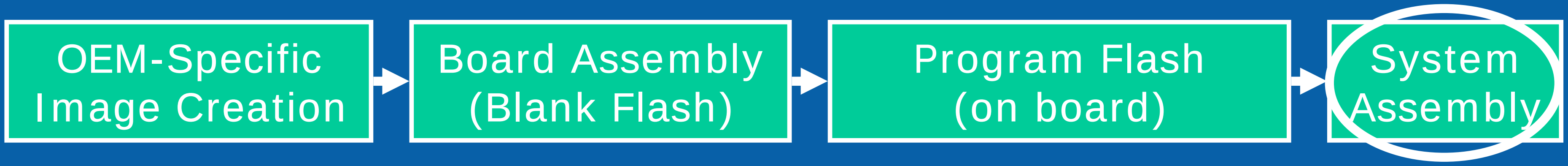
Program Flash

AMTManuf

Validate Intel® AMT <Full> or <Partial>

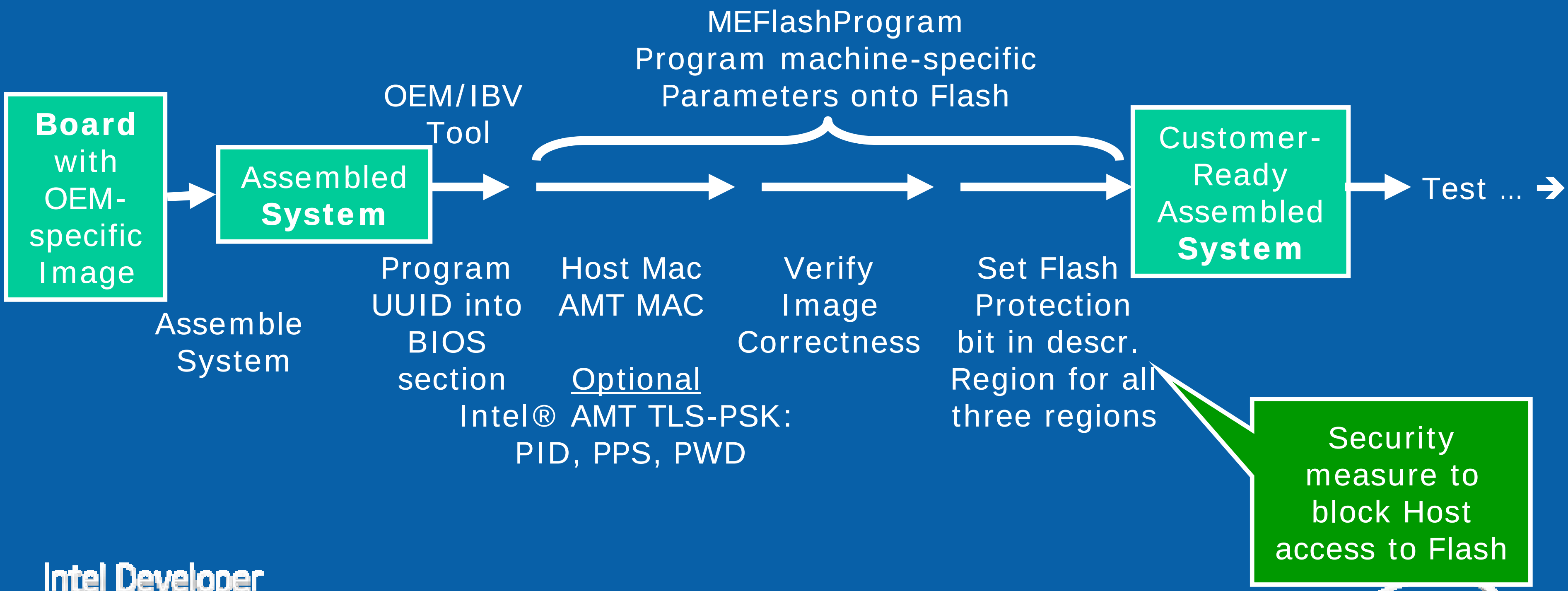
Board with OEM-specific Image

System Assembly



OEM-Specific Image Creation → Board Assembly (Blank Flash) → Program Flash (on board) → System Assembly

- MEFlashProgram: Windows XP, DOS, DRMK DOS, FreeDOS
- MEFlashProgram: CLI



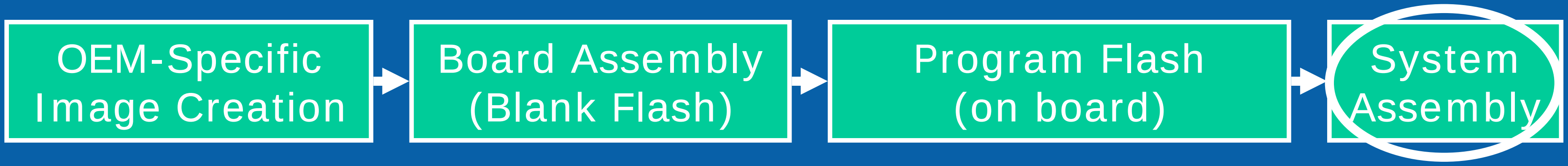
MEFlashProgram
Program machine-specific
Parameters onto Flash

Board with OEM-specific Image → Assemble System → Assembled System → OEM/IBV Tool: Program UUID into BIOS section → Host Mac AMT MAC → Verify Image Correctness → Set Flash Protection bit in descr. Region for all three regions → Customer-Ready Assembled System → Test … →

Optional
Intel® AMT TLS-PSK:
PID, PPS, PWD

Security measure to block Host access to Flash

Validation



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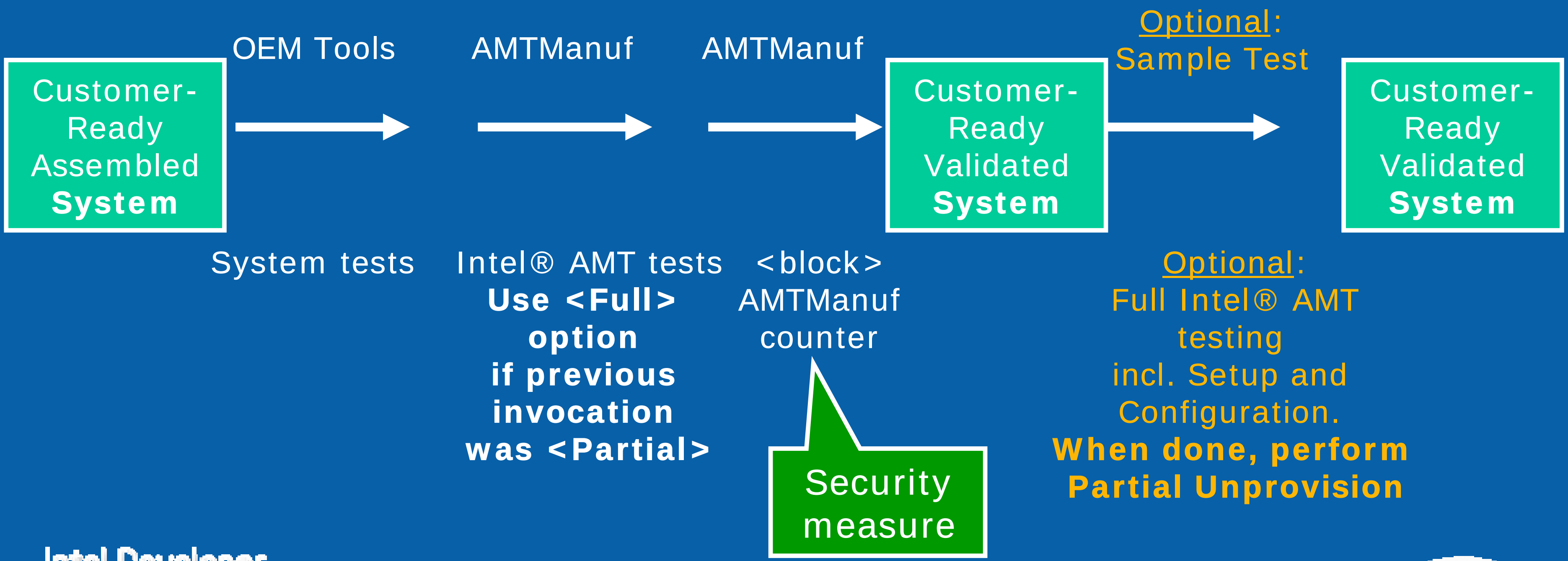

Customer-Ready Assembled **System**

OEM Tools → System tests

AMTManuf → Intel® AMT tests **Use <Full> option if previous invocation was <Partial>**

AMTManuf → <block> AMTManuf counter

Security measure

Customer-Ready Validated **System**

Optional: Sample Test → Optional: Full Intel® AMT testing incl. Setup and Configuration. **When done, perform Partial Unprovision**

Customer-Ready Validated **System**

(Optional) Sample Test Flow

- Start Tests:
  - WebGUI
  - AMTFeaturesLocal and AMTFeaturesRemote
  - AMTCB, AMTRedirection
- Partial Unprovision in order to return machine to exact previous state (keeping the same PSK information)
- Sample test completed

- Note:
  - If test fails and machine is repaired, note that image should be reprogrammed with new counter in order to run AMTManuf again:
    - Override protection (OEM-dependent)
    - Reprogram Flash image (possibly using MEFlashProgram), resetting AMTManuf counter
    - Run AMTManuf
    - Run Sample Test again