



Uniform Driver Interface (UDI) Support for Real Time OSs and Portable Communications Protocol Modules

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Outline

- • *Background of UDI*
- Real Time UDI
- Communication Protocol Portability
- Conformance Testing



UDI Sponsors



Platform and OS Vendors

COMPAQ

hp HEWLETT
PACKARD

IBM

intel.

Lynx

SCO

Sun
microsystems
We're the dot in.com!

Independent HW Vendors (IHVs)

adaptec

INTERPHASE CORPORATION

SBS
Technologies, Inc.

Integrators, Solution Providers, and Trainers

LOCKHEED MARTIN

software
technologies
group

The Computer
Classroom



Project UDI

- Open Organization Responsible for UDI Technology
- Technology for Portable, Scalable, High Performance I/O drivers and Communications Protocol Modules
- Products
 - Standards
 - White Papers
 - Reference Implementation
- Technical meetings - weekly phone, monthly face to face, quarterly plugfests



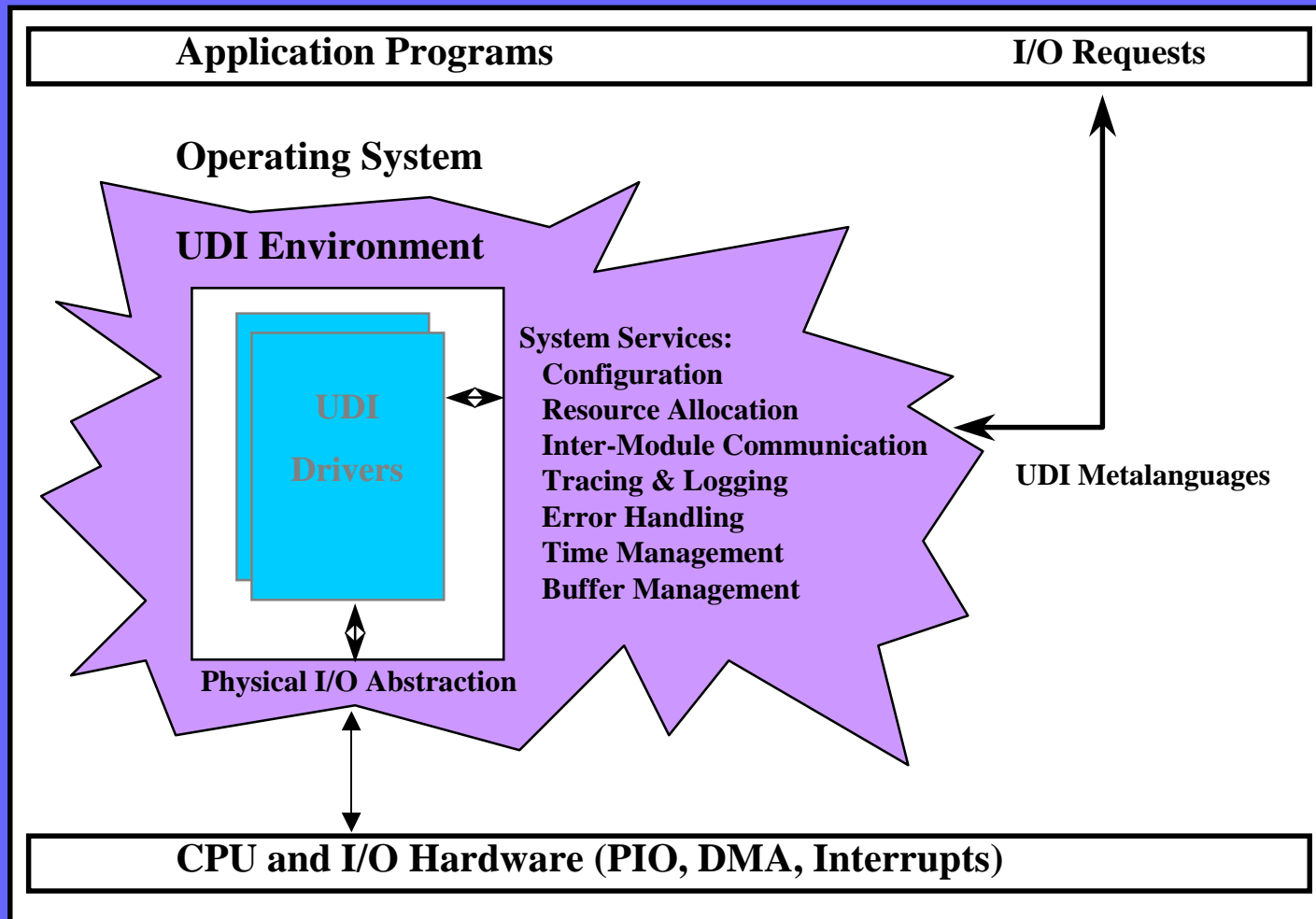
Truly Portable I/O Drivers



- Precise separation of device and OS semantics
- No OS or platform specific components in driver
- No OS policy in driver
- Flexibility to evolve OS without affecting drivers
- All interfaces defined
- Not specific to any group of OSs
- Co-exists with legacy driver environments



UDI Completely Encapsulates I/O Drivers





Advantages of UDI to Independent Hardware Vendors (IHVs)



- IHVs have huge matrix of drivers to develop/port
 - # Devices × OSs × OS versions × platforms × features
- IHVs have finite development and support resources
 - Must select OSs
 - Supporting more than one OS is difficult
 - Poorly supporting an OS can damage reputation
- UDI has simpler drivers
- Driver porting not directly related to core IHV business
 - Technology
 - Performance
 - Functionality



UDI Advantages to Platform and OS Vendors



- Platform and OS vendors need IHV device support
 - Need broad device technology coverage to compete
 - Limited internal resources for driver development
 - Must leverage IHV partners
 - Competitive advantage lost if too far down porting order
- Driver porting not directly related to core business
 - Features and services
 - Enabling applications
 - Reliability, Availability, Scalability



Advantages of UDI to Large Real Time Vendors (e.g. DoD)



- Real time systems outlast computer systems by decades
- Development cycles are so long that the deployed platform is frequently different from the initially selected platform
- Frequently use special interfaces or cutting edge interfaces that are not yet mature. The application may become dependent on characteristics that are unique to a particular interface or its I/O driver.
- Frequently interface to legacy interfaces
- I/O drivers need to be ported for decades
- UDI reduces porting costs even when the OS is upgraded to a new version
- UDI solves issues with current I/O driver standards

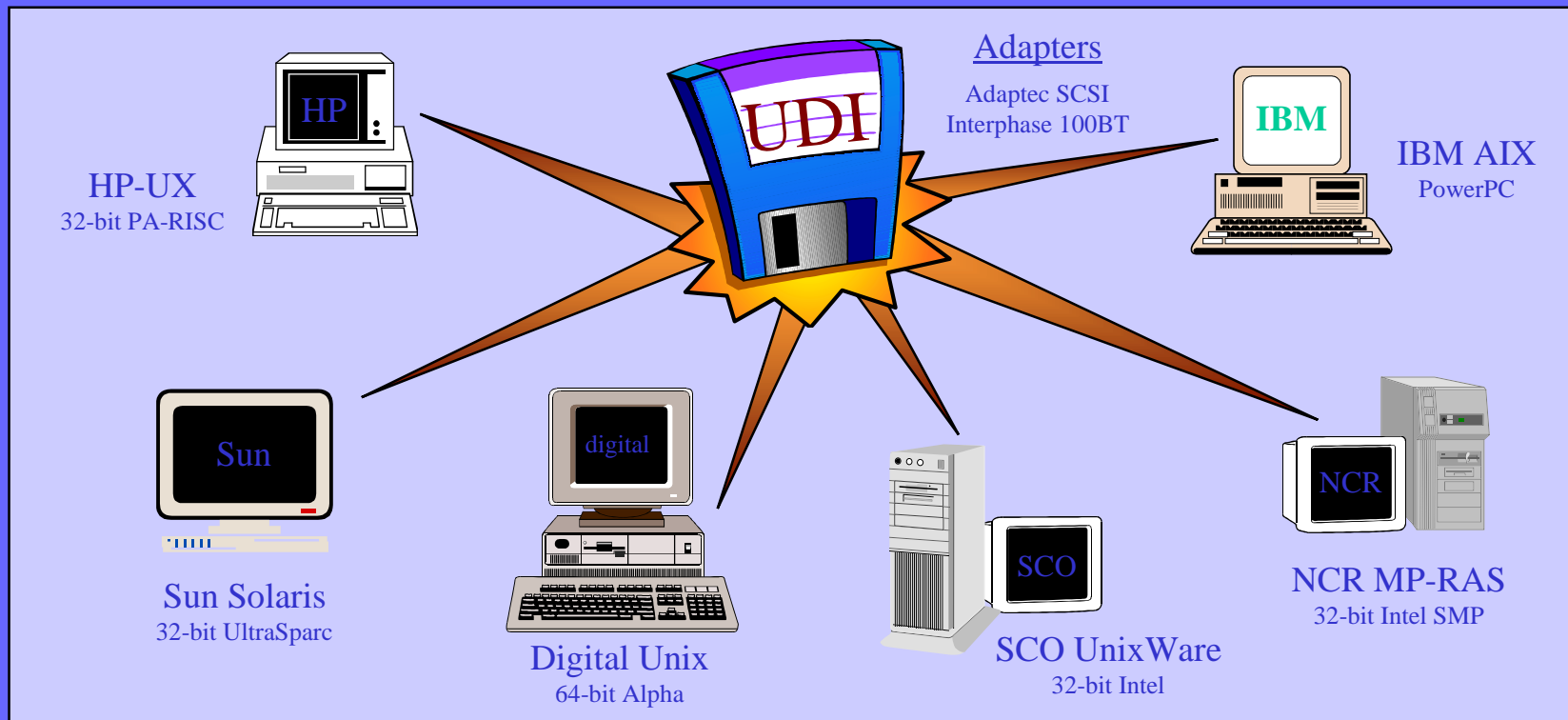


Other Benefits of UDI

- Addresses real time issues in conjunction with NCITS Technical Committee R1 and its Sub-Committee R1.1 (Real-Time Device Driver Portability)
- All interfaces are completely defined
- I/O drivers are simpler
- Promotes more robust I/O drivers



Prototype Completed 12/9/97





Project UDI Works With Other Standards Organizations



- USB drivers
 - OpenUSBDI spec defines USB Metalanguage
 - Developed/published by USB DWG
- UDIG (UNIX Developer's Interface Guide for Intel Servers)
- Compact PCI Hot Swap
 - Developed/published by PICMG
- “HomeGate” residential gateways
 - JTC1/SC25/WG1
- Open Group Real-time Forum
 - Coordinating with real-time community standards work
- National Committee for Information Technology Standards (NCITS)
 - UDI standards probably going to ISO through NCITS
 - NCITS Technical Committee R1 (Real-time Computing Systems) includes:
 - NCITS R1.1 working on Real Time UDI standardization and Protocol Metalanaguages
 - NCITS R1.2 working on Real Time UDI test standardization



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Real Time UDI

- R1.1 activities are “work in progress”
- R1.1 is looking at issues for real time and embedded users
- R1.1 will define how real time needs to interact with, and what it requires of, the operating system in the UDI environment to provide:
 - Deterministic performance
 - Priorities of requests
 - Preemptability
 - User API
 - Maintenance interface (e.g. SNMP)
- Project UDI is modifying its standards to accommodate what it can
- R1.1 will specify
 - What it means to be a real time implementation of UDI
 - What it means to be a real time UDI driver
 - Real-time behavior required in UDI devices and Operating Systems
- R1.1 will work with R1.2 to specify conformance testing



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Communication Protocols

- R1.1/Project UDI approach (“Portable Protocols”)
 - Interface for traditional layers (Transport, Network, Data Link)
 - Layers are bypassed when flow is established to maximize performance
 - Support for deterministic transfers
- This approach opens market for new protocols
 - Protocols interfacing to IP, Data Link, or NIC Driver
 - More deterministic protocols
 - Protocols supporting improve fault tolerance
 - A way to make Real Time CORBA more deterministic



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Test Issues

- Need conformance test suite for O/S vendor implementations
- Need conformance test suite for drivers
- Need a way to determine whether implementations and drivers are suitable for real time (hard and soft)
 - Conformance test
 - Code Inspection



Project UDI Contacts



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