PADRES (Publish/Subscribe Applied to Distributed Resource Scheduling) is an enterprise-grade event driven infrastructure designed for large-scale system management applications.

**Applications Enabled**

- Inter-enterprise supply chain management
- Distributed event management
- Business activity monitoring
- Business process execution
- SLA monitoring and management
- Distributed system management and control
- Data management in RFID-based systems
- Sensor network management
- Distributed surveillance and sensor fusion

**Example**

Unpredictable, asynchronous, distributed events in supply chain and logistic applications are easily handled with publish/subscribe middleware.

**Summary**

*Enterprise applications* are often based on tightly coupled, centralized architectures. This results in performance bottlenecks, single points of failures, and poor response to changing requirements. The PADRES system provides a secure, scalable, and resilient infrastructure for loosely coupled applications, and allows flexibility in reacting to changing business and technological requirements.

- Reliable and secure business process execution in Service-Oriented Architectures (SOA) and Event-Driven Architectures (EDA)
- Distributed Enterprise Service Bus (ESB) for scalable application messaging integration
- Flexible and open infrastructure for global business intelligence management and large-scale, distributed business activity monitoring
- Robust and enterprise-grade event management supporting diverse application domains
- Powerful middleware for building a real-time event-driven enterprise

**Contact Info**

Research on the PADRES project is conducted by the Middleware Systems Research Group (MSRG) at the University of Toronto.

E-mail padres@microsoft.ca
Website padres.msrsg.utoronto.ca

**Sponsors**

© Middleware Systems Research Group (MSRG) 2007
Overview

An enterprise-grade event management infrastructure

- Designed for flexibility and responsiveness to changing business and technological requirements

Distributed content-based publish/subscribe system

- Intelligent rule-based routing and scalable matching
- Powerful correlation of future and historic publications
- Automatic failure detection, recovery and dynamic load balancing
- Flexible security framework and encrypted message routing
- Distributed system administration and monitoring

Integrated system and process management

- Decentralized transformation, deployment and execution
- Distributed monitoring and control
- Goal-oriented resource discovery and scheduling

Content-based Publish/Subscribe

A PADRES overlay network consists of brokers and clients. Brokers use content-based message routing to provide scalable and reliable ESB infrastructure services. Clients are application components that interact through the overlay using the publish/subscribe paradigm.

Benefits

- Simplifies IT development and maintenance by decoupling enterprise components
- Supports sophisticated interactions among components using expressive subscription languages - going beyond the limits of topics
- Allows fine-grained queries and event management
- Achieves scalability with in-network filtering and processing

Features

Enterprise-grade features

- Complex, in-network event detection
- Failure detection and recovery
- Dynamic load-balancing
- Content-based policy and security framework
- Unified future and historic data access

PADRES features

- Powerful content-based routing
- Graphical system monitor
- Flexible client binding support (Native, RMI, JMS, Web-based AJAX)
- Standards-based proof-of-concept workflow execution engine (BPEL and Web-Services)

Project roadmap

- Establish open source license, model, and distribution
- Serve as reference implementation for Web services Brokered Notification specification
- Support for Advanced Message Queuing Protocol (AMQP) specification
- Establish emulation testbed for rapid prototyping and testing
- Support Web-based broker management interface

The publish/subscribe paradigm: (1) publishers advertise a template of their event space, (2) subscribers subscribe to events of interest, and (3) publications are routed to interested subscribers.