AUTONOMIC COMPUTING (Models and Applications)

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Outline

Introduction

- *An Autonomic Computing* is *IBM's term* for an approach including a set of products, tools and services to add self-managing capabilities to IT systems.
- It helps to develop computer systems capable of self-management.
- Inspired by the **Human Autonomic Nervous System.**

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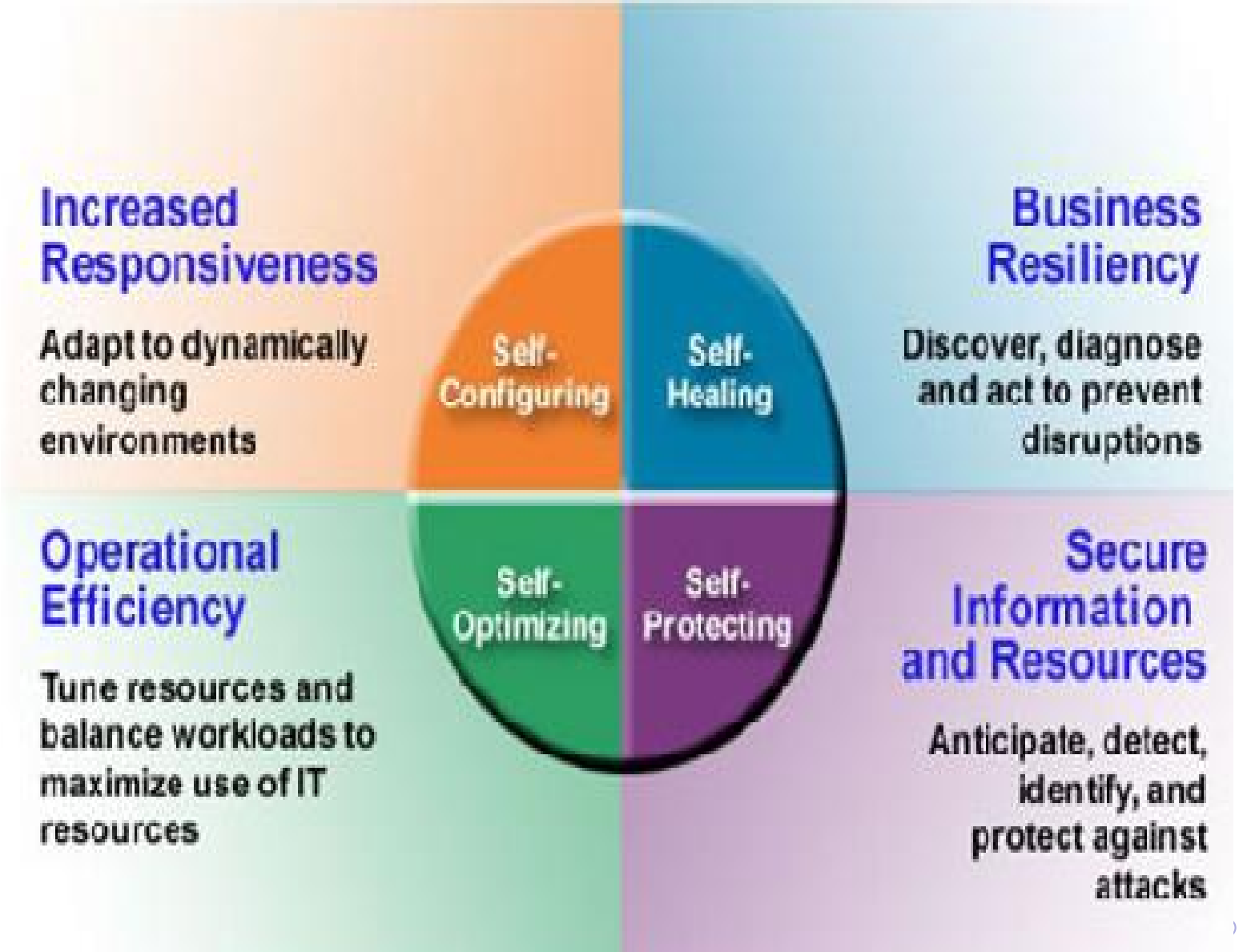
- Realizes computer,software systems and applications to manage themselves with high-level guidance from humans.
- Focuses on *managing complexity* of system.
- Shifts the burden of managing the system from people to technology

History

- In 2001, *IBM* had initiated and investigated the autonomic computing.
- IBM compared complex computing with autonomic computing and distilled it with 4 autonomic features.
- *In 2004*, IBM started *DARPA*(Self-Regenerative) system programme.

Features


Increased Responsiveness
Adapt to dynamically changing environments
Business Resiliency
Discover, diagnose and act to prevent disruptions
Self-Configuring
Self-Healing
Self-Optimizing
Self-Protecting
Operational Efficiency
Tune resources and balance workloads to maximize use of IT resources
Secure Information and Resources
Anticipate, detect, identify, and protect against attacks

Continue

Features of the autonomic computing are:-

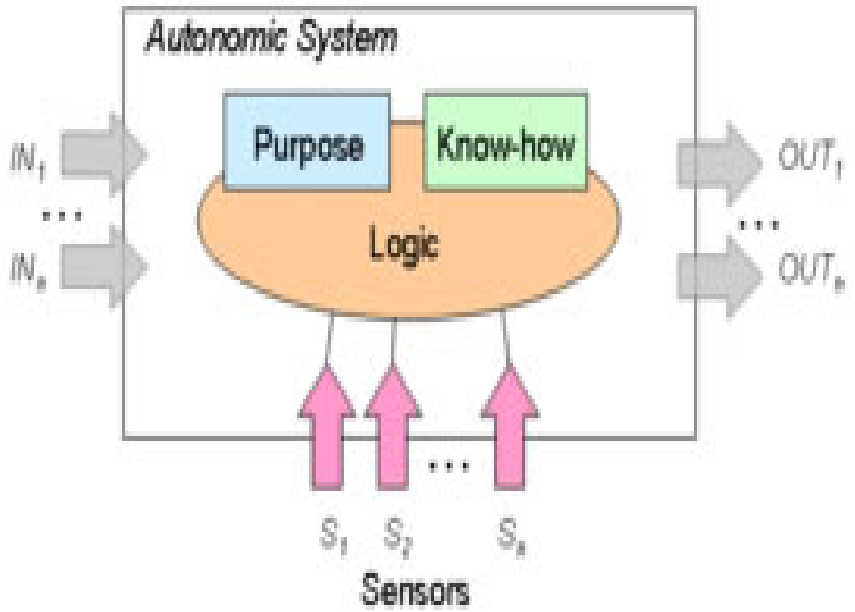
- **Self-Configuring:**
  Automatic configuration of components.
- **Self-Optimizing**
  Automatic control and management to ensure optimal functioning.
- **Self-Protecting:**
  Proactive identification and protection from arbitrary attacks.
- **self-Healing:**
  Automatic detection and correction of errors.

Models

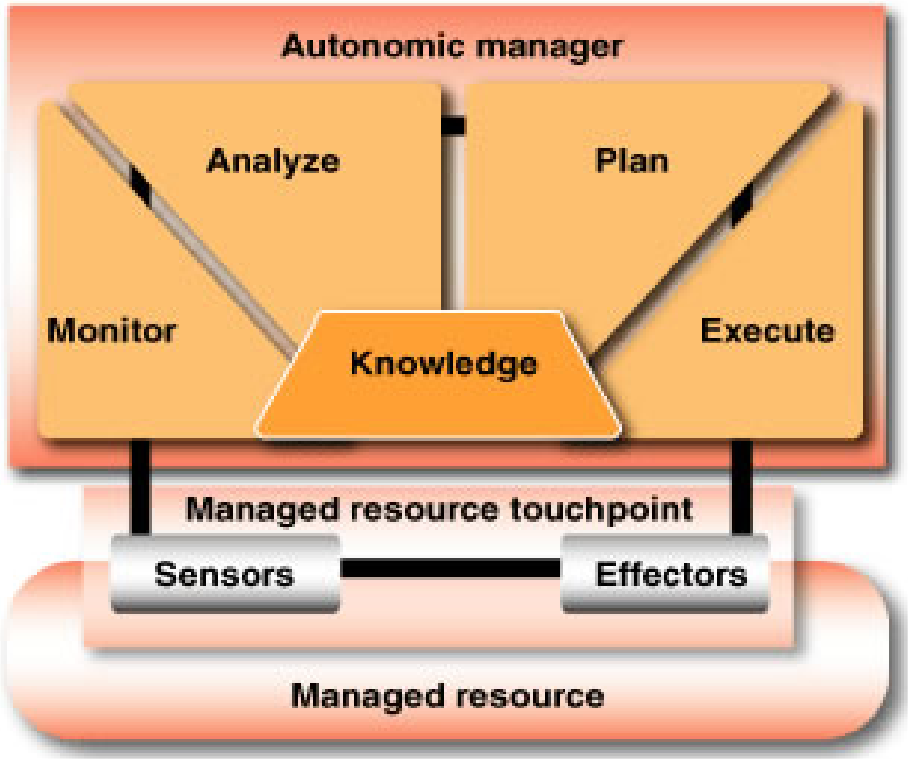
There are several models of the autonomic computing as:

1. **Conceptual Model**
2. **The MAPE-K Model**
3. **Architectural Model**

Conceptual Model



MAPE-K Model


Autonomic manager
Analyze
Plan
Monitor
Knowledge
Execute
Managed resource touchpoint
Sensors
Effectors
Managed resource

Advantages

Some benefits provided by autonomic computing are:-

- **Automatic:**
  The ability to self-control its internal functions and operations.
- **Adaptive:**
  To change their job efficiently.
- **Know:**
  The system makes decisions independently.

Challenges

Some of the challenges still have to face related to:

- **Conceptual challenges**
- **Architecture challenges**
- **Middleware challenges**
- **Application challenges**

Applications

- **In Power management of the system**
- **In multiple modules of ERP**
- **CRM (Customer Relationship Management)**
- **In Data centers, Clouds**

Conclusion

- A solution of todays increasing complexity in computing science, Self-Management and dynamic adaptive behaviors.
- Still challenges in diverse fields of science and technology like science System managements, software engineering, etc.
- Well suited for implementation of complex and sophisticated systems.