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Next Generation Instrumentation Bus



Sid Jones
NexGenBus Project Manager

10/7/99

NexGenBus

Goal



- The goal of the NexGenBus Project is to establish a commercial communications bus as an interface standard for the test instrumentation system of the future.

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Background

- Current data requirements exceed the capacity of any single instr. bus
- Increased fusion of data from numerous sources
 - Analog measurements/Avionics busses/Radar data/Video/Voice
- Instrumentation vendors need a bus standard to base future products

NexGenBus

Background (cont.)

- Commercial standards show promise
- Leverage off comm industry investment
 - Standards development
 - Interface hardware design (chipsets to test sets)
 - Large production quantities
- Range Commander's Council (RCC) task TG-50 concluded existing busses looked feasible and recommended a task to establish an IRIG Bus Standard

Project Description

- Office of Secretary of Defense (OSD) funded effort
 - Test Technology Development and Demonstration (TTD&D)
- Tri-service program participation
- The program is a three year effort
 - Year 1 - Define Requirements and research busses
 - Year 2 - Test and demonstrate bus(es)
 - ➔ – Year 3 - Write Profile

Completed Tasks

- Established bus requirements
- Located 33 possible commercial busses
- Identified 8 busses > 100Mbps
- Researched the 8 busses to determine 3 viable busses.
 - Fibre Channel ANSI X3.230
 - Gigabit Ethernet IEEE 802.3z
 - Firewire IEEE 1394

Completed Tasks (cont)

- Down Select
 - The 3 busses were studied
 - Rated H/M/L for 13 criteria
 - » Data Rate / Synchronicity / Class of Service / Protocols / Working Groups / Topologies / etc.
 - Converted ratings to numbers (average)

» Fibre Channel	8.85	High: 10
» Gigabit Ethernet	5.00	Med: 5
» Firewire	4.46	Low: 1

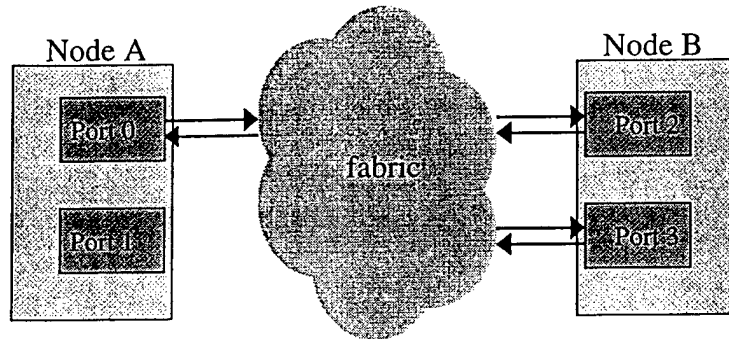
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Selected Bus for Testing

- Fibre Channel was selected for follow-on testing
- Of the three busses, Fibre Channel is the only one being used in a military flight environment

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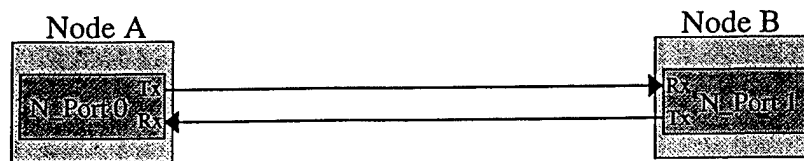
Fibre Channel: Nodes & Ports



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Fibre Channel: Topologies

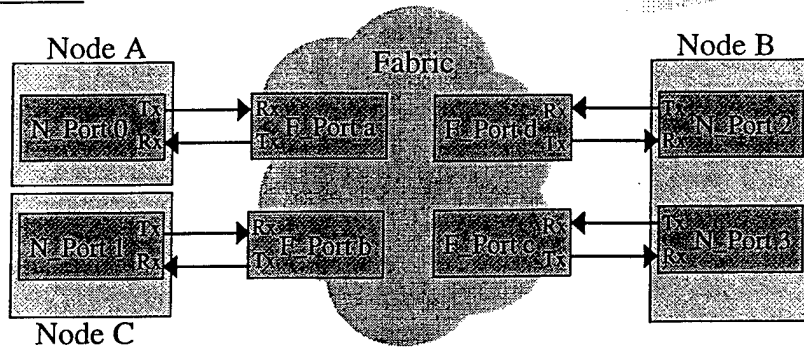
Point-to-Point



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Fibre Channel: Topologies

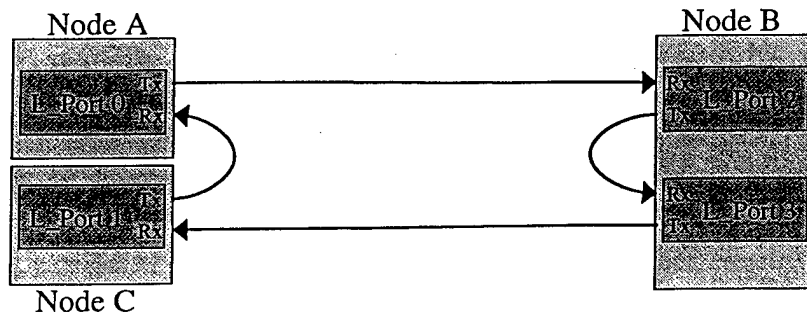
Fabric



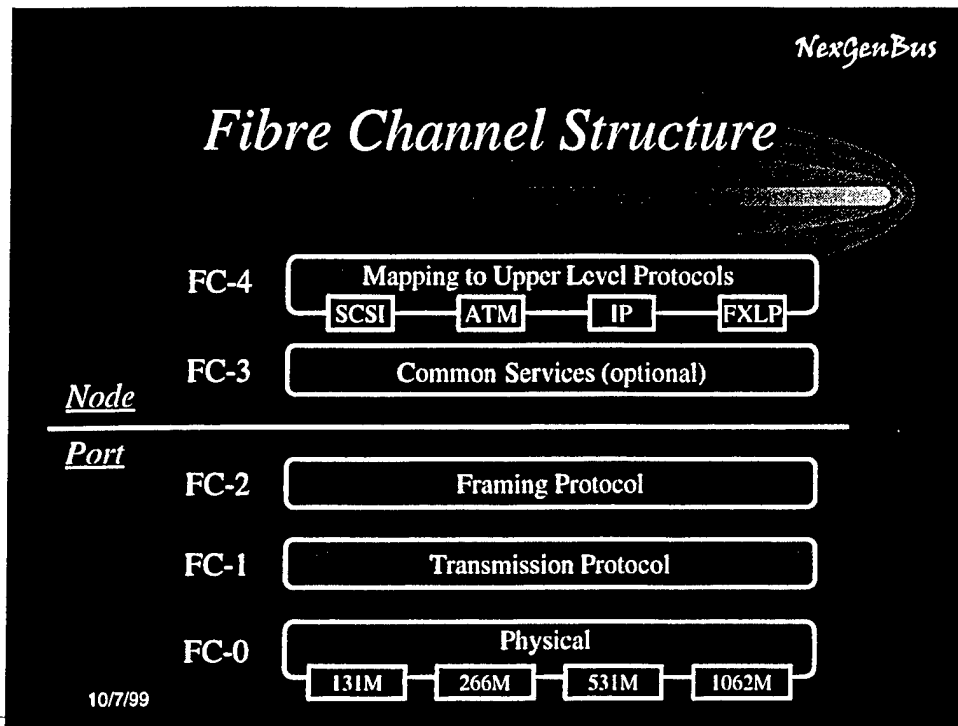
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Fibre Channel: Topologies

Arbitrated Loop



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Avionics Working Group

- Technical Committee T11.4 sponsors a Fibre Channel Avionics Environment (FC-AE) group
- Produce a “Profile” using Fibre Channel in an avionics environment
 - Concerns they may be working toward non-standard approach

www.t11.org

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Schedule

CY	97		98				99				00			
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Define Requirements	█													
Research	█													
Test					█									
Write Standard									█					

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