Object™ Security

CORBASec Reality Check

MICOSec: CORBA Security Reality Check

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CORBASec Reality Check

CORBASec Reality Check

- The Business Promise
- Design Goals
- MICOSec
  - Implementation
  - Evaluation
  - Wireless CORBA Security
- Challenges and Workarounds
- Upcoming Standards
- Conclusion

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CORBA Business Promise

Large enterprises use
many incompatible components

Specific Application

Web Server

Legacy Backend Data Store

Contractor Data Access

Firewall

Data Mining Machine

Customer Data

PDA Application

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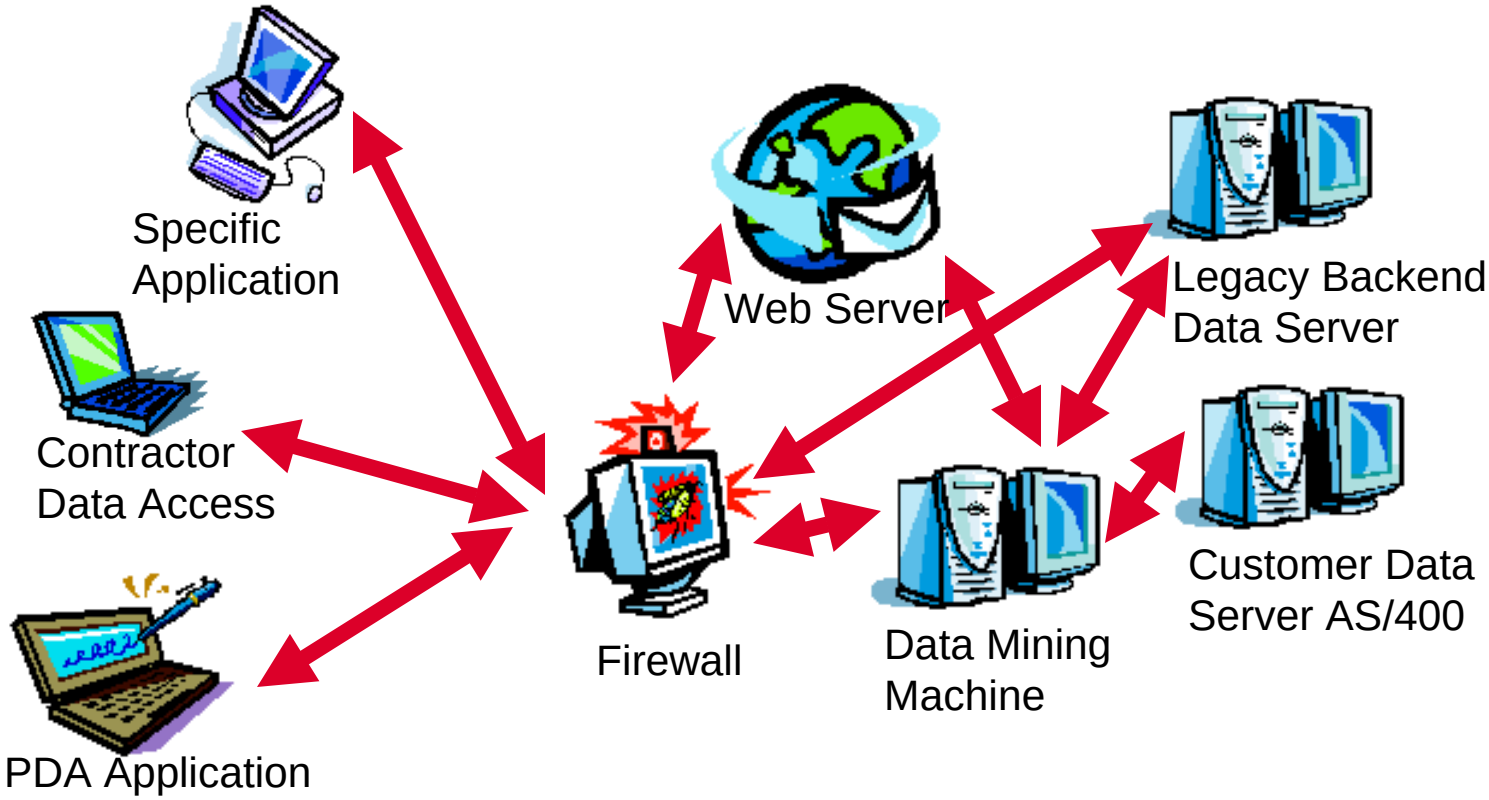
CORBA Business Promise

CORBA gives seamless, enterprise-wide integration of services and data



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CORBA Business Promise

- With minimal extra impact on:
  - Installation, configuration, administration
  - Application development
  - Existing Systems (legacy Integration)
  - Training
  - Performance

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CORBASec Business Promise

- Add security without sacrificing the purpose of CORBA
- With as little extra impact as possible on existing:
  - Applications
  - Security infrastructure
  - Business processes
- Make security manageable

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Design Goals

- Preserve main CORBA design goals:
  - Interoperability
  - Flexibility
  - Automation
  - Portability
  - Abstraction
  - Scalability

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Functionality

- CORBASec specifies:
  - Authentication
  - Message Protection
  - Access Control
  - Audit
  - (Non-Repudiation)
- ORB layer & application layer security enforcement

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Reality Check

Can CORBASec be used to secure real-world CORBA applications?

Learning by Doing
implement
and test the
specification

+

Conceptual work
technical flaw
or fundamental
challenge/trade-off?

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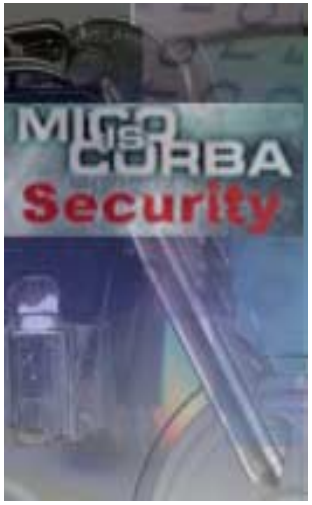
MICOSec Implementation



- CORBASec level 2
- Based on:
  - MICO ORB
  - OpenSSL library
  - PostgreSQL database
- Originally developed for research
- Work in progress (like CORBASec)

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Wireless MICOSec

- Proof of concept: test CORBASec in a specific environment
- Full MICOSec was ported to a Compaq iPAQ 3630 PocketPC under Linux
  - Performance is adequate
  - Porting of existing applications is easy (except GUI)

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MICOSec Evaluation

- Lots of pitfalls (esp. for non specialists)
  - Difficult to design
  - Difficult to implement
- Does not meet all requirements:
  - Does not provide simple and automatic security enforcement
  - Does not always integrate well
  - Identity based access control hard to administer
  - Assurance?
  - …

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MICOSec Evaluation

- Some modifications of the spec necessary:
  - Domain based object names
  - SSL needs simple PKI support
  - …
- Does CORBASec work?
  - Some conceptual challenges
  - But real-world workarounds are possible
  - Fits to wireless systems

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Challenges & Workarounds

- Example challenges:
  - Conflicting goals
  - Object identifiers
  - Underlying security infrastructure
- Real-world workarounds

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Challenge 1: Conflicting Goals

- Interoperability requires common mechanisms, data formats etc.
- Flexibility allows many differing mechanisms, data formats

- Assurance requires evaluation of the whole (static) system
- Flexibility results in dynamically changing system

- Workarounds: identify sensible trade-offs

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Challenge 2: Object Identifiers

- Challenge: How to represent client and target object in the security policy:
  - Access Control Policy
  - Audit Policy
  - (Authentication)
  - (Non-Repudiation)
- Goal: find an interoperable identifier on the middleware layer – must be:
  - Fined-grained
  - Security mechanism unspecific
  - Static
  - Precise and trustworthy

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Challenge 2: Object Identifiers

- Reality: CORBASec uses target interface
  - Not precise enough because of object inheritance etc.
- Other options?
  - Abstract from security mechanism
    - Semantics and granularity not clear
  - Target identifier [Host|POA|ObjectID]
    - Changes dynamically
- Workarounds:
  - Target Identifier:
    Object Domain Mapping (ODM)
  - Client Identifier:
    Only security mechanism identifier available, use it.

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Challenge 3: Infrastructure

- CORBASec runs on top of existing security infrastructure:
  - Security Mechanism
  - Public Key Infrastructure
  - Firewalls
- Often not good enough for CORBASec
- Often do not fit with the architecture

- Workaround: Do it yourself
  - Use own security mechanism
  - Mappings, e.g.directory services for roles, domains

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CORBASec is Work in Progress

- Upcoming Standards
  - Security Domain Membership Management Service
  - Common Secure Interoperability version 2 (CSIv2)
  - Authorization Token Acquisition Layer Server (ATLAS)

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Conclusion

- CORBASec is a useful tool for securing today's CORBA applications

- But:
  - Some "wishes" are unrealistic
    - No out-of-the-box security
    - No idiot proof security
    - Cannot solve fundamental difficulties
  - Some technical issues need to be fixed

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MICOSec Main Features

- Security level 2 version 1.7
- security aware and security unaware applications
- All features of MICO 2.3.1, including POA
- SSLIOP based on SSL v 3 with different ciphers
- Extended attributes for X.509 and environment information
- Plain IIOP
- Authentication
- Message protection
- Policies for secure associations
- Extended level 1 interfaces
- Auditing into file/syslog/RDBMS
- Secure interoperability with other ORBs
- Object Domain Mapping
- Domain based access control and auditing
- Domain Membership Management