Autonomic Computing:
An introduction to MAPE-K reference model

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Organization

- Autonomic Computing (AC) – Background
- AC systems – basic properties?
- IBM – MAPE-K reference model
Background: Autonomic Computing

- Autonomic Computing: Initiative was proposed by IBM in 2001
- Later, discussed by
  - Kephart and Chess, The Vision of Autonomic Computing
- NASA
  - ANTS (2005) : Development of large number of autonomous space-crafts
- Industrial Research
  - HP Labs : Adaptive Enterprise
  - Microsoft Research : Dynamic Systems
AC Systems - basic properties

Increase Responsiveness
Adapt to dynamically changing environments

Business Resiliency
Discover, diagnose, and act to prevent disruptions

Operational Efficiency
Tune resources and balance workloads to maximize use of IT resources

Secure Information and Resources
Anticipate, detect, identify, and protect against attacks
IBM : AC Reference Model

- **MAPE-K**
  - Monitor, Analyze, Plan, Execute, and Knowledge

- **Managed Element (ME)**
  - Any software or hardware element

- **Sensors**
  - Collect the data about ME

- **Effectors**
  - Carry out changes to ME

- **Autonomic Manager (AM)**
  - Monitor ME and Execute changes

- **Analysis and Planning**
  - Analyzing the monitored data and producing changes
  - If changes are required, the request is passed to the plan function

- **Knowledge**
  - Refers to the information that AM may maintain about ME
Thank You!