The Autonomic Computing Vision

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Autonomic Computing
April 14, 2004

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Agenda

- Autonomic Computing Overview
- Autonomic Computing Attributes
- Levels of Autonomic Computing Maturity
- Technical considerations for driving adoption of Autonomic Computing

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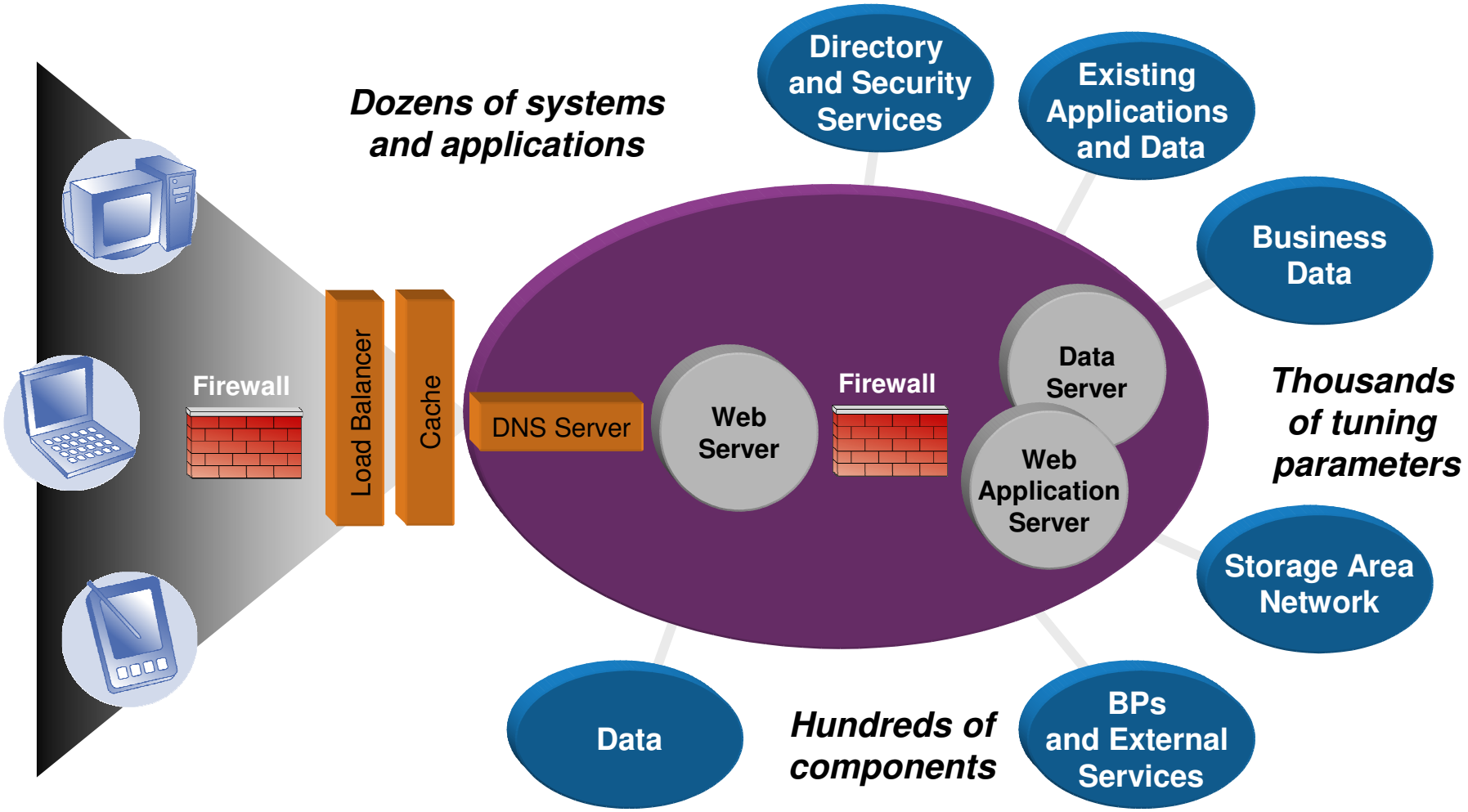
Complex heterogeneous infrastructures are a reality



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CIO's Speak Out

"Most of my costs are really pure maintenance and operations – keeping the processes running that keep the ship afloat. Our development budget suffers."

"Y2K and 9/11 have forced us to look at what we have – and we have too much complexity."

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Autonomic vision – self-managing systems

“Intelligent” open systems that…

- Manage complexity
- Know themselves
- Continuously tune themselves
- Adapt to unpredictable conditions
- Prevent and recover from failures
- Provide a safe environment

Providing customers with…

- Increased return on IT investment
- Improved resiliency and quality of service
- Accelerated time to value

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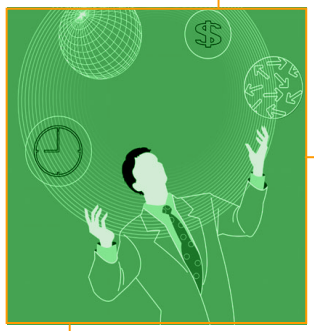
Autonomic Computing helps solve customer challenges

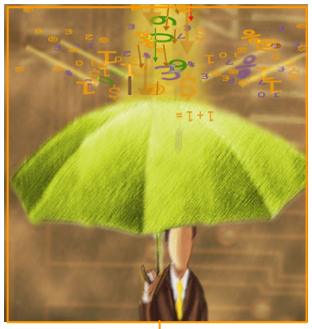
Management of complex, heterogeneous environments too hard



Operational speed too slow, IT flexibility too limited

Privacy, security and business continuity

The inability to manage the infrastructure seamlessly



Swamped by the proliferation of technology and platforms to support

IT asset utilization is way too low

Operational cost too high, efficiency too low

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Autonomic computing attributes

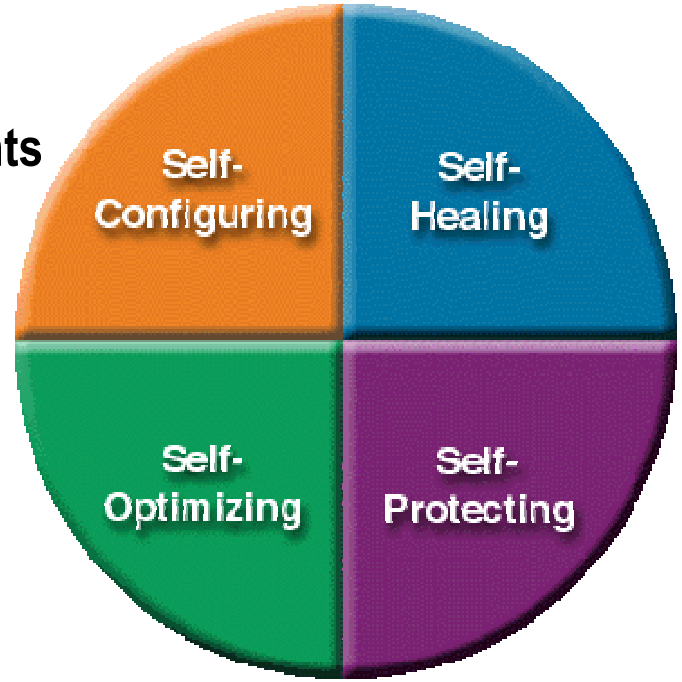
Self-managing systems that deliver:

Increased Responsiveness

Adapt to dynamically changing environments

Operational Efficiency

Tune resources and balance workloads to maximize use of IT resources



Business Resiliency

Discover, diagnose, and act to prevent disruptions

Secure Information and Resources

Anticipate, detect, identify, and protect against attacks

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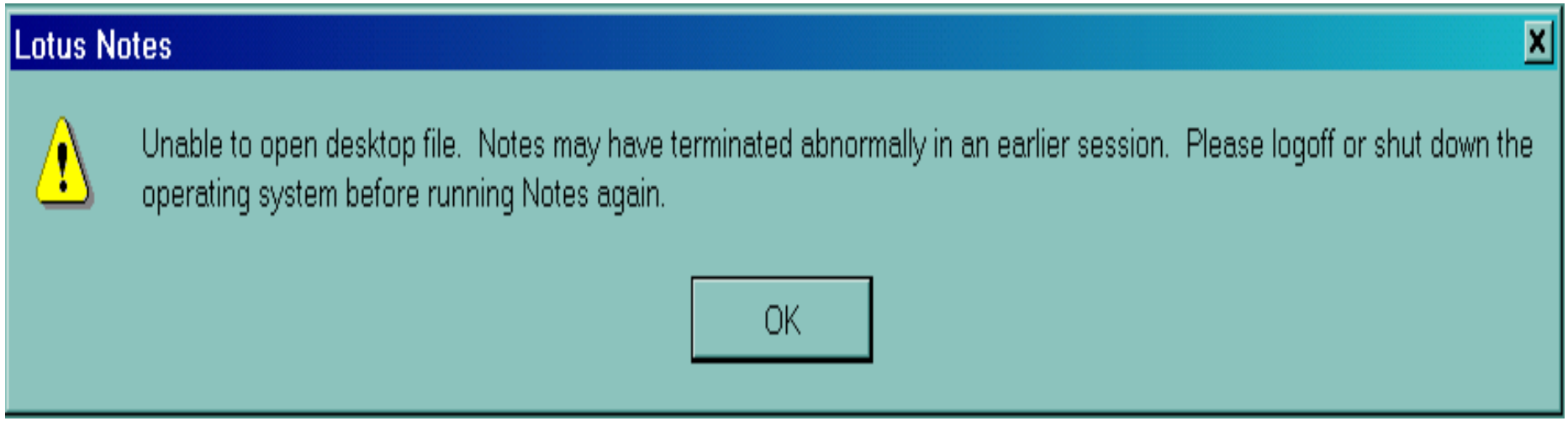
An example of something that is NOT self-healing...



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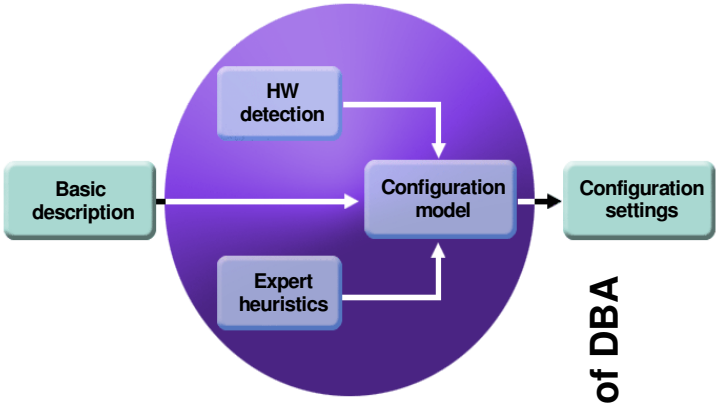
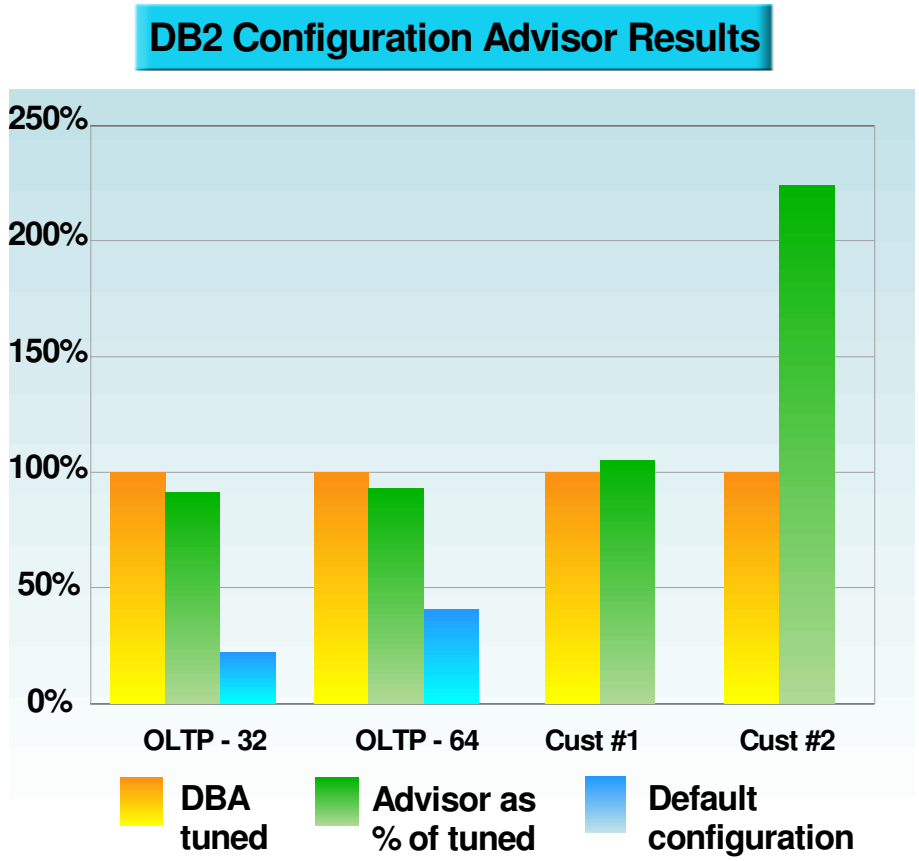
Self-configuring Example: DB2 Configuration Advisor





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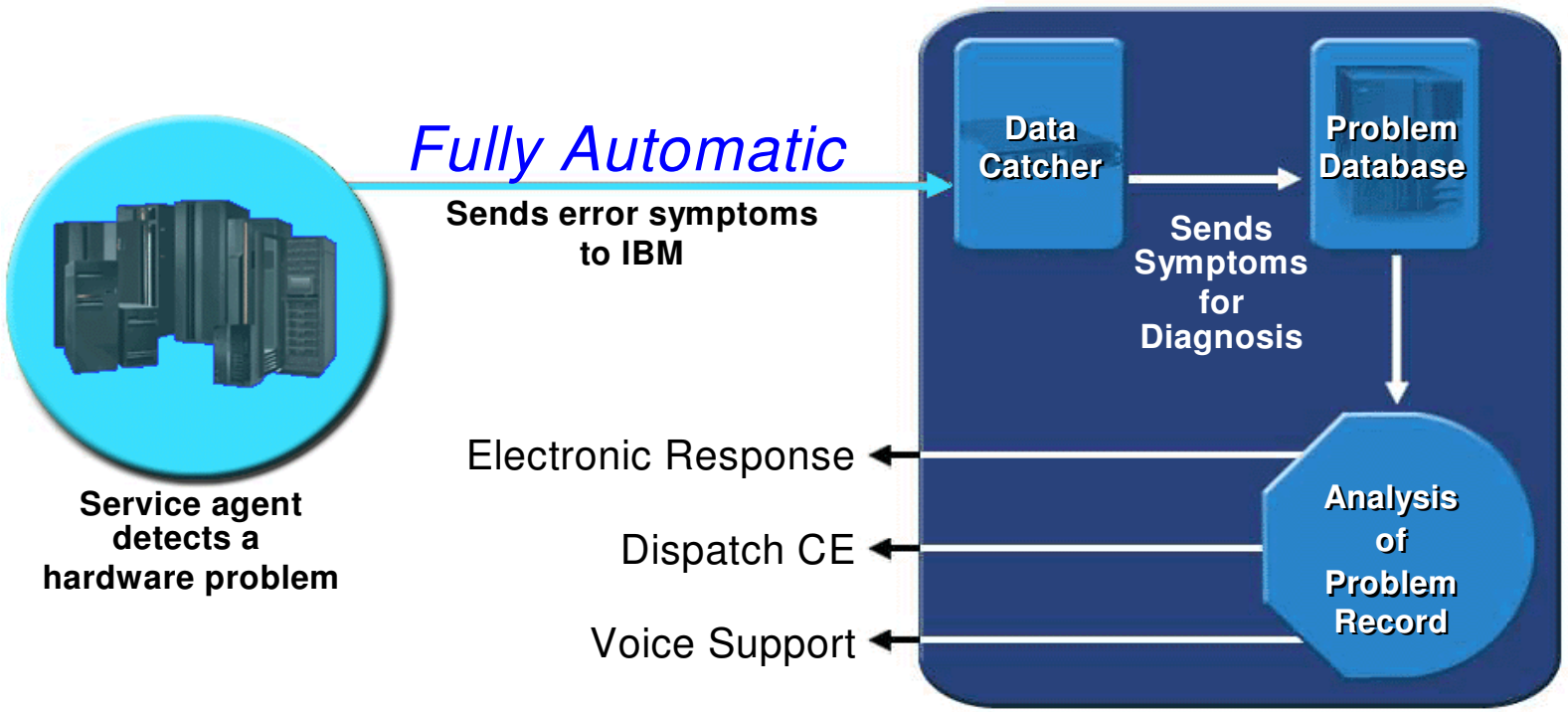
Self-healing Example: IBM Electronic Service Agent



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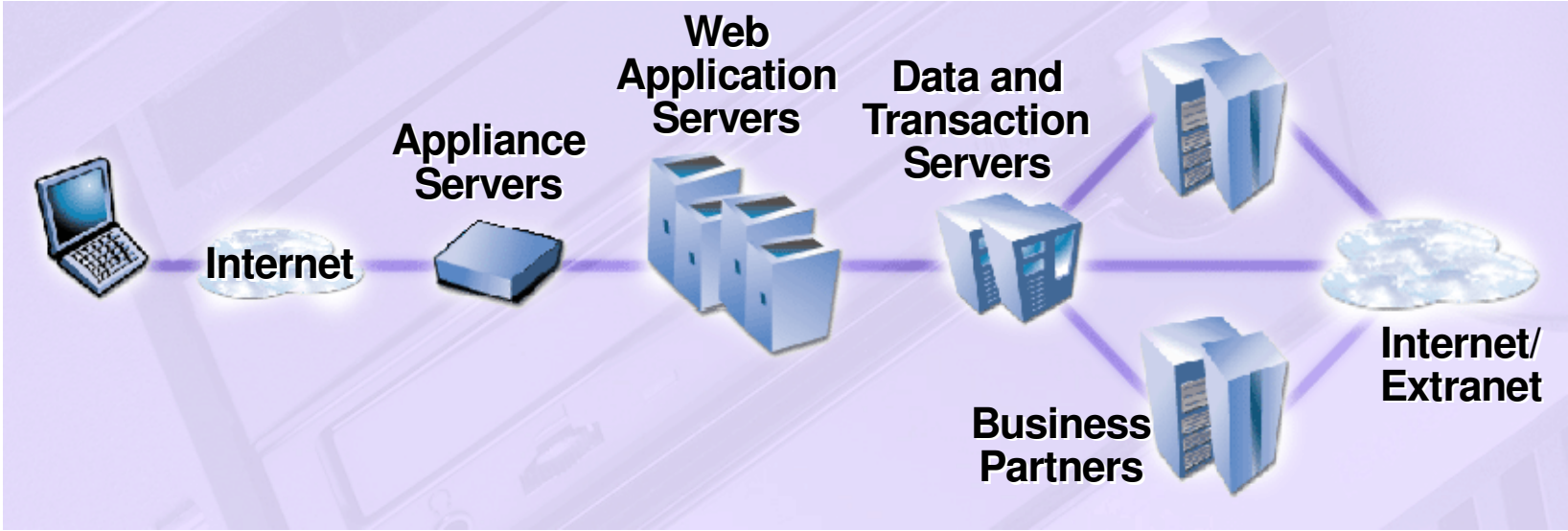
Self-optimizing Example: Enterprise Workload Management



- ARM standard for measuring response time of a transaction
- Workload balancing & routing
- Cross platform reporting
- Policy-based for various classes of users & applications

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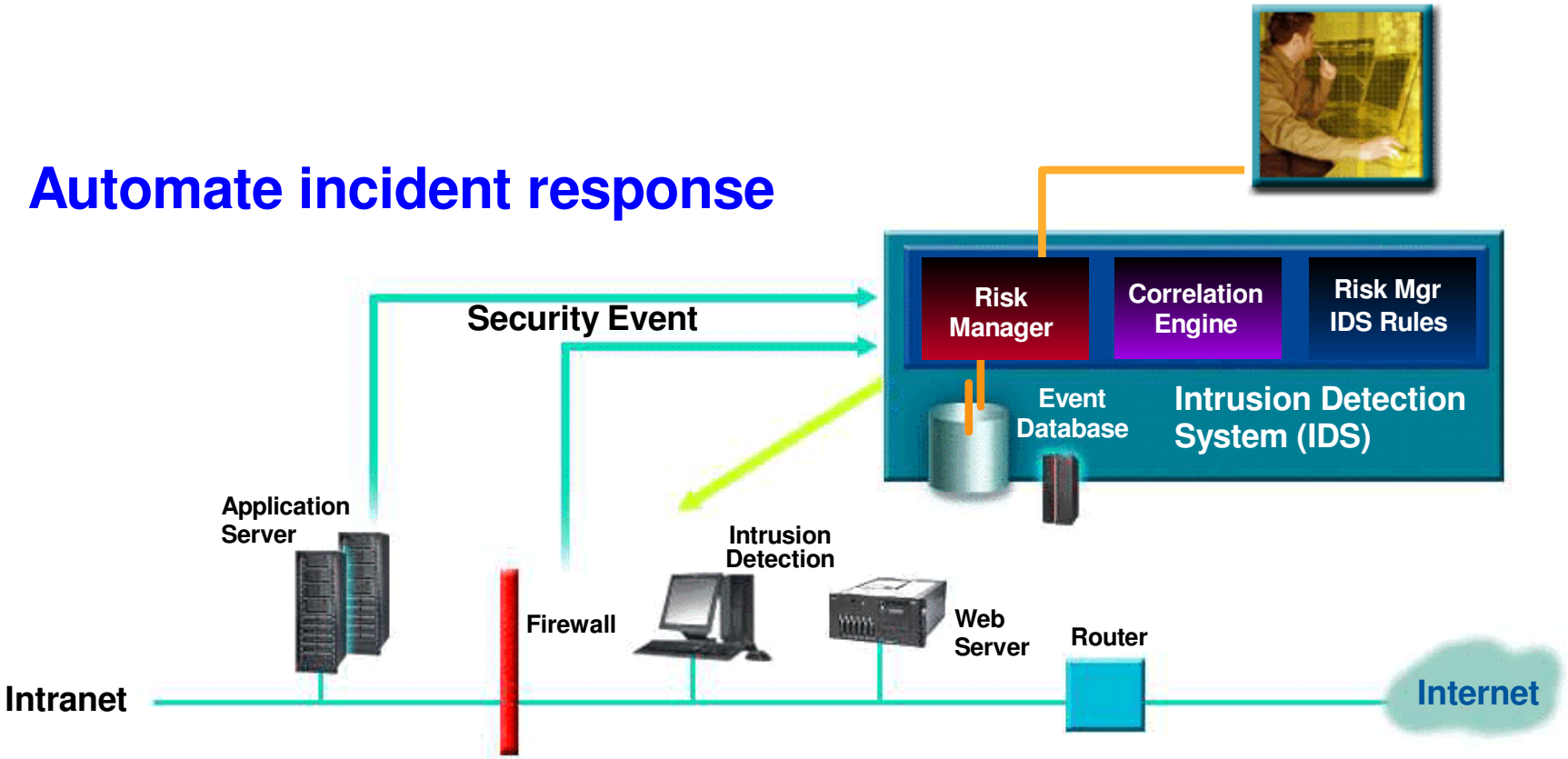
Self-protecting Example: IBM Tivoli Risk Manager

Automate incident response



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Levels of Autonomic Computing Maturity

	Basic Level 1	Managed Level 2	Predictive Level 3	Adaptive Level 4	Autonomic Level 5
Characteristics	Multiple sources of system generated data	Consolidation of data and actions through management tools	System monitors, correlates and recommends actions	System monitors, correlates and takes action	Integrated components dynamically managed by business rules/policies
Skills	Requires *extensive, highly skilled* IT staff	IT staff *analyzes and takes actions*	IT staff *approves and initiates actions*	IT staff *manages performance* against Service Level Agreements	IT staff *focuses* on enabling business needs
Benefits	Basic Requirements Met	Greater system awareness Improved productivity	Reduced dependency on deep skills Faster/better decision making	Balanced human/system interaction IT agility and resiliency	Business policy drives IT management Business agility and resiliency

Manual ➢ ***Evolution, not Revolution*** **Autonomic**

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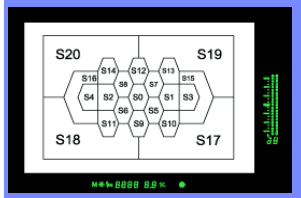
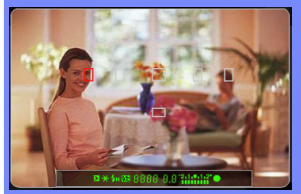
An analogy - Camera “Autonomics”

	Manual	Auto Exposure	Auto Focus	Selective Auto
Exposure	Shutter / Iris	Weighted	Weighted, Average, Spot	Database Look-up
Focus	Lens Ring		Center Spot	Eye Control
Film Advance	Lever	Add-on Motor Drive	Integrated Motor Drive	Single Shot, Multi-Shot, Movie
	70’s	80’s	90’s	00’s





- *Function has grown dramatically*
- *Automation has responded*
- *User control has increased*

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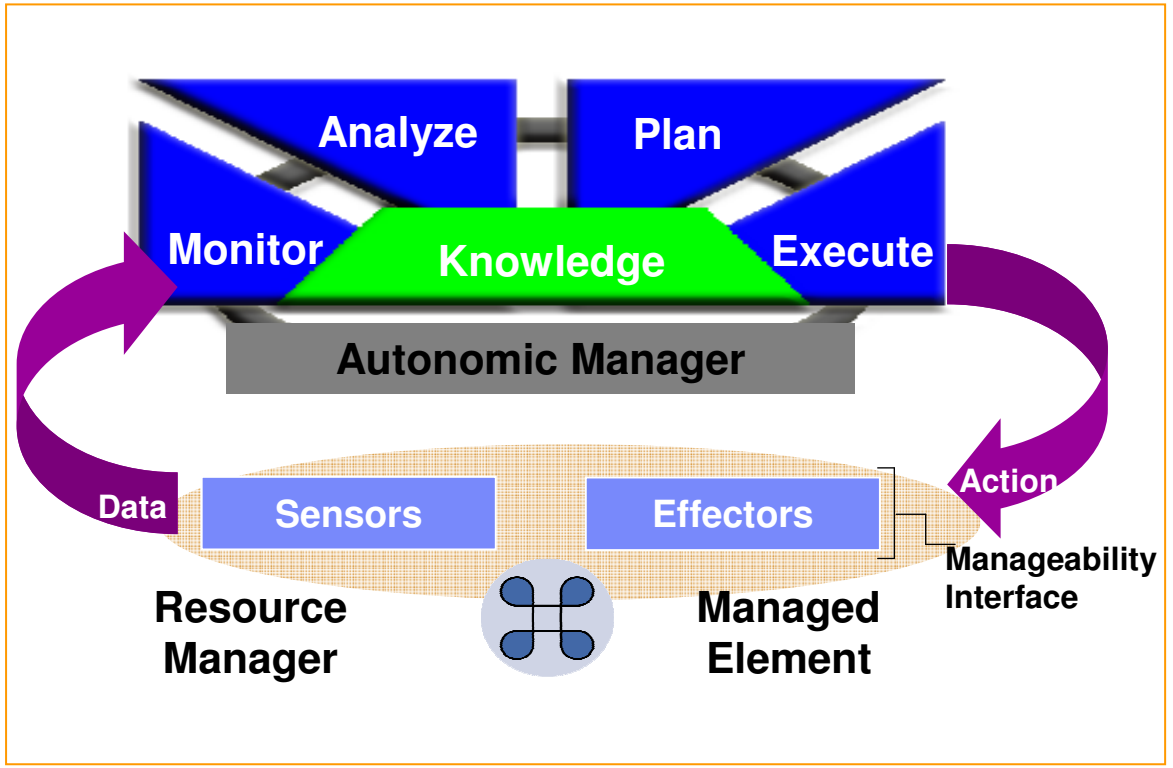
Starts with Architecture

- **Architecture**
- Open standards
- Technology



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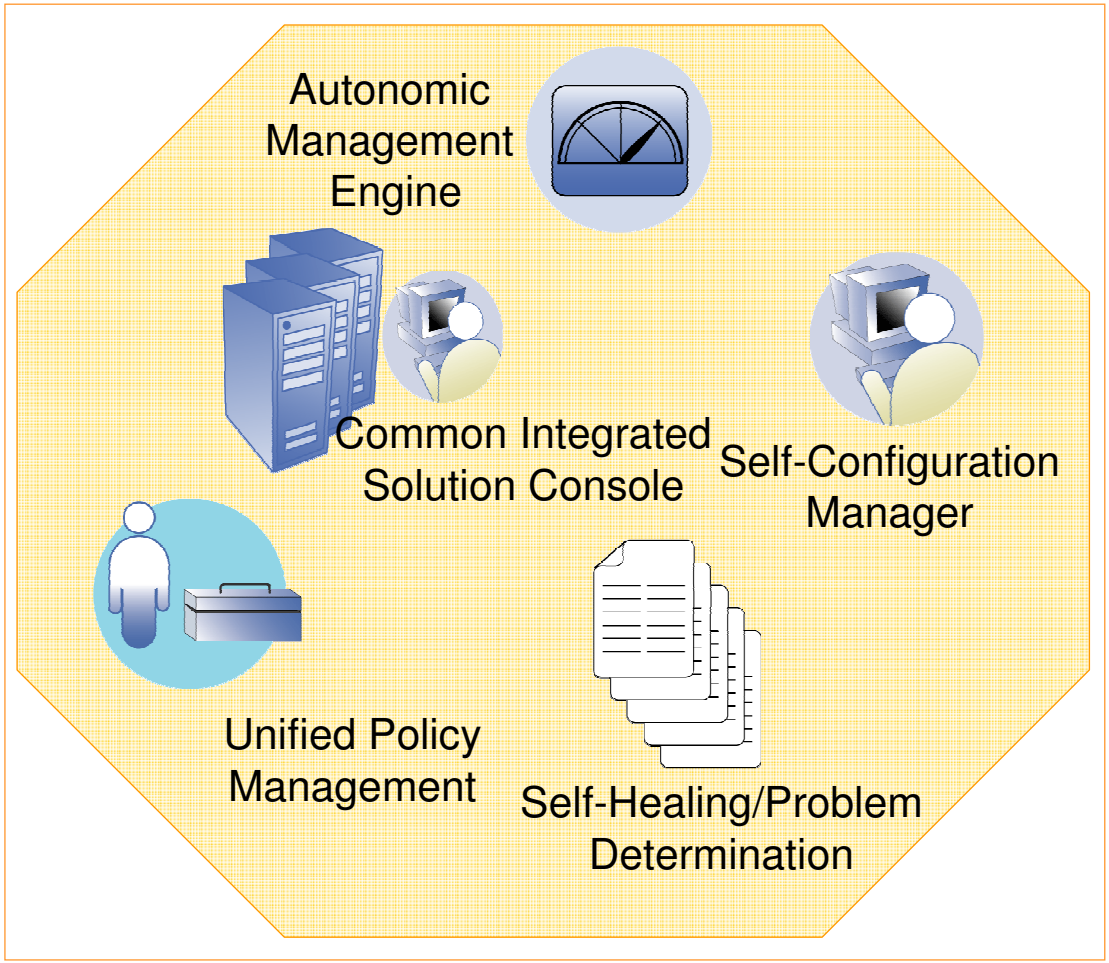
Delivering Core Technologies

- Architecture
- **Technology**
- Open standards



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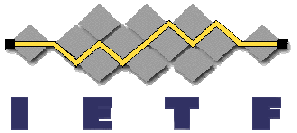
Based on open standards and industry best practices

- Architecture
- Technology
- **Open standards**



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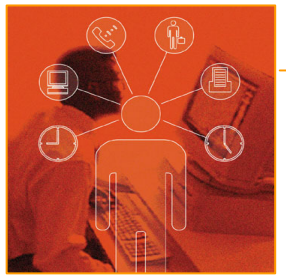
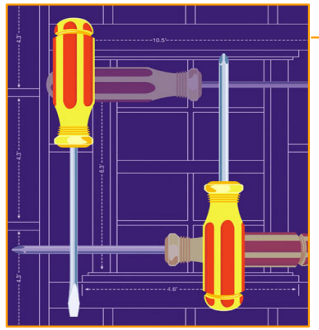
Autonomic Computing Toolkit

Technologies:
- Autonomic Management Engine
- Generic Log Adapter
- Integrated Solutions Console
- Solution Installation and Deployment



Scenarios:
Illustrations of how the technologies work together and how they can be used in realistic solutions



Tools:
- Resource Model Builder
- Adapter Rule Builder
- Log and Trace Analyzer
- ISC Toolkit
- Solution Installation and Deployment Tools

Documentation:
Detailed individual technology and tooling documentation, as well as documentation
to help you begin developing autonomic solutions, customized to your products

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Summary

- Autonomic Computing is an analogy to the human autonomic system
- Autonomic Computing will be an evolutionary process towards more self-managing IT systems and resources
- The Autonomic Computing architecture draws from “closed loop” control systems
- Autonomic Computing can be accelerated by having a common set of core technologies
- Open standards adoption will be critical to the success of Autonomic Computing

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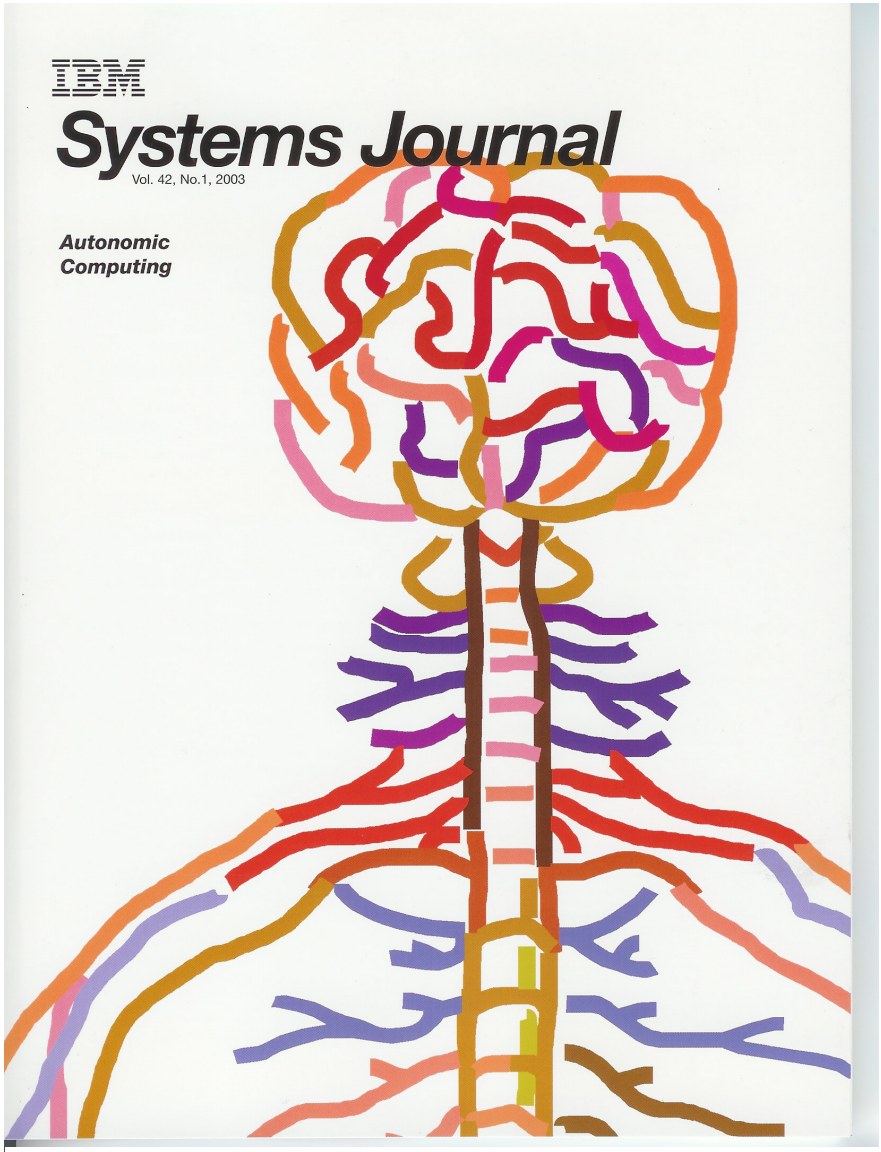

Homework

Papers in this issue describe a variety of research projects in which the concepts of autonomic computing are being developed.

http://www.research.ibm.com/journal/sj42-1.html

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