# Tracing CORBA applications using interceptors

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- 1. Motivation
- 2. Tracing in general
- 3. Interceptors
- 4. Tracing using interceptors
- 5. Conclusion



### Motivation

1. Technical development:

- Distributed, heterogeneous environment



#### Motivation

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2. Applications:

e-Business

Embedded systems

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### Motivation

#### 3. Growing competition:

- Functional and reliability requirements
- Time-to-market pressure

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# Tracing vs. debugging



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# Aims of tracing (use cases)

- 1. Checking correct behaviour
- 2. Locating bugs
- 3. Better understanding of how the system works
- 4. Monitoring crucial applications
- 5. Automatic documentation extraction
- 6. Performance analysis, identifying bottlenecks

# Current tracing mechanisms

Current solutions are bound to particular programming languages.

Problems with distributed systems:

- Heterogeneity
- Collecting information from different namespaces
- Synchronization, lack of global clock etc.



## **Current tracing mechanisms**

State of the art in distributed systems:

+ Central tracer

Manual instrumentation

Extra programming work

– Prone to errors



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## **CORBA** interceptor

- An object implementing the interceptor interface
- extending the functionality of the ORB
- using callback methods
- without actually modifying the ORB

### Callback methods



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# **Definitions & implementations**

- First definition: CORBA 2.3
- Incompatible implementations
- September 1998: OMG RFP
- December 1999: Joint Submission
- March 2000: CORBA 3.0 Working Draft
- The used implementation: TAO 1.1 and 1.1.9 beta

# Other possible solutions

- Smart proxies
- Servant managers
- Pluggable protocols
- ORB event handlers

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# Tracing using interceptors



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# The resulting architecture

- Automatic instrumentation
- One single line of initialization code per name space
- With the standard registration mechanism of interceptors, even that could be avoided
- Until then: a slight modification of the ORB
- Open system

### Overhead

- In interactive mode: ~ 500 % communication overhead
- In local mode: ~ 15 %



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### Results

- A tracing architecture satisfying the previously defined requirements
- A tool for documenting and interactive tracing of CORBA applications
- The solution works in a distributed and heterogeneous environment
- Prototype of a future product

# Future plans

- Improving interoperability
- Extending the architecture for other middleware systems, such as DCOM

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- Improving user interface, with the inclusion of possible users
- Making the tracer persistent

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