Always Available Manageability -
IPMI v1.5 and SMBus 2.0

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IPMI

Intelligent Platform Management Interface

- Defines a common, abstracted, message-based interface to intelligent platform management hardware

- Defines common records for describing common platform management devices and their characteristics

- Supports OEM differentiation and value added features

- Promoters: Intel, HP, NEC & Dell

intel   **HEWLETT PACKARD**   **NEC**   **DELL**

IPMI Enables Cross-Platform Management Software

IPMI Update

Promoter, Contributor, and Adopter News

- Acer Inc.
- Agilent Technologies GmbH
- Alberta Microelectronics
- American Megatrends Inc.
- ASUSTek Computer, Inc.
- Bull S.A.
- Celestica
- CyberGuard Corporation
- Data General Corporation
- Dell Computer Corporation
- Egenera, Inc.
- ElanVital Corporation
- Ericsson UAB
- Evans & Sutherland
- Eversys Corporation
- Exabyte Corporation
- FORCE Computers GmbH
- Fujitsu, Ltd.
- HADCO Corporation
- Hewlett-Packard Company
- Hewlett-Packard GmbH
- Hitachi Ltd.
- Hybricon Corporation
- InnoMediaLogic, Inc.
- Intel Corporation

- Interphase Corporation
- InterWorks Computer Products
- Inventec Corporation
- Ipex ITG
- JMC Products
- L-3 Communications Corp.
- Lynux Works, Inc.
- Macrolink, Inc
- Magnetek, Inc.
- Micro-Star International
- Mitsubishi Electric Corp. Information Systems Engineering Center
- NEC Corporation
- Nematron Corporation
- Network Engines, Inc.
- NOCpulse, Inc.
- Olivetti Computers Worldwide
- Phoenix Technologies Ltd.
- Praim, Inc.
- Qlogic Corporation
- Radisys Corporation
- Reliance Computer Corporation
- Sanera Systems, Inc.
- SBS Technologies (Industrial Computers GmbH)

- Scenix Semiconductor, Inc.
- Siemens AG
- Silicon Graphics, Inc.
- Stratus Computer Systems Ireland Ltd.
- Sun Microsystems
- Super Micro Computer, Inc.
- Symphony Group Intl. Co., Ltd.
- Synergy Microsystems
- Teknor Applicom, Inc.
- T-Netix, Inc.
- Tatung Co.
- Tektronix
- Texas Micro Corporation
- Toshiba Corporation
- Trimm Technologies
- Tyan Computer Corporation
- Universal Scientific Industrial Corp.
- USAR Systems, Inc.
- Vitesse Semiconductor Corp.
- Vividon, Inc.
- Vooha, Inc.
- Winbond Electronics Corp.
- Ziatech Corporation

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3

IPMI 1.5
Goals

- **Enable Always Available Manageability**
  - **Incorporate LAN and Serial/Modem access technology into IPMI**
  - **Unify LAN and Serial out-of-band access capabilities and protocols**
- **Synch-up with and support emergent and existing standards**
  - **PPP**
  - **DMTF Pre-OS Working Group 'ASF' spec**
  - **PCI Management Bus / SMBus 2.0**
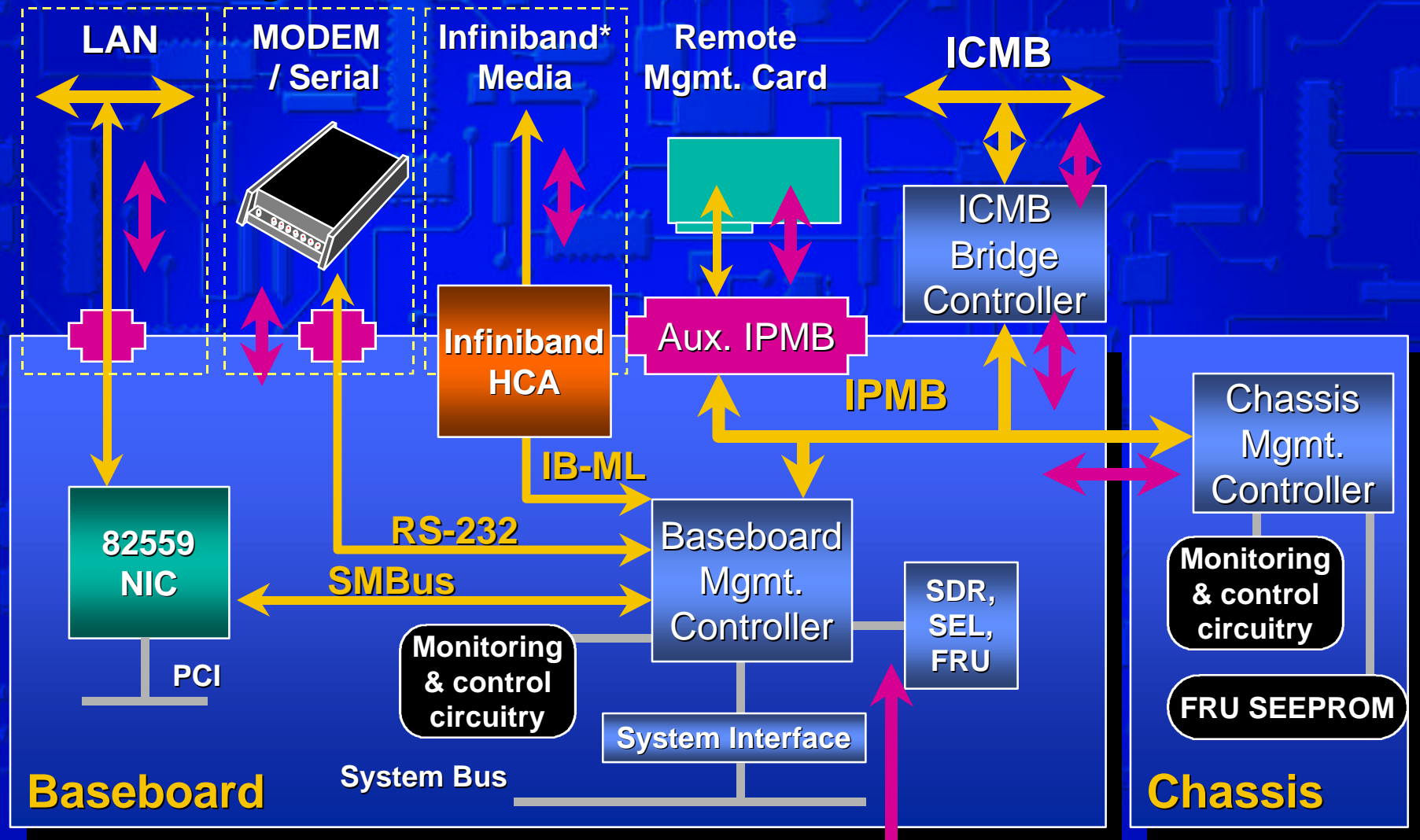 - **Compact PCI**

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IPMI Web Site

- **Latest IPMI Specifications & Errata**
  - ◆ **Updated document revisions**
- **FAQ and Integration Guides**
- **Mailing List**
- **Presentations**
- **Tools**
- **IPMI Conformance Test Suite**

developer.intel.com/design/servers/ipmi

Always Available

LAN

MODEM / Serial

Infiniband* Media

Remote Mgmt. Card

ICMB

Infiniband HCA

Aux. IPMB

ICMB Bridge Controller

IPMB

IB-ML

82559 NIC

RS-232

SMBus

PCI

Baseboard Mgmt. Controller

Monitoring & control circuitry

SDR, SEL, FRU

System Interface

System Bus

Baseboard

Chassis Mgmt. Controller

Monitoring & control circuitry

FRU SEEPROM

Chassis

IPMI Messages

IPMI v1.5
Specification Target Timeline**

- **IDF Spring 2000   Technology Preview**

- **Fall 2000   Release for Industry
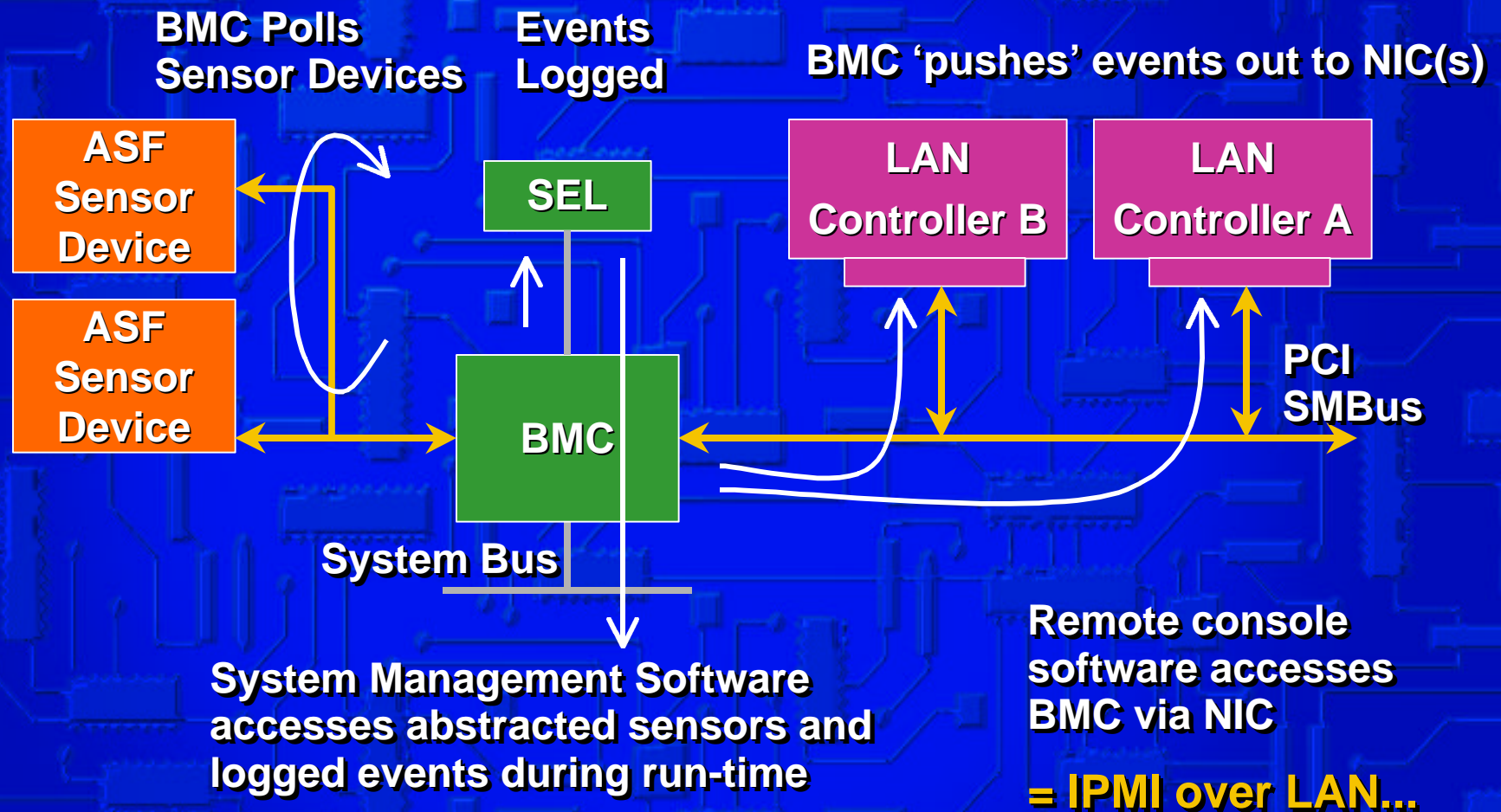   Review & Early Adopters**

- **Spring 2001   Final Version**

** All dates are provided for planning purposes
only and are subject to change.

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PCI Management Bus

IPMI application

BMC Polls Sensor Devices

Events Logged

BMC 'pushes' events out to NIC(s)

ASF Sensor Device

ASF Sensor Device

SEL

BMC

LAN Controller B

LAN Controller A

PCI SMBus

System Bus

System Management Software accesses abstracted sensors and logged events during run-time

Remote console software accesses BMC via NIC
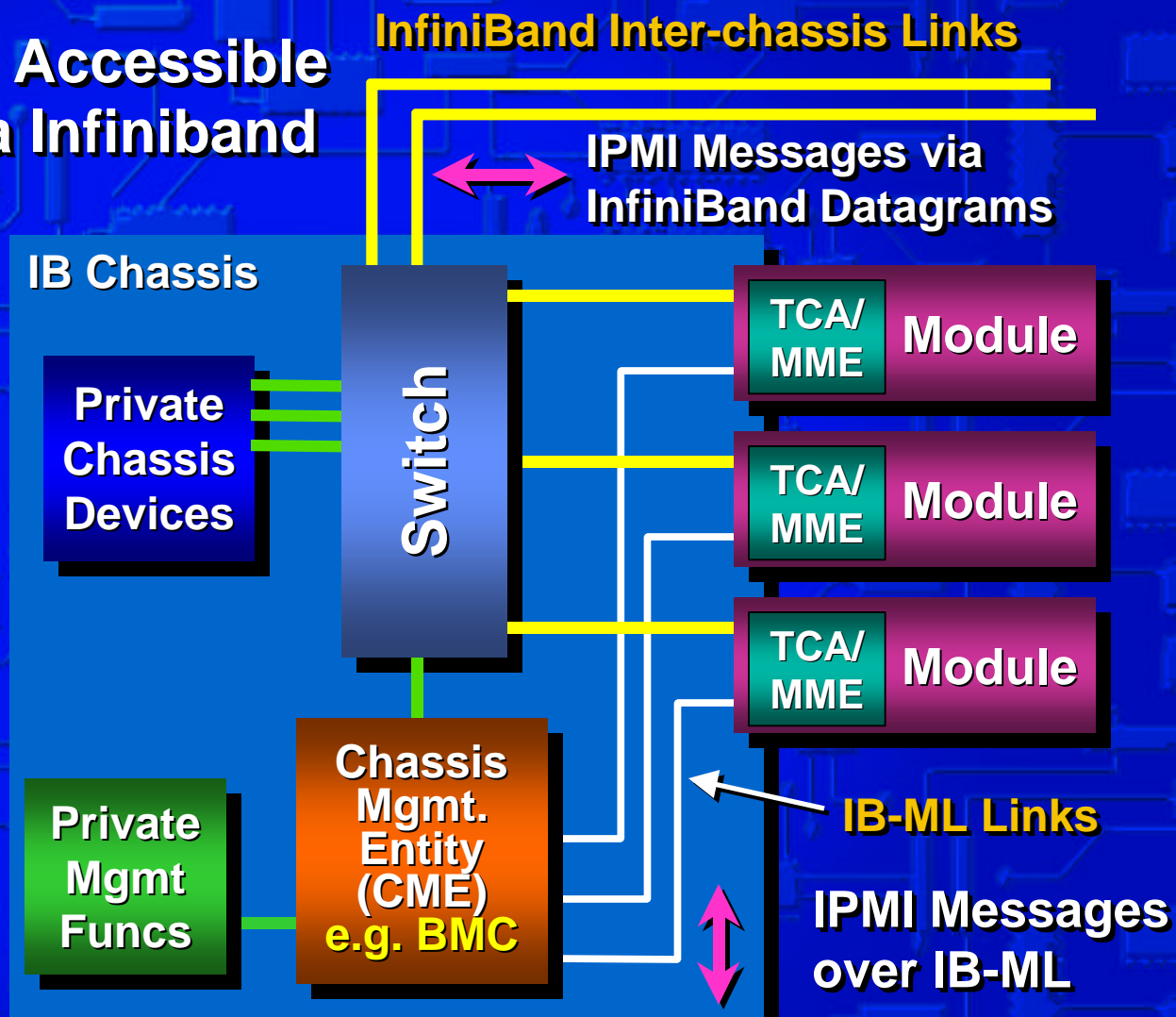
= IPMI over LAN...

Future: IPMI over InfiniBand*

- **Provides Always Accessible Manageability via Infiniband media**
  - ◆ **Detect presence**
  - ◆ **Control power**
  - ◆ **Control Hot-swap**
  - ◆ **In-band view of:**
    - – **Chassis state**
    - – **Slot population**
    - – **Module IDs**
    - – **Power State**
    - – **Event Logs**
    - – **SDRs**
    - – **Sensors**

InfiniBand Inter-chassis Links

IPMI Messages via InfiniBand Datagrams

IB Chassis

Switch

Private Chassis Devices

TCA/MME **Module**

TCA/MME **Module**

TCA/MME **Module**

Chassis Mgmt. Entity (CME) **e.g. BMC**

Private Mgmt Funcs

IB-ML Links

IPMI Messages over IB-ML

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IPMI 1.5
SMBus/PCI Mgmt. Bus Support

IPMI *Master Write-Read* command

- ◆ **Allows BMC to serve as a host controller**
- ◆ **System software can perform any SMBus or I^{2}C transactions**
- ◆ **IPMI v1.5 supports full-size SMBus transactions, including PEC**
- ◆ ***Master Write-Read* command includes a 'bus ID' parameter to support multiple SMBus/I2C segments, including:**
  - – **Private management busses (single master)**
  - – **IPMB (IPMI's internal expansion I^{2}C bus)**
  - – **PCI Management Bus**
- ◆ **Can use command to 'bridge' to busses behind other management controllers**

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IPMI 1.5
SMBus/PCI Mgmt. Bus Support

IPMI *Send Message* Command supports IPMI Messaging on PCI Mgmt. Bus as an IPMI Channel

- ◆ IPMI message transactions use a 'split transaction' request/response protocol
- ◆ Responses are queued in a 'Receive Message Queue'

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IPMI 1.5
SMBus/PCI Mgmt. Bus Support

Management Controllers on PCI Management Bus can be target of both IPMI Protocol and SMBus Protocol messages

- **IPMI Messages are positively differentiated from SMBus 2.0 protocol messages**
  - Accomplished by IPMI protocol messages setting byte 3 (which maps to the SMBus length byte) to zero
  - From SMBus view, messages appear as an illegal Block Write
  - Other SMBus protocols are differentiated by fact that the transaction's too short to be an IPMI message

- **Primarily done to allow BMC to be possible target of future DMTF Pre-OS WG 'ASF' commands**

- **Assures BMC in Host Controller role could support Write Block to Host, if that becomes supported in future SMBus spec**

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12