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Building Distributed Access Control System Using Service-Oriented Programming Model

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Overview

- Introduction
- Service-Oriented Programming Model
- Distributed Access Control System
  - Architecture
  - Performance analysis
- Conclusion
Introduction

- Service-Oriented Computing
  - Services as fundamental elements for application development

- Services
  - Self-describing and open components
  - Web Services technology stack

- Access Control
  - Exchange of services in a secure, controlled and accountable manner
Service-Oriented Programming Model (SOPM)

- Execution environment
  - Coopetition-based Distributed Architecture (CBDA)

- End-user design environment
  - Simple service composition language (SSCL)

- Translation environment
  - Distributed translation and interpretation of SSCL programs
Access Control System (ACS)

- ACS function
  - Controlling authority in virtual organizations
    - Registration
    - Authentication
    - Authorization
    - Secure communication
    - Usage tracking
- Research goals
  - Distributed ACS using SOPM
  - Performance analysis
Distributed ACS architecture
Distributed ACS architecture

Distributed Access Control System

Distributed Document Storage

Security Gateway

Security Services

System Controller

Access service

MailBox

MailBox

SS Distributed Program

RegAuth service

RegAuth service

DDS Distributed Program

Document Store service

Document Store service

Access service
Performance analysis

- Architectures
  - Monolithic
  - Distributed
    - Pull
    - Push

- Parameters
  - Parallelism
  - Concurrency
  - Workload
Performance analysis

- Architectures
  - Monolithic
  - Distributed
    - Pull
    - Push

- Parameters
  - Parallelism
  - Concurrency
  - Workload
Pull Architecture - parallelism

No. of instances of SS Distributed programs: 3
Push Architecture - parallelism

No. of instances of SS Distributed programs: 10
Conclusion

- Service-Oriented Programming Model
- Distributed Access Control System
- Run time reduction
  - pull architecture vs. monolithic architecture
    - 30 – 80% reduction in execution time
  - pull architecture vs. push architecture
    - 30 – 50% reduction in execution time