A CORBA-based Secure Session Service for Distributed Multimedia Collaborative Environments

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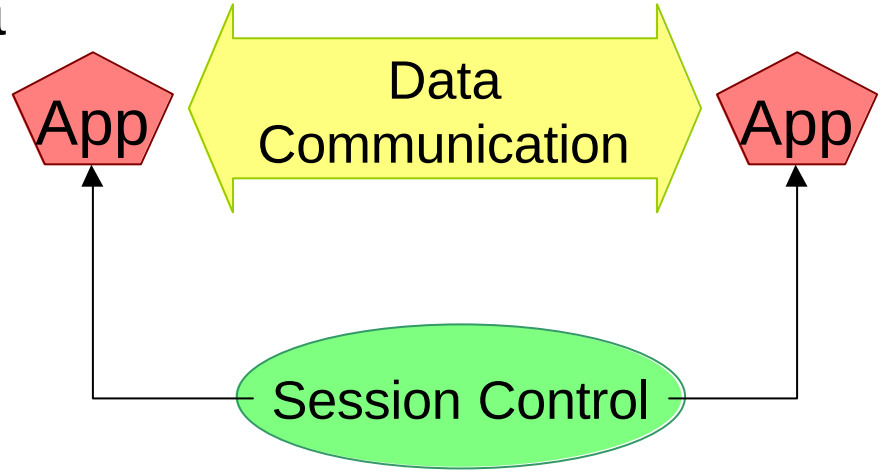
Introduction

- Collaborative environment (CE) allows a group of users to collaborate from their desktops as effectively as if they were face-to-face.
- Increase the need of collaborative environments with distributed multimedia applications.

Collaborative Environment Architecture

- Application
  - Distributed multimedia application
- Data Communication
  - Multimedia data
- Session Control
  - Information of collaborative environment



Data Communication vs. Session Control

- Data Communication
  - Multi-point Communication
  - Flow Control
  - Reliable Communication
  - Quality of Service
- Session Control
  - Facilities for creating, eliminating, joining, and leaving conference session
  - User authentication, data confidentiality, data integrity

Related Work (1)

- MBone
  - UNIX based
  - Virtual network
    - Data communication
    - Session control
- NetMeeting
  - Windows 95/NT based
  - Multiple point-to-point communication
  - Internet Locator Servers (ILS)
    - Centralized

Related Work (2)

- CORBA Security Service
- MBone Security
  - Encryption of data streams
  - Enhance the security of protocol format
  - The Secure Conferencing User Agent

Motivation

- Session control of CE is important.
  - But it has scarcely been researched.
  - Dedicated session control is needed.
- Session control of CE must be distributed.
  - Distributed user.
- CE must be secure and platform-independent

Goal of Research

- Distributed Session Service
- Secure Session Service
- Platform-independent
- General management of session information

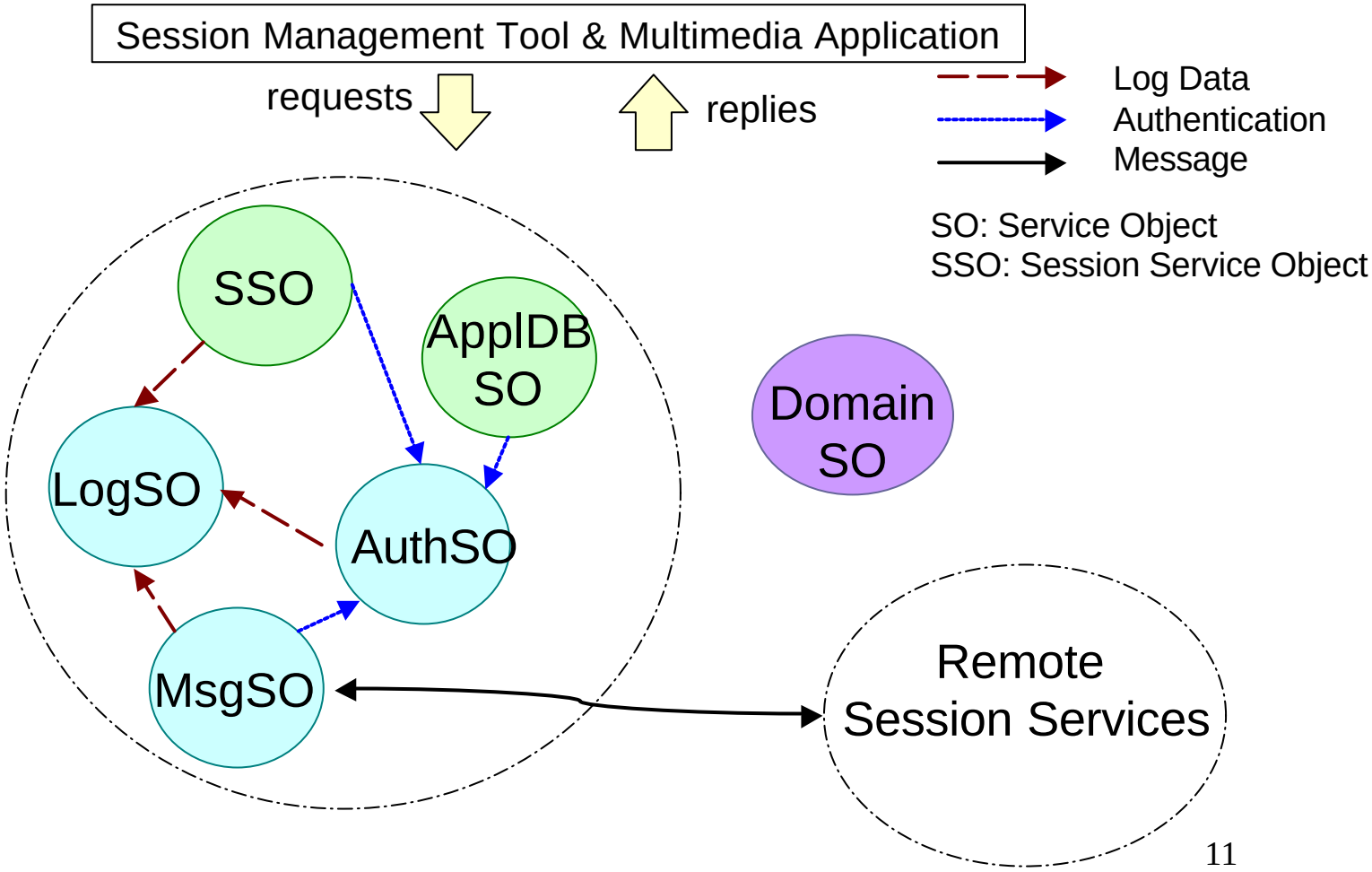
Use CORBA technology

- CORBA Security Service

Secure Session Service Specification

- Session Service
  - List of session
  - Creating, eliminating, joining, and leaving conference session
  - Invitation others
  - Register of multimedia application
- Security of Session Service
  - User authentication
  - Session access control
  - Data confidentiality/ integrity

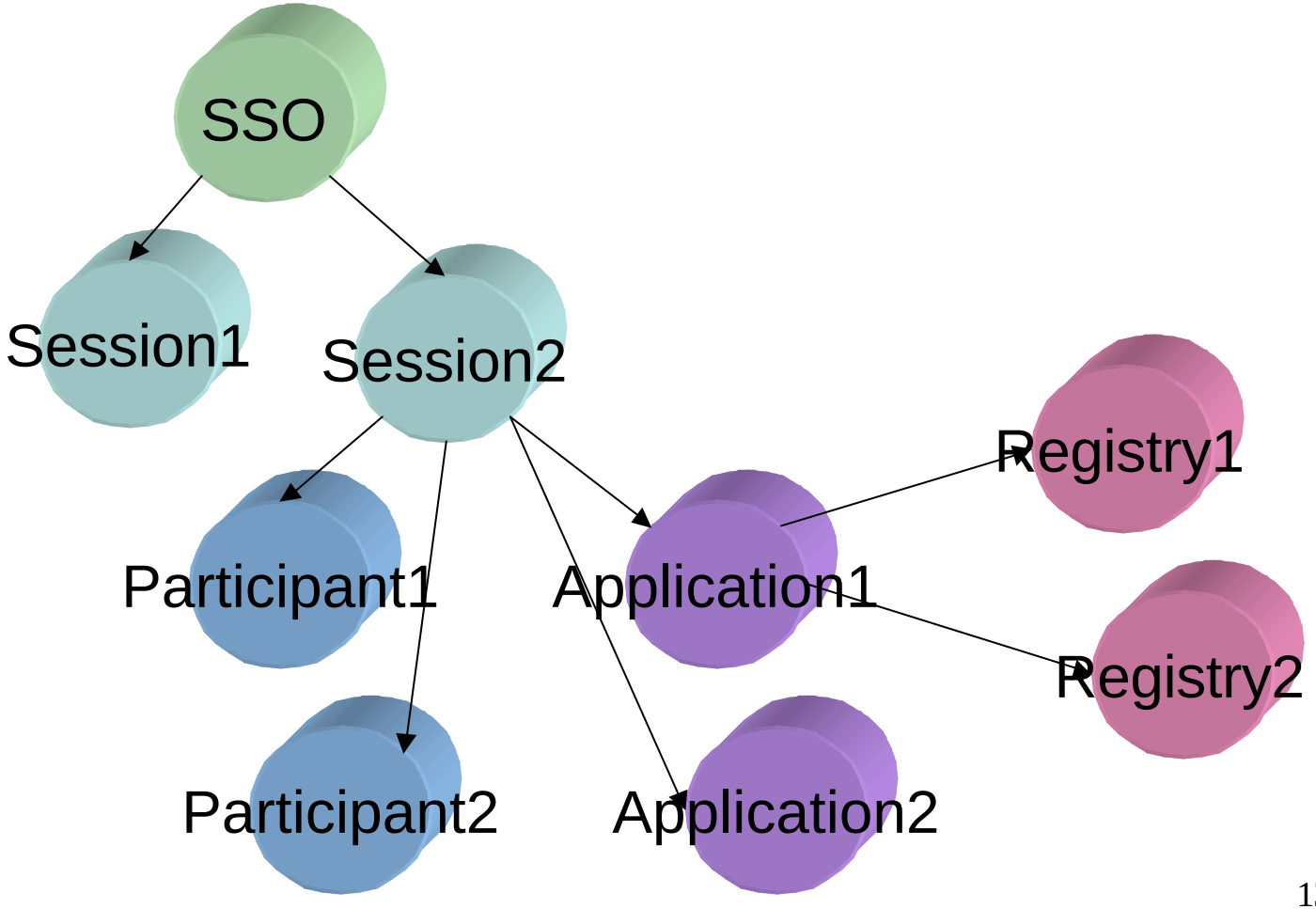
Secure Session Service Architecture



Session Service (1)

- Session Service Object
  - Manages generically session information
  - Session information
    - Opened sessions
    - Users currently participating in a session
    - Applications used in a session
  - Registry information
    - Information used by application.

Session Service Object



Session Service (2)

- Application Database Service Object
  - Register application.
- Domain Service Object
  - Location of distributed Session Server.
  - Centralized Server

Secure Session Service

- Domain level security
  - Domain administrator
  - Authentication, log
- Session level security
  - Session chairman
  - Session access control
- User level security
  - Message deliver

Domain Level Security

- Authentication
  - Authentication Service Object
  - Administration select the authentication policy
    - administration / user
  - Checking valid users
- Log
  - Log Service Object
  - Logging the important event related to security.

Session Level Security

- Chairman is responsible for his session.
- Session access control
  - Public session
  - Private session
    - session password

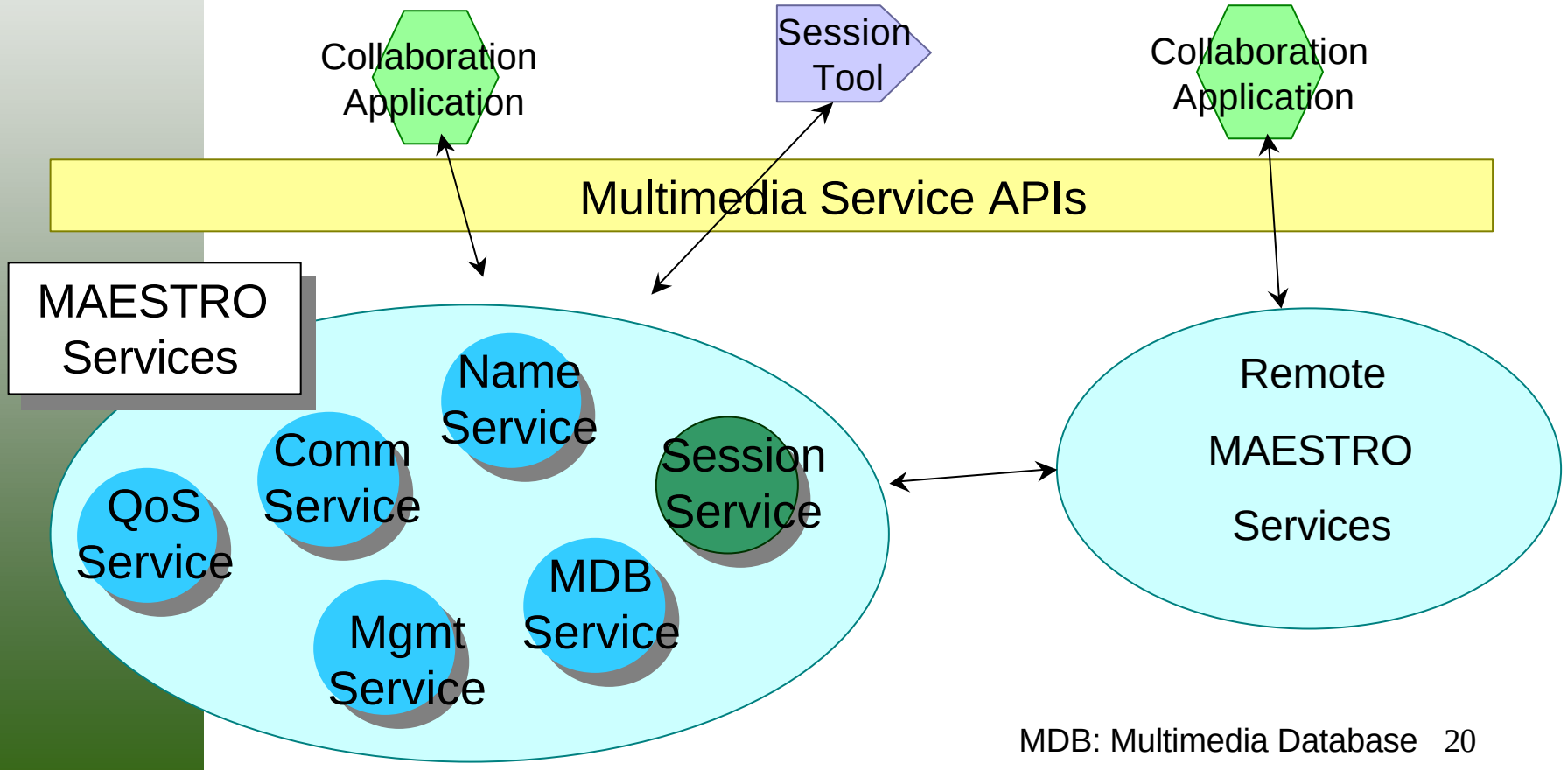
User Level Security

- Message deliver
  - Message Service Object
  - Deliver message between two users.
  - Message is eliminated after fixed time.
  - Inform sender the receiver’s response.
  - Message type
    - invitation/ session password/ reply
  - Format
    - msg type, receiver, sender, timeout, content

Implementation

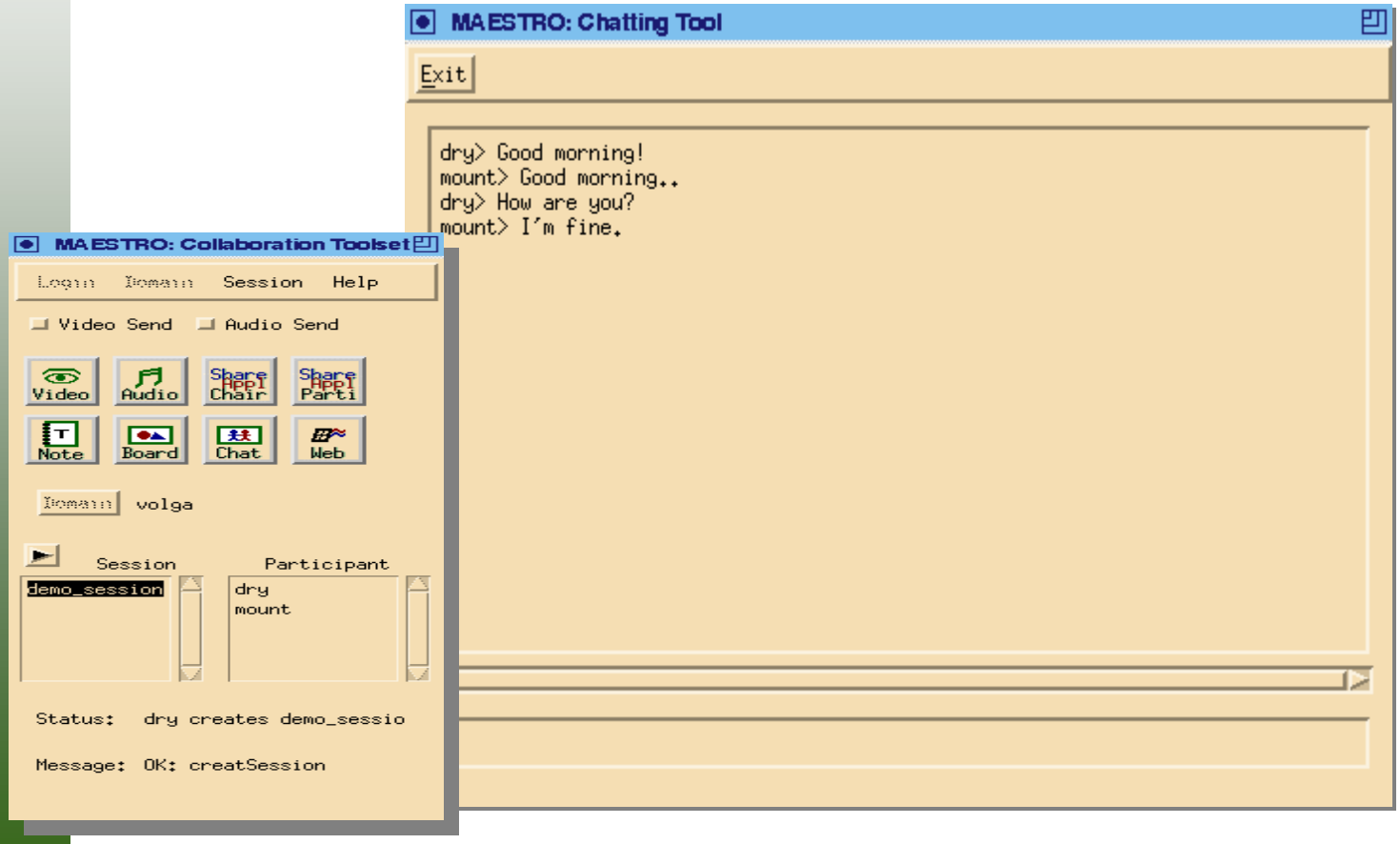
- Implementation Environment
  - Solaris 2.4, 2.5
  - Orbix 2.3c & Sparc C++ 4.1
  - X-Windows, Motif Library
- Session Servers
- Session Management Tool
- Part of MAESTRO

Session Service of MAESTRO



MDB: Multimedia Database

Session Management Tool



Conclusion & Future Work

- A CORBA-based secure session service
  - is distributed, secure, platform-independent
  - manage generically session information
- Multimedia application of CE can easily be developed.
- Future Work
  - Integrating CORBA Security Service
  - Integrating Non-CORBA distributed multimedia applications.
  - Session service can be a new Common Object Service in the OMG standard.