OMG Real Time Workshop
ORB Inter-Operability Testing

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Purpose

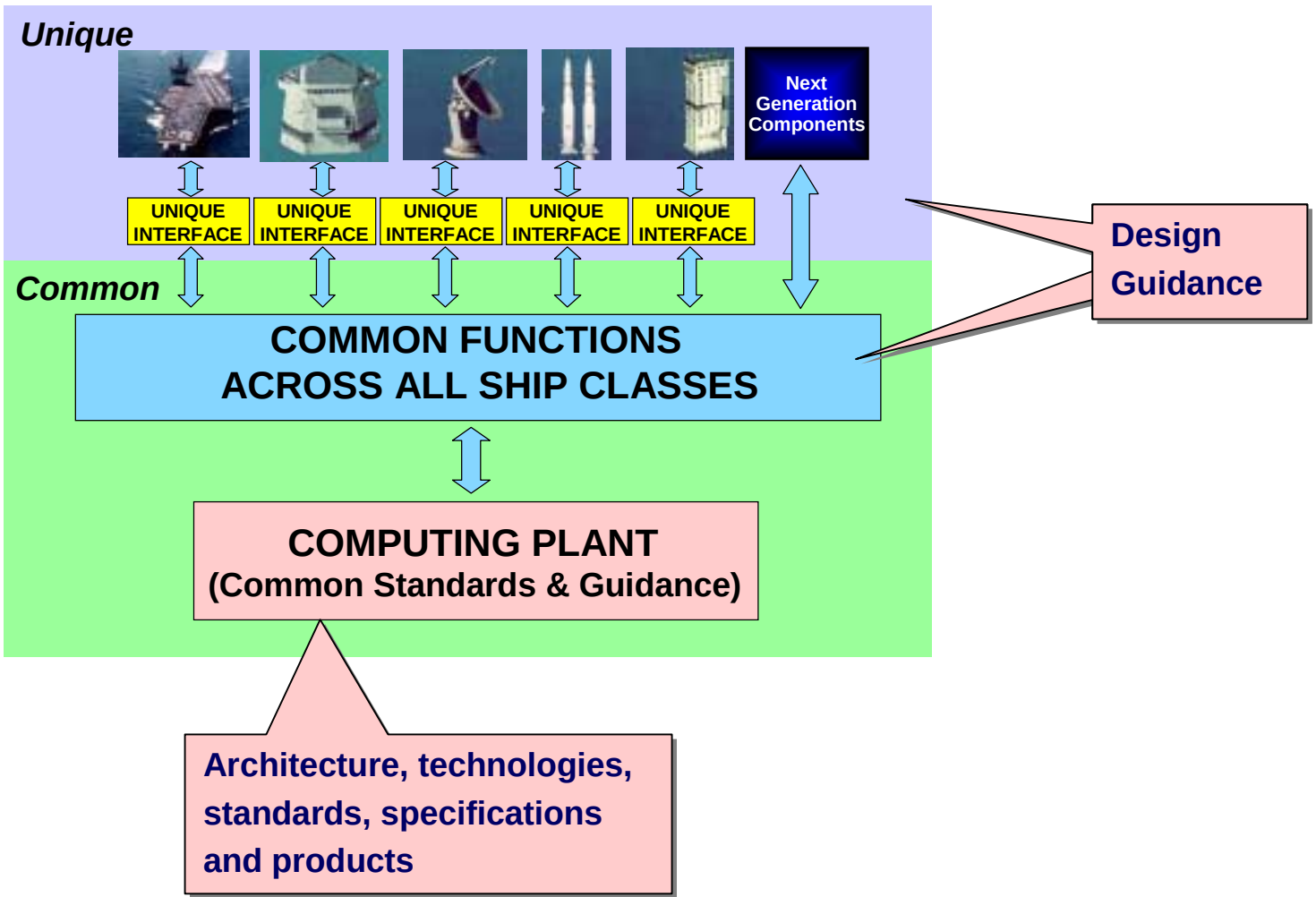
- **Purpose of the Presentation**
  - Present motivation for the task and a sample of the results of inter-operability testing between two ORBs
- **Purpose of the Task**
  - Assess the amount of effort involved in getting:
    - Two ORBs to communicate
    - Porting benchmark applications to another OS
    - Changing compilers
    - Integrating in another ORB
  - Quantify how the performance scales when ORBs inter-operate with different hardware, OSs and other ORBs

OA Goals

- **Open Architecture (OA) Goals**
  - Reduce total ownership cost
  - Make system change and upgrade easier and faster
  - Lower the impact of COTS refresh
  - Reduce interoperability and compatibility problems

- **Two Implementation Concepts to Achieve OA Goals**
  - Common set of warfighting functions
  - *A layered standards based Open Architecture Computing Environment (the OACE)*

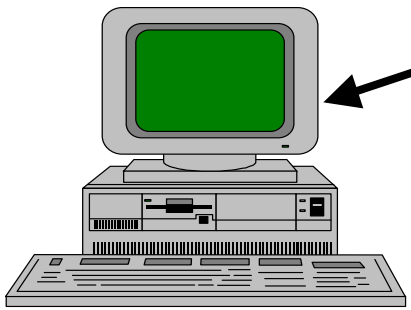
OA Scope


Unique
Next Generation Components
UNIQUE INTERFACE
UNIQUE INTERFACE
UNIQUE INTERFACE
UNIQUE INTERFACE
UNIQUE INTERFACE
Common
COMMON FUNCTIONS ACROSS ALL SHIP CLASSES
COMPUTING PLANT (Common Standards & Guidance)
Design Guidance
Architecture, technologies, standards, specifications and products

Motivation

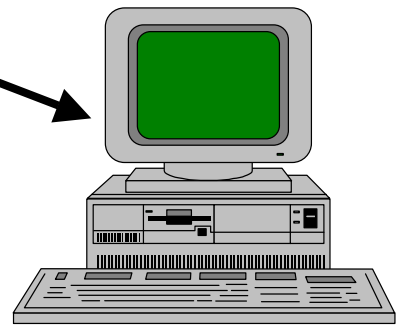
- **What Does OA Bring to the Table Regarding the Computing Environment**
  - Technical Architecture
    - Layered approach
  - Standards
    - OMG, IEEE, ISO etc.
  - Guidance/Requirements
- **Motivation for the Task was to Validate that a Standardized Middleware such as CORBA Could Assist in Achieving OA Goals**

Configuration



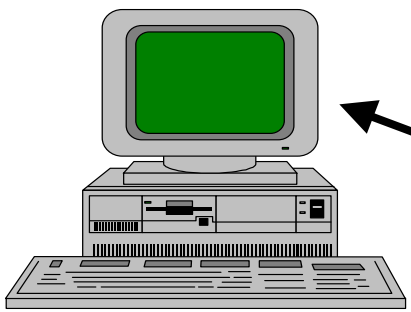
Server Host

X86
CPU: 1 Pentium 3, 800 MHZ
Memory: 128 Mbytes
OS: Lynx 3.1
Compiler: gcc 2.9
NIC: Intel Pro 100
ACE Version: 5.2
TAO Version: 1.2
ORBexpress Version:2.3.2



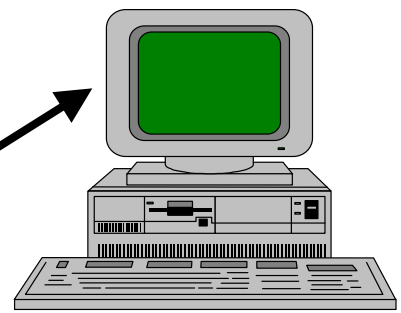
Client Host

Fast Ethernet 100Mbps
HP ProCurve 4000 10/100-T
Switch



Server Host

Memory: 512 Mbytes
OS: Solaris 2.8
Compiler: gcc 2.95.2, Sun CC 5.1
NIC: Sun Fast Ethernet
ACE Version: 5.2
TAO Version: 1.2
ORBexpress Version: 2.5.1



Client Host

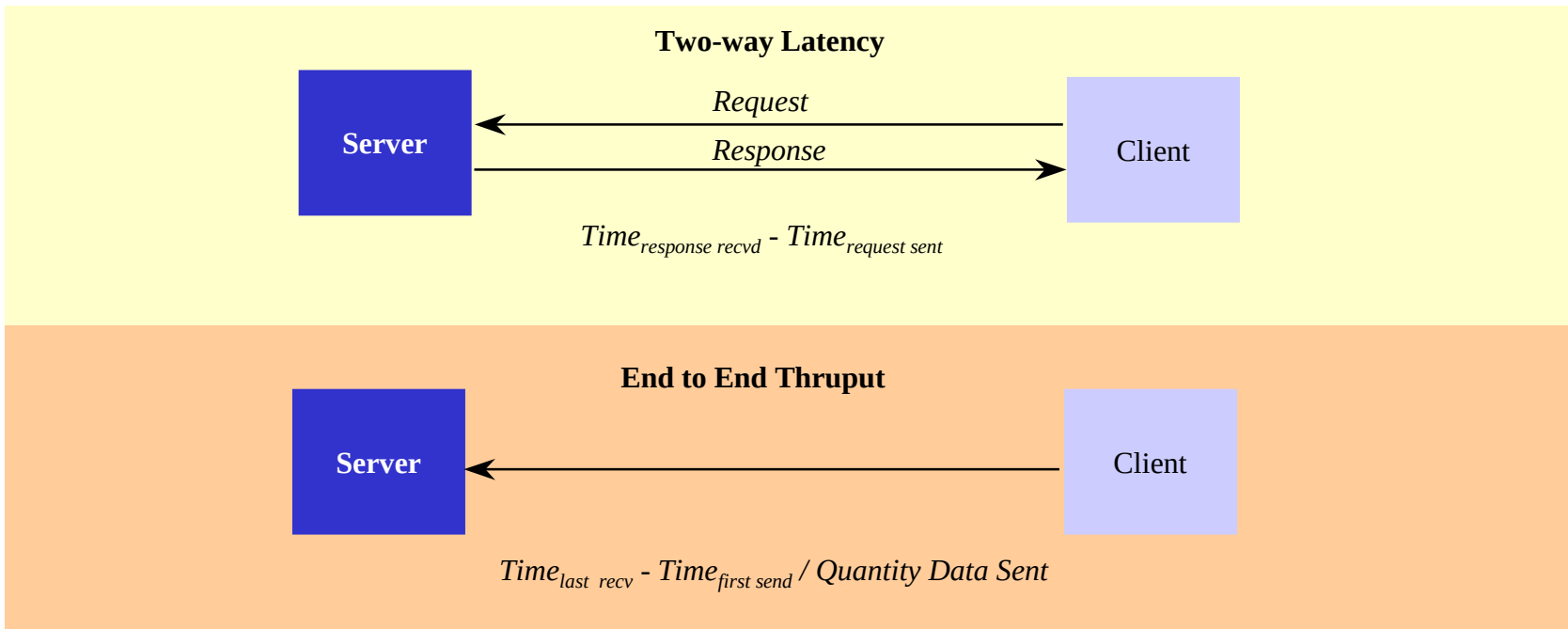
Sun Microsystems Ultra-Enterprise
CPUs: 8 - 168 MHz Sparc

Sun Microsystems Ultra 2
CPUs: 2 - 200 MHz UltraSPARC

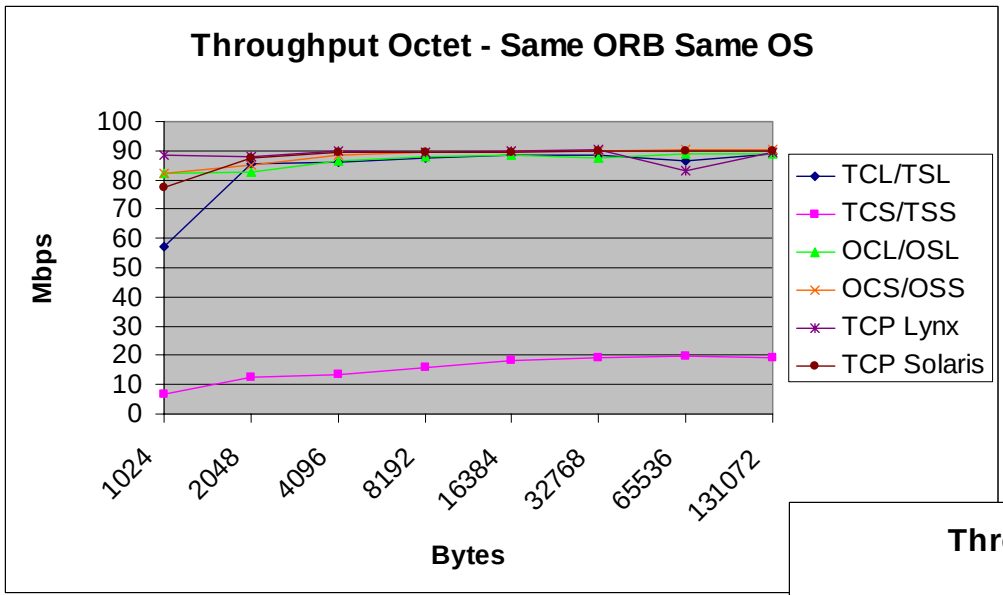
Test Methodology

- **IDL Operations (Throughput)**
  - static one-way
  - pass octets and structures as in parameters and returns a void
  - total of 64MB of data transferred using various buffer sizes
- **Data Collected**
  - Throughput measured for a group of messages sent
  - averages, std devs, mins and maxs for 10 samples

- **IDL Operations (Latency)**
  - static one-way and two-way
  - pass octets and structures as in parameters and returns a void
  - 32 to 2400 byte buffer sizes in increments of 32 bytes
  - passed noparams and returned void
- **Data Collected**
  - latency measured for each message sent
  - averages, std devs, mins and maxs for 100 samples



Throughput Results

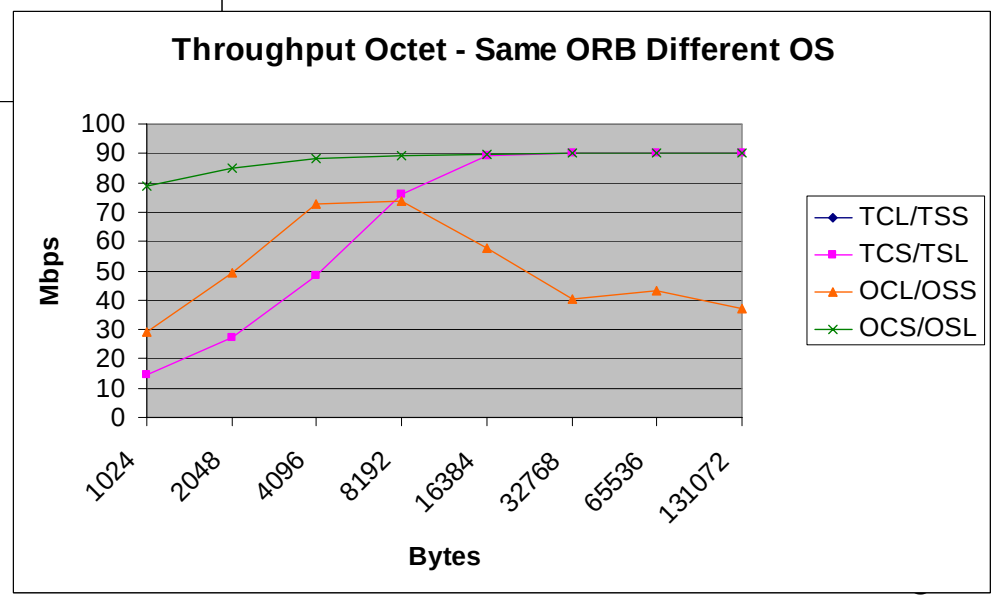


First letter = ORB (TAO, ORBexpress)

Second letter = Host (Client, Server)

Third letter = OS (Solaris, Lynx)

TCL/TSS combination did not work



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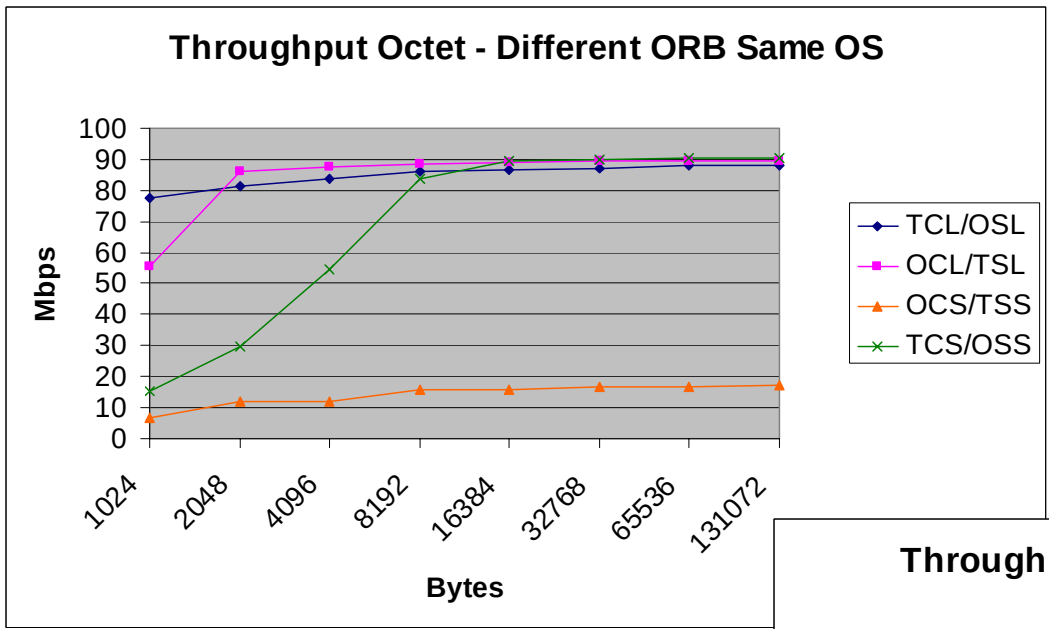

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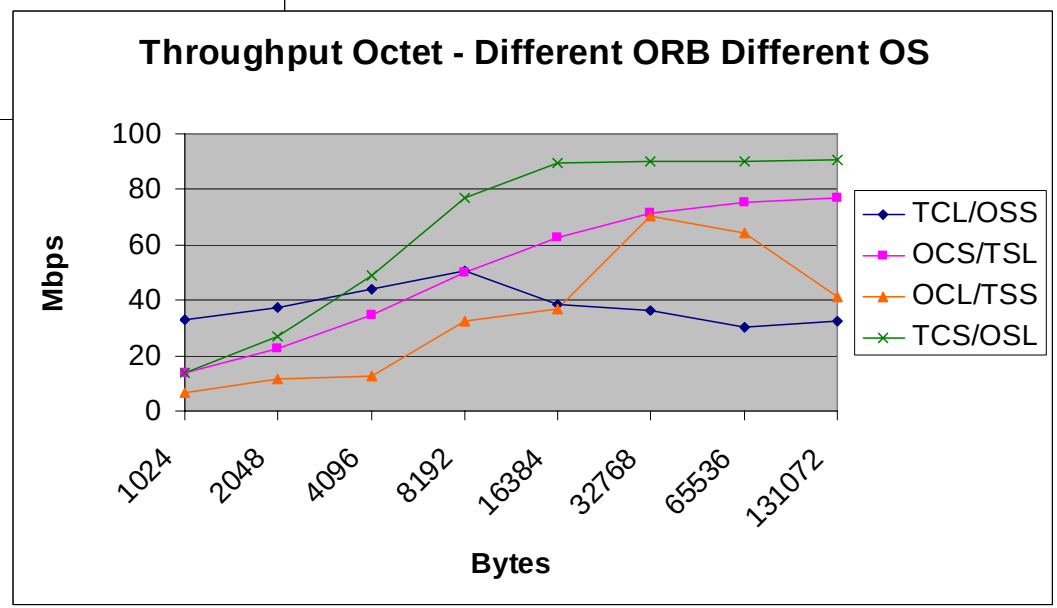
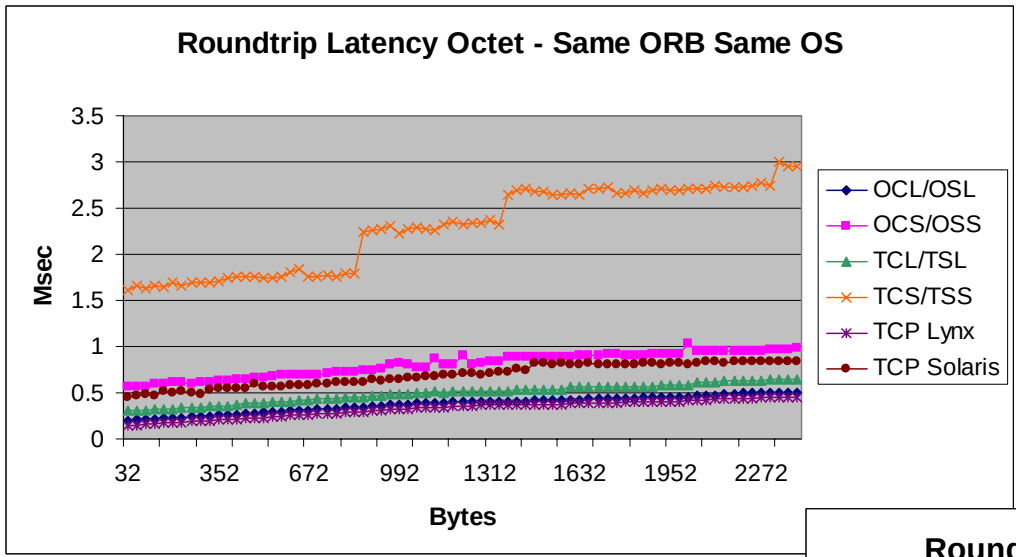


Roundtrip Latency Results



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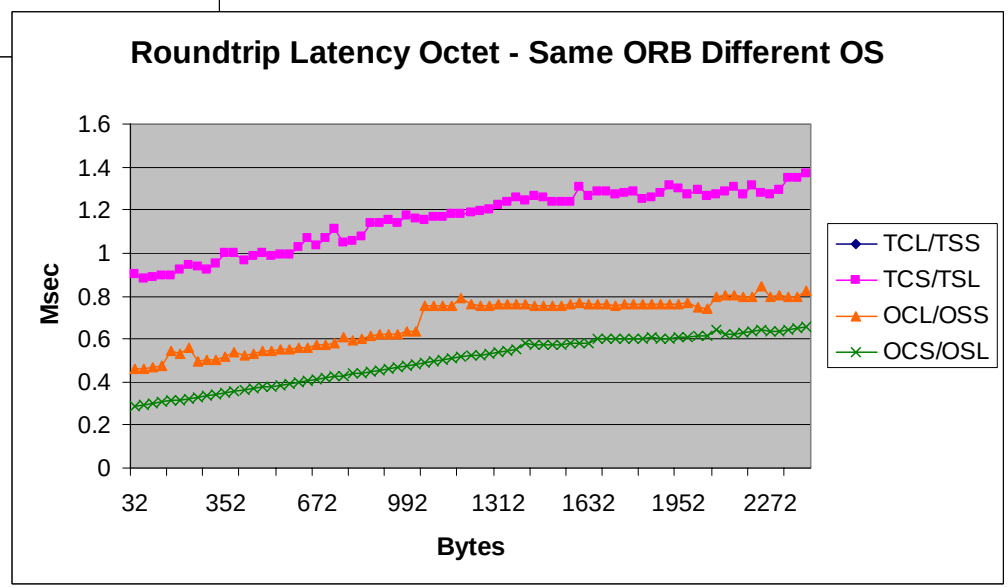

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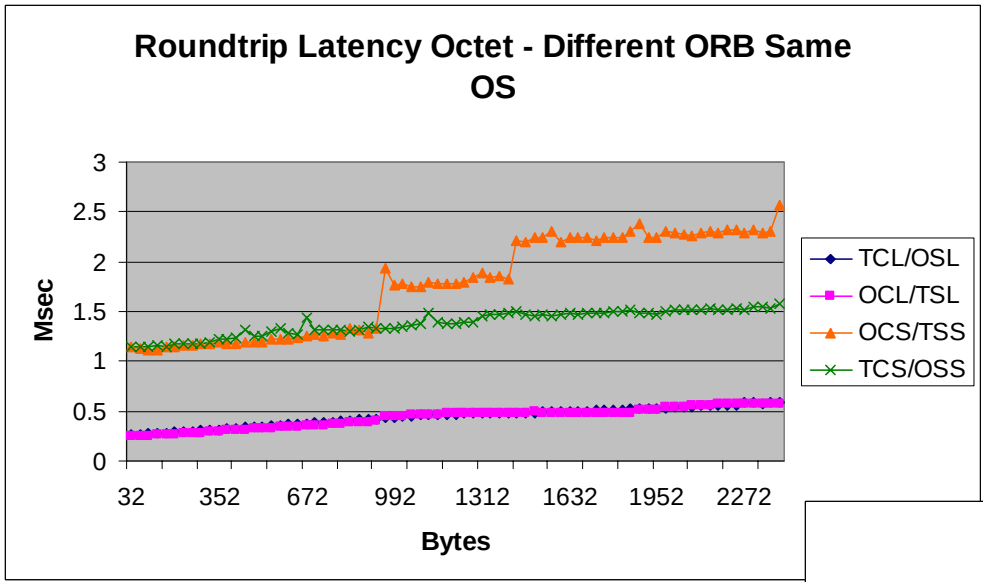

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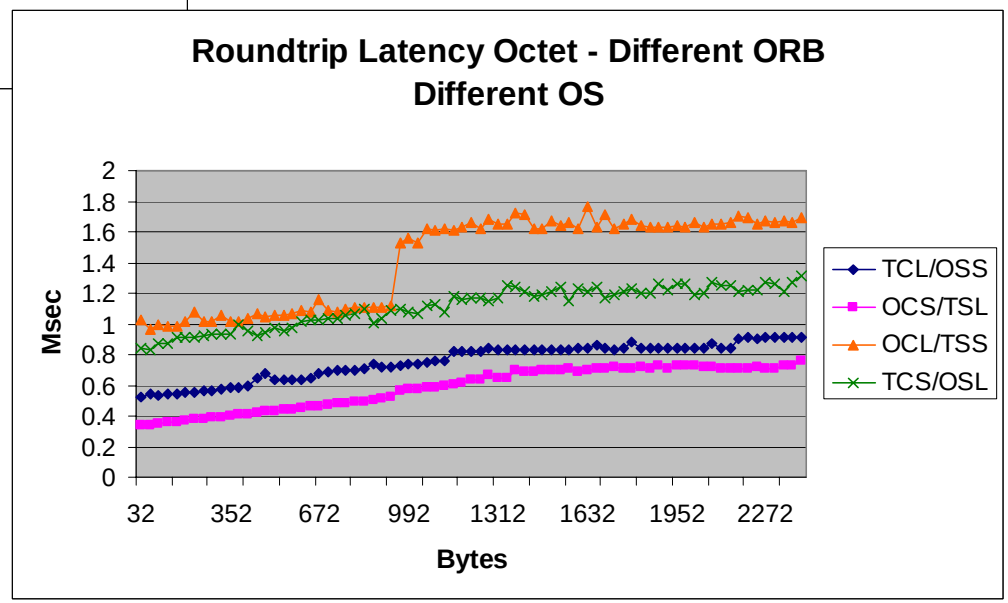


Conclusions

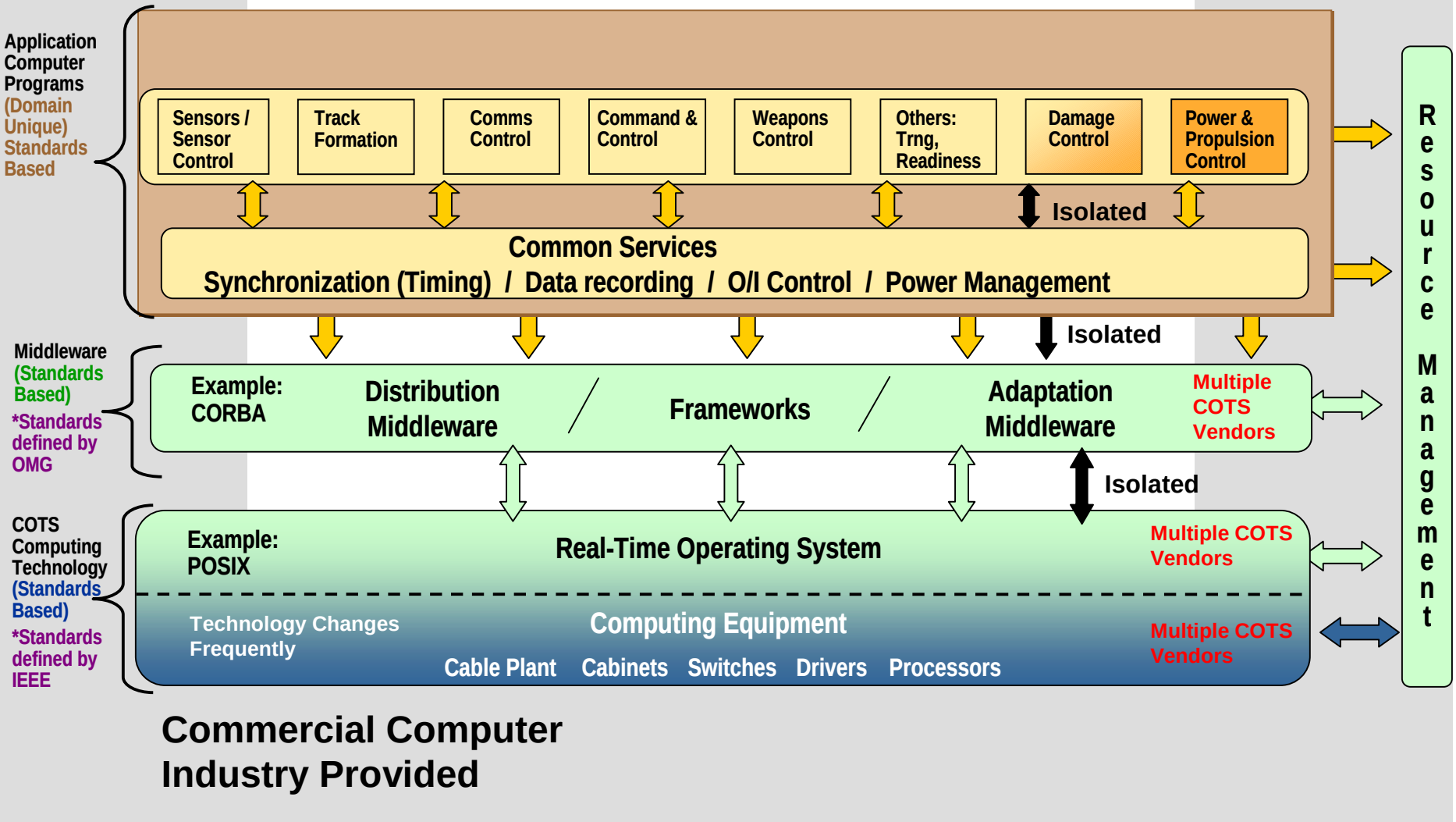
- **Porting Effort Was Relatively Easy**
- **Integrating in Another ORB Was Straight Forward**
  - ORB APIs and functionality behind the APIs were consistent
- **Moving from the Sun To gcc Compiler was not as Easy**
  - gcc not as forgiving as the Sun compiler
- **ORBs Successfully Inter-Operated in Multiple Configurations**
- **Configuration has Significant Effect on Performance**
  - Particular OS and CORBA server combinations can dominate performance

Summary

- **Results Support Spirit and Intent in OA Guidance Documents**
- **As OA System Architecture moves into the Implementation and Design Phase, ORB/OS/Hardware and CORBA Client/Server Configuration Decisions will be important**
- **Full Set of Results will be Published in an NSWC Technical Report**

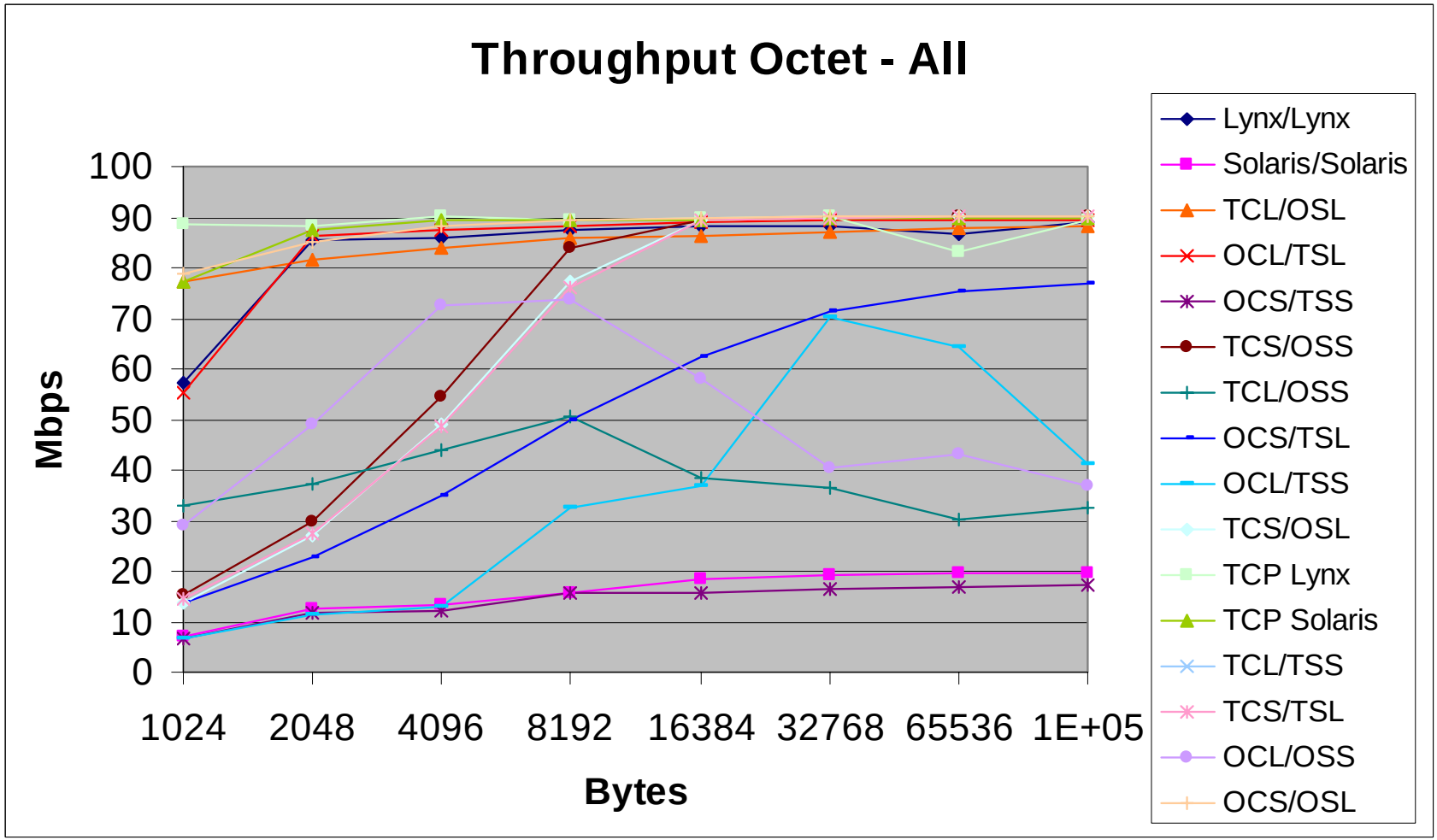
Back-up Slides

Technical Architecture Layers



Commercial Computer Industry Provided

Throughput Results



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