Self-Adapting Concurrency: The DMonA Architecture

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Target applications

Flow based internet services and underlying system software

Peak loads
- Slash-dot effect
- Not feasible to over-provision resources

Varying request types
- Static vs. dynamic web requests
- Varying security needs (types of encryption)
Target applications

Workshop on Self-healing Systems 2002
New ideas/approaches

Component architecture (DiPS)
Pluggable self-healing architecture (DMonA)

Anonymous component interaction (DiPS)
Separation of concerns
  Functional vs. concurrency units (DiPS)
  Functionality vs. management (DMonA)
Self-healing aspects of DMonA

DMonA architecture

Self-monitoring & interpreting
  - Analysis & state sensors

Prescribing appropriate measures
  - Pluggable monitor strategies

Self-healing
  - Management interface
  - Dynamic concurrency control for
    - improving performance
    - Graceful degradation
DMonA architecture

Functional Layer (DiPS)
Management Layer (DMonA)

Component

- Packet Scheduler
- Packet Scheduler
- Active Unit
- SI
- MI
- QS
- QS
- PR
- PF
- PR
- SI
- Sensor Interface
- Queue Sensor

Throughput Sensor
Active Monitor
Throughput Sensor
Monitor Strategy
**DMonA architecture**

Functional Layer (DiPS)

Management Layer (DMonA)
Conclusion

Behavior adaptability (Concurrency)
Separation of management and functionality
Reuse of functional DiPS components
DMonA is a runtime pluggable extension
Ongoing work

Functional adaptability (Hot swapping)
Combination of hot swapping extension with DMonA
Environment sensors
Available system resources
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Static & Dynamic Management

Meta monitor

Thread Pool

Resource Manager

Queue Manager

Thread Manager

Thread

Thread

Thread
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