Our Market Focus:

- High Performance Systems
- Embedded Systems
- Real-Time Systems
How CORBA Benefits Application Development

- CORBA removes the need for
  - Socket Level Programming
  - Defining a client/server protocol
  - Defining a message format
  - Marshalling of data
  - Demarshalling data upon return from call
- Saves developer’s time
- Improves Time to Market
- Increases System Reliability

- Raises the level of abstraction
- Moves infrastructure support to COTS vendors

Results:
- No more ‘stove pipe’ applications
- Allows all languages to cooperate on an equal footing
- Reduces the need for bindings to GUIs, databases, etc.

CORBA Performance

Word on the Street About CORBA...

- Provides a solid middleware foundation
- Provides development flexibility
- Simplifies reconfiguration
- Increases re-use
- Protects investment
- Decreases cost
- Mitigates risk

...CORBA works!

- Uses too much memory
- Is too slow
- Is not reliable
- Is too poorly supported

...to be used for Real-time or embedded applications

ORBexpress is Objective Interface’s ORB targeted to real-time and embedded systems

This might be true for a general purpose ORB.
It is not true for a Real-Time ORB
ORBExpress was built from the ground up to emphasize:
- Small footprint
- Fast performance
- High Reliability
- Top Notch Tech Support
The High Performance ORB Advantage

- Let’s analyze a benchmarking application (i.e. Time spent in application code is 0)
- Typical ORB throughput:
  - Desktop ORB
    - ~400 two-way remote invocations per second
  - Browser ORB
    - ~600 two-way remote invocations per second
  - “Tweaked” Research ORB
    - ~1200 two-way remote invocations per second
  - Real-Time ORB (ORBexpress benchmarks used)
    - ~2,700 two-way remote invocations per second

Independent Assessment: Background

- Background: Performed by independent third party over a 6 month period
- CORBA Products Assessed:
  - HARDPack – Lockheed Martin
  - TAO – Washington University
  - ORBexpress – Objective Interface Systems
- Methods Used:
  - Vendor Survey
  - Independent Assessment and Benchmarks
  - User Survey
**Independent Study: Conclusions**

- "A summary of results is simple: in general, ORBexpress products test out-performed alternatives in terms of both raw speed and predictability in most categories tested…"
- "For transfers of primitive data types over a network, the performance of ORBexpress on primitive data types approached the performance of our direct, unmarshalled transfers over TCP sockets."
- "For transfers of aligned and non-aligned records over a network, ORBexpress outperformed TAO."
- "ORBexpress performance on Any transfers bettered other products by a wide margin."

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**Ingredients of a Real-Time ORB**

- Predictable ORB infrastructure
  - Predictable memory management, etc.
  - Use of predictable, bounded algorithms
  - Analysis and documentation of behavior
- Priority Propagation & Distributed Priority Inheritance
- Predictable transport (i.e. not TCP)
  - Native ATM (ANI)  Reflective Memory  FDDI
  - FireWire (IEEE 1394)  Shared Memory  VME/PCI
- ORB must understand and use deterministic transports & Quality of Service (QoS) metrics
- ORB must allow designer to control QoS and map them from client → network → server
ORBexpress Product Concepts

- Reliability
- Size / Speed
- Support
- Widely Ported
- Scalable

Latest CORBA Standard

ST, GT or RT
Which One for You?

- Cross Compiled Embedded Target? No
- Want to Plug In Transports? No
- ORBexpress ST
- Yes
- Need to Pass Priorities? Yes
- Need to set QoS per connection? No
- ORBexpress GT
- Yes
- ORBexpress RT
- ORBexpress focuses on High Performance, Embedded and Real-Time Systems
ORBeXpress ST
Product Features

- Native language ORB
  (Ada ORB in Ada, C++ ORB in C++)
- IIOP (Interoperable)
- POA and other CORBA 2.3 advances
- Full Multi-Threading/Tasking Support
- Engineered for Performance
  - Operation Invocation
  - Scalability
- Simplified Configuration and Daemon operation
- Provides projects with flexibility in their Client/Server Architecture

ORBeXpress RT
Features

- All functionality of ORBeXpress GT plus:
- OMG Real-Time CORBA 1.0 standard
  - Predictable end-to-end operation invocation
  - Priority Ceiling Locking Protocol support
  - Thread Pools
  - Real-Time POA
- Focus
  - High-performance CORBA ORB implementation
  - Designed and coded with real-time as primary goal:
    - Predictable ORB internals
    - Targeted to Embedded Systems and RTOSs
ORBexpress for Ada 95 — Platform Coverage

- **Hosts (and self targeted)**
  - Sun/Solaris
  - PC/Windows NT
  - PC/Linux
  - HP/HPUX (ST self only)
  - DEC Alpha/Open VMS (self only)
  - DEC Alpha/DEC Unix (self only)

- **Targets**
  - PPC/VxWorks
  - x86/VxWorks
  - PPC/Lynx OS
  - PPC/ Concurrent

- **Compilers**
  - Rational Apex
  - ACT Gnat
  - Aonix ObjectAda
  - GreenHills AdaMulti
  - PowerAda

Other ports and combinations may exist

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Some Customers

- Lucent
- Ericsson
- Nortel Networks
- Lantern Communications
- Hughes Network Systems
- Acturna (TTC)
- Rational Software Corp.
- Lawrence Livermore
- Paranor
- Reuters
- BAeSEMA
- Sandia Labs

- Boeing
- Lockheed Martin
- Logicon
- DISA
- NRaD/SPAWAR
- Ecobilan
- Eurocontrol
- Air Force, Army, Navy
- TRW
- MITRE
- Litton
- Raytheon
Lawrence Livermore National Lab

- National Ignition Facility - 2 megajoules
- 192 lasers beams propagate a 25-ns burst
- Monitoring and Control of 60,000 devices
  - Including mirrors, lenses, motors, sensors, cameras, amplifiers, capacitors, and diagnostic instruments
- Sun-Solaris with cross to PowerPC-VxWorks

Paranor

- 2 Projects:
  - KingCat MCAS - Monitoring, Control, and Alarm System for a 70ft twin hull luxury yacht
  - ADAM - a Swiss Military MCAS
- Integrates ship controls and geographic position
  - Fuel Status, Engine Control, Electrical Systems
- Safety Critical Command & Control
- Windows NT and Alpha/OpenVMS
- Interoperates with Java ORB (via IIOP)
Conclusion

**CORBA**
- Proven, mature standard
- Cross platform, cross language compatibility
- Wonderful standard for integrating technologies
- Multi-vendor technology with proven interoperability

**ORBexpress ST/GT/RT**
- Independently benchmarked as fastest ORB implementation
- Highly interoperable, tested with many other ORBs
- Embeddable
  - Fast, safe
  - Small Footprint
  - Plug-In Transports
- Real-Time CORBA Support
  - Predictable, Distributed Priority Inheritance™
- Highly Scalable