# Dolphin software

SCI
Software

Hugo Kohmann

hugo@dolphinics.no

Dolphin Interconnect Solutions

SISCI software Developers Kit

- **Interconnect Resource Manager (IRM) Driver**
- **SISCI Driver and API Library**
- **SISCI Demo and Benchmark Programs**
- **Cluster Toolbox**

Software Architecture

Dolphin INTERCONNECT SOLUTIONS

SISCI API	Socket API	User Space

Kernel Space

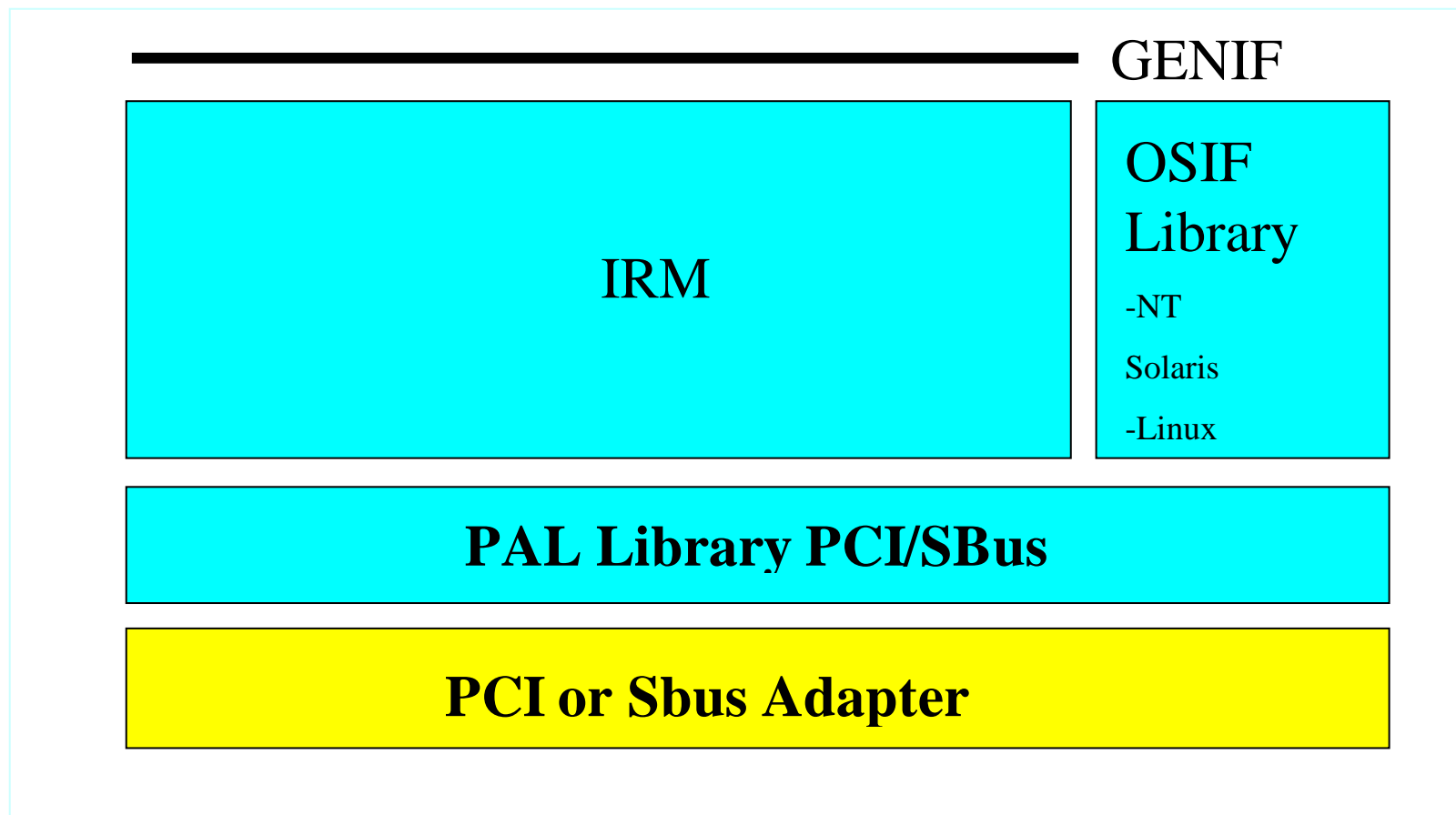| SISCI	TCP/UDP IP
	DLPI/ NDIS

GENIF

IRM
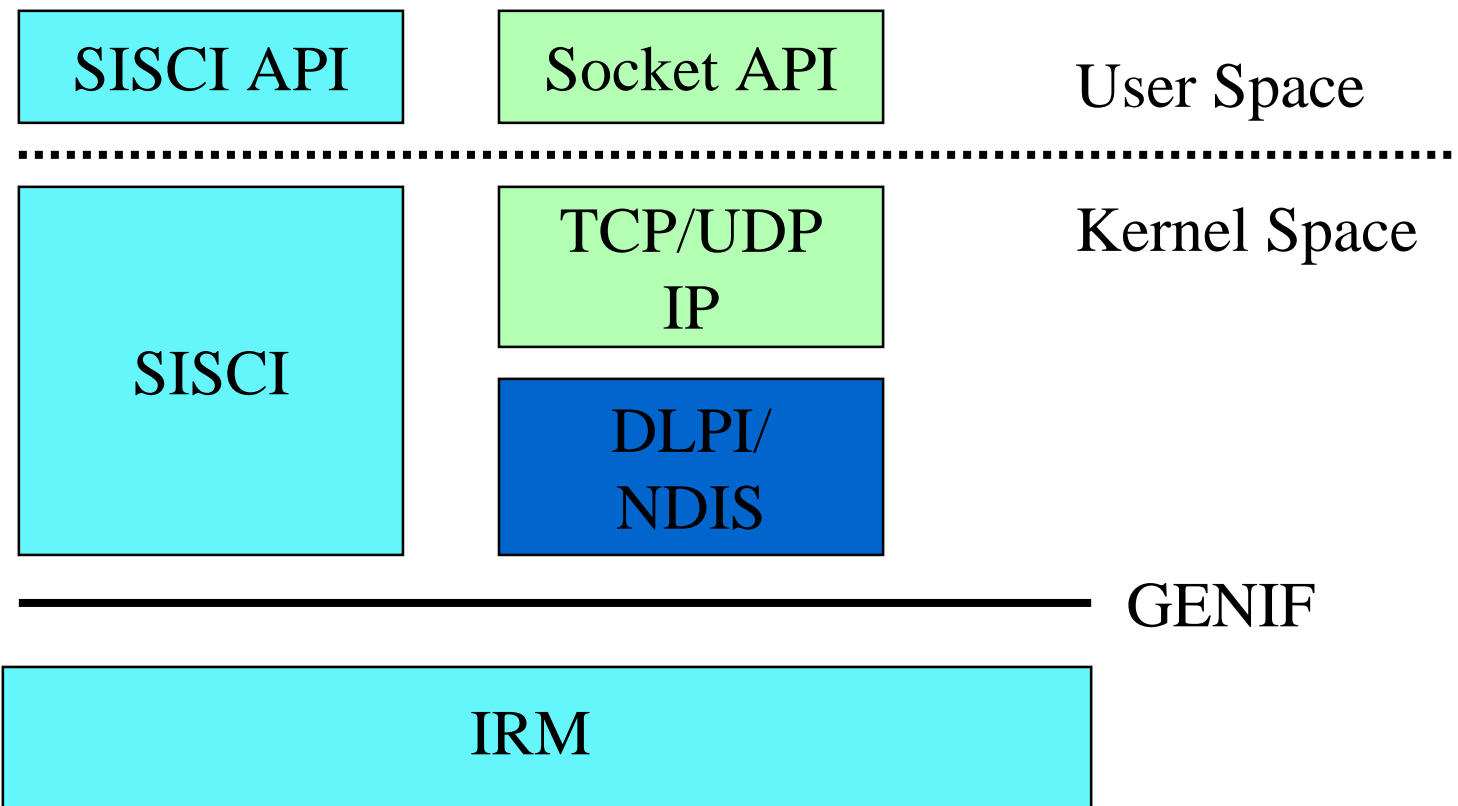
IRM Driver

- **Managing Hardware Cluster Resources**
- **Adapter Card Initialization**
- **SCI Address Translation Table Manager**
- **Adapter DMA Engine Manager**
- **In-band Switch Configuration and Management**
- **Cluster Heartbeat Alive Checks**
- **Endpoint to Endpoint Session Control**
- **Error Recovery and Notification**
- **Kernel Programming Interface (GENIF)**
- **Highly portable**

IRM Supported Hardware

- **Adapter Cards**
  - *D307 - SBus*
  - *D310 - PCI32*
  - *D314 - PMC32*
  - *D320 - PCI64*
  - *D323 - PMC64*
  - *D330 - PCI 66*
- **Switches**
  - *D505 - 4 way (SBus)*
  - *D512 - 4 way (PCI)*
  - *D515 - 4 - 16 way (PCI)*
  - *D525 - 8 way switch*

IRM Driver Architecture

Dolphin
INTERCONNECT SOLUTIONS

GENIF

IRM

OSIF Library

-NT

Solaris

-Linux

PAL Library PCI/SBus

PCI or Sbus Adapter

GENIF

- **Kernel Level Programming Interface**

- **Memory Segment Allocation, Connection and Mapping**

- **DMA Engine queues and completion control**

- **Local Interrupt Routine Registration**

- **Remote Interrupt Triggering**

- **Error Detection Mechanisms**

- **Cluster and Connection Callbacks**

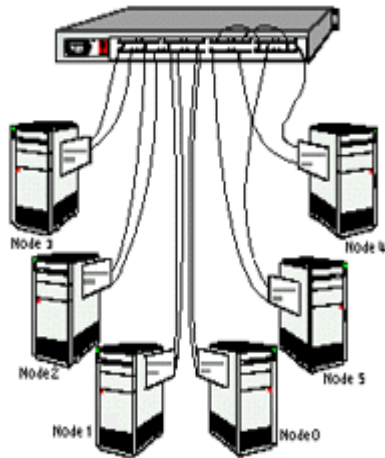- **Hartbeat and Remote Node Alive Check**

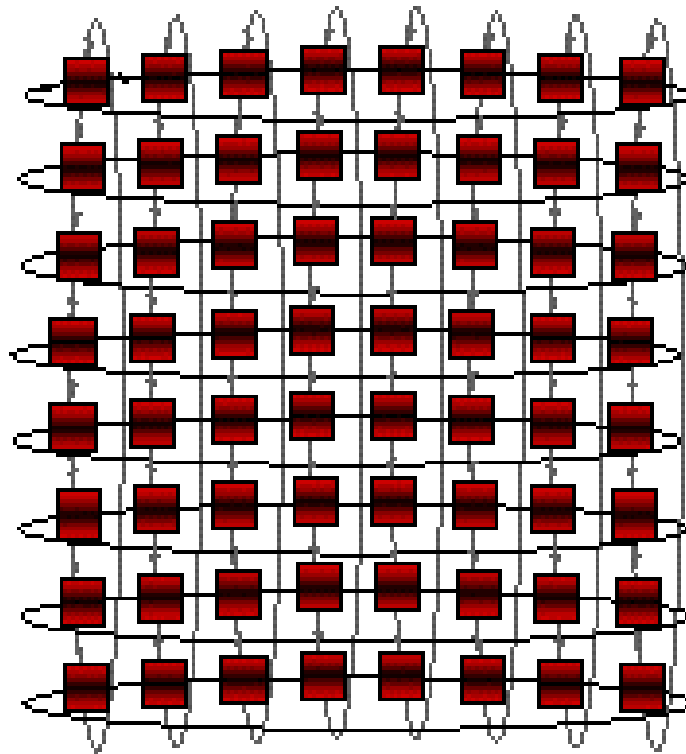# Main line Topologies

- SCI Ring Configurations 2+ Nodes
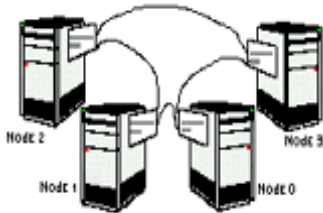
- Switched Configurations 4 - 16 nodes

Topologies

- **2D Topology**

Cluster Toolbox

- **Sciconfig - Cluster configuration**
- **Scidiag - Hardware diagnostic**
- **Scibench - Performance benchmark**
- **Isptools - Field firmware upgrade tools**

Sciconfig

- **SCI Adapter configuration utility**
  - *Adapter NodeId*
  - *Adapter Number*

- **GUI**
  - *Windows NT*

- **Console Application**
  - *All system*
  - *Interactive*
  - *Command line option*

Scidiag

- **SCI Diagnostic utility**
- **Local Adapter diagnostic**
  - *Transaction Controller*
  - *On Board RAM/ROM*
  - *LinkController*
  - *Interrupt statistics*
- **SCI Cluster Diagnostic**
  - *Local Link Status*
  - *Switch Port Status*
  - *Remote Adapter Access*

Isptool

- **In System Programming**

- **Adapter Firmware Update**
- **Switch Firmware Update (D525)**

SISCI

- **Esprit Project 73124**
  - *Software Infrastructure for SCI*

- **Application Programming Interface (API)**
  - *Low Level SCI Programming*

- **User space Access to basic SCI and Adapter properties**
  - *High Bandwidth*
  - *Low Latency*
  - *Memory Mapped Remote Access*
  - *DMA Engine*
  - *Interrupts*
  - *Callbacks*

SISCI Features

- **Access to High Performance HW**

- **Highly Portable**

- **Cross Platform / Cross Operating system interoperable**

- **Simplified SCI Programming**

- **Flexible**

- **Reliable Data transfers**

- **Hostbridge / Adapter Optimization in libraries**

SISCI Performance

- **Highly dependent of the PC Chipsets**

- **Requires special attention**
  - *Write Combining*
  - *Write Posting*
  - *Burst Assembly*
  - *Cache line manipulation / flush*

- **Taken care of by**
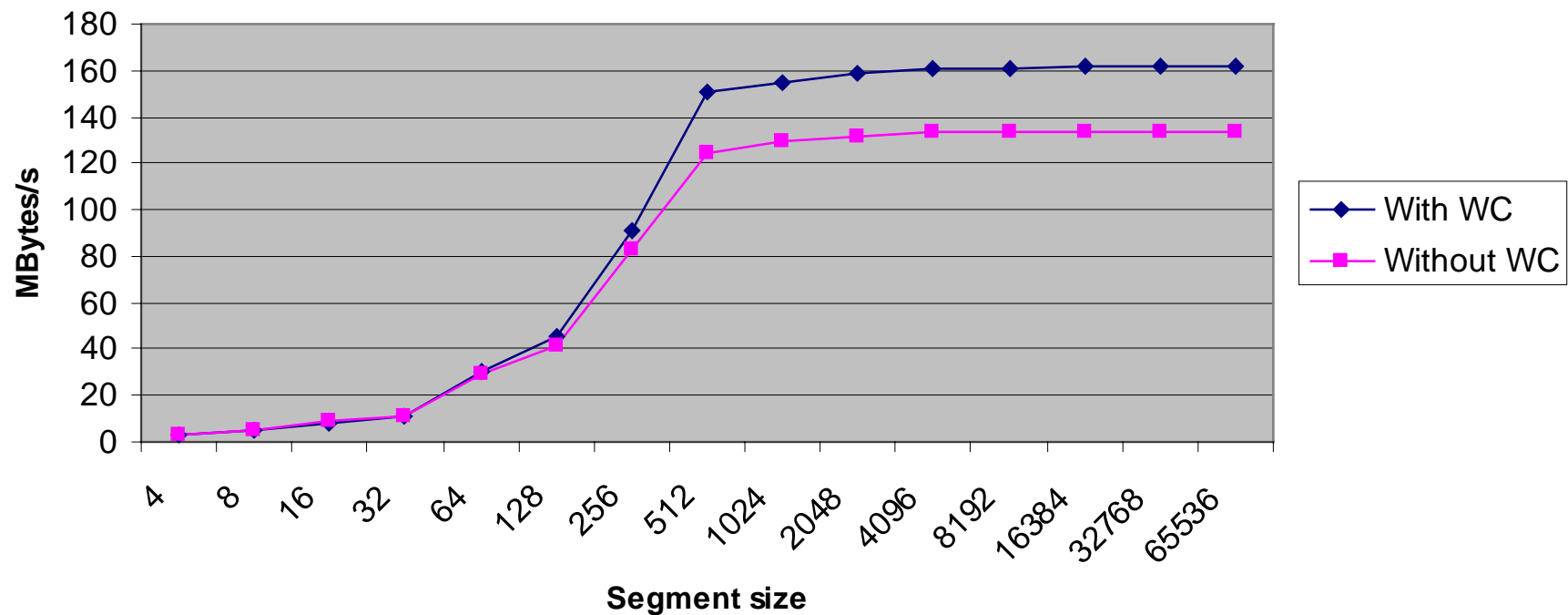 - *IRM*
  - *SCIMemCopy()*

Bandwidth test results PIO - D330

SUSTAINED ONE WAY DATARATE, D330
PIO on ServerWorks HE-III

Legend:
- With WC
- Without WC

Y-axis: MBytes/s (0 to 180)
X-axis: Segment size (4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536)

Bandwidth test results
PIO - D330

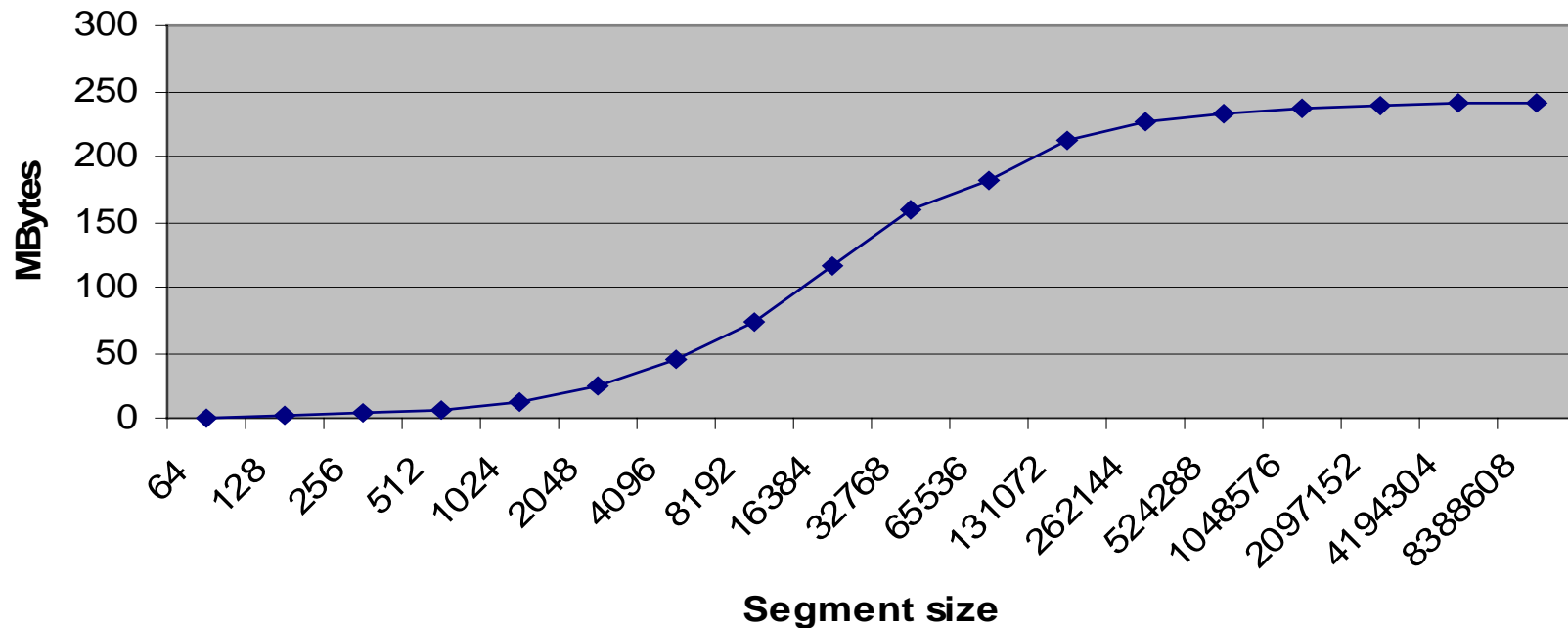| Size (byte)	One way (MB/s)	Bi directional (MB/s)	
4	2.62	2.62	
8	5.2	5.2	
16	8.12	9.41	
32	10.92	10.94	
64	30.38	28.98	
128	45.85	40.96	
256	91.49	82.68	
512	150.38	124.25	
1024	154.96	129.44	
2048	158.91	131.44	
4096	160.35	133.35	
8192	160.96	133.48	
16384	161.38	133.52	
32768	161.57	133.46	
65536	161.66	133.51	

Bandwidth test results DMA - D330

SUSTAINED ONE WAY DATARATE, D330
DMA on ServerWorks HE-III

Bandwidth test results DMA - D330

Segment s (byte)	Latency (us)	Throughput (MB/s)
64	71	0.9
128	78	1.64
256	78	3.28
512	78	6.56
1024	78	13.13
2048	81	25.28
4096	93	44.04
8192	110	74.47
16384	140	117.03
32768	207	158.3
65536	360	182.04
131072	620	211.41
262144	1160	225.99
524288	2250	233.02
1048576	4423	237.07
2097152	8781	238.83
4194304	17484	239.89
8388608	34906	240.32

SISCI software layers

Node A

Node B

| Application (Performance tool) |
| SISCI library |
| SISCI Driver |
| IRM Driver |
| Hardware abstraction layer (PAL) |
| PCI-SCI adapter card |

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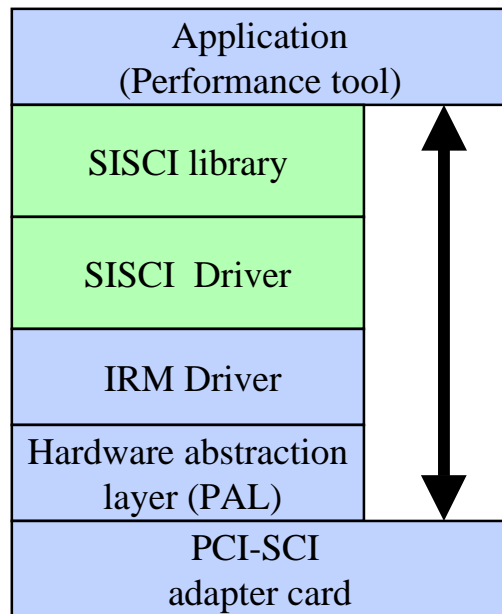
*remotePtr = value;
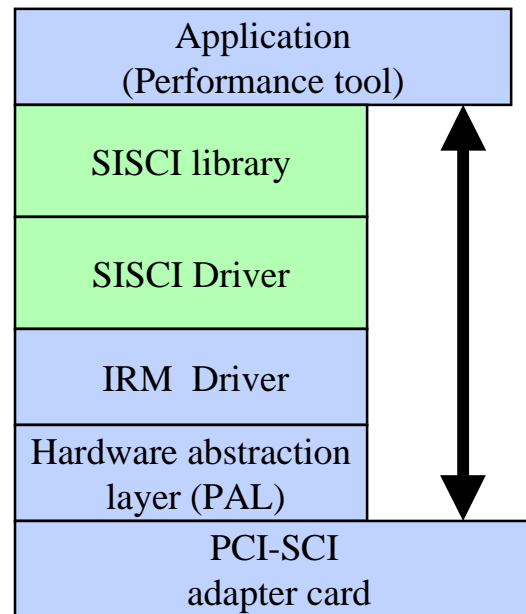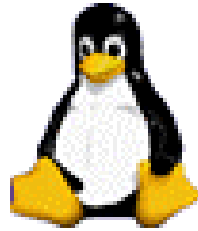
Dolphin
INTERCONNECT SOLUTIONS

*remotePtr = value;

SISCI
Example Programs

- **The programs are made simple to demonstrate the use of the SISCI functions.**

- **Example programs available:**

  – *Shared memory*   — *Block transfers*

  – *DMA*   — *CSR*

  – *Interrupts*   — *Query*

  – *Probe*   — *Scibench2*

  – *Connection to SCI Space*

Operating Systems supported

- **Linux 2.0 / 2.2 x86**
  - *SISCI*
  - *Available since December 1998*
  - *TCP/IP Prototype available*
- **Linux 2.2 Alpha**
  - *SISCI*
  - *Running Prototype*
- **Linux 2.4**
  - *Port in progress*

Operating Systems supported

- **Solaris 2.5.1 / 7 / 8 SPARC**
    - *SISCI and DLPI*
    - *Available since 1994*

- **Solaris 2.6 / 7 x86**
    - *SISCI*
    - *Available since 1998*

Operating Systems supported

- **Windows NT 4.0 x86**
  - *SISCI and NDIS*
  - *Available since August 1996*

- **Windows 2000 x86**
  - *SISCI and NDIS*
  - *Available since March 2000*

Operating Systems supported

- **Dolphin is a Lynx Synergy partner**
- **Lynx 3.01 x86**
  - *SISCI*
  - *Available since December 1999*
- **Lynx 3.0.1 PowerPC**
  - *SISCI*
  - *Beta testing in progress.*
- **Lynx HA Package support is being added**
- **Lynx Messenger is being reviewed**
- **Lynx 3.1 Prototype available**

Operating Systems supported

- **Dolphin is a WindLink Partner**

- **VxWorks PowerPC**
  - *SISCI*
  - *Beta available since September 2000*

- **VxWorks x86**
  - *SISCI*
  - *Beta planned mid October 2000*

- **cPCI backplane messaging API ported to SCI**

Operating Systems supported

- **Compaq Tru64 Unix Alpha**
  - *SISCI*
  - *Running Prototype*

Software Distribution

- **Distributed using web technology**
  - *www.dolphinics.com*

- **Free of Charge**
  - *Operating system choice*
  - *Upgrades*

- **On Line Web Documentation**
  - *Software installation Guides*
  - *Users Guides*
  - *Configuration Guides*

- **CD ROM Available on request**