A Framework for Autonomic Networking

draft-behringer-autonomic-network-framework-01.txt

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Self-Managing

Self-Configuring
Self-Protecting
Self-Optimizing
Self-Healing

AUTONOMIC NETWORK

History: IBM’s “Autonomic Computing” (2001)
http://www.research.ibm.com/autonomic/
Traditional

- Configuration
- Monitoring
- Reporting

Autonomic

- Policy and Service Orchestration
- Aggregated Reporting

- Routing
- Discovery
- Autonomic interactions

**Autonomic Networking means:**

- Minimize operator interventions
- Minimize NMS dependencies
Definitions (1)

• Autonomic: Self-managing (self-configuring, self-protecting, self-healing and self-optimizing); however, allowing high-level guidance by a central entity, through intent.

• Intent: An abstract, high level policy used to operate the network autonomically. Its scope is an autonomic domain, such as an enterprise network. It does not contain configuration or information for a specific node. It may contain information pertaining to nodes with a specific role.

• Autonomic Domain: A collection of autonomic nodes that instantiate the same intent.
Definitions (2)

- **Autonomic Function**: A function which requires no configuration, and can derive all required information either through self-knowledge, discovery or through intent.

- **(Fully) Autonomic Node**: A node which employs (exclusively) autonomic functions. It may operate on any layer of the networking stack. Examples are routers, switches, personal computers, call managers, etc.

- **(Fully) Autonomic Network**: A network containing (exclusively fully) autonomic nodes.
Autonomic Networking – Fundamental Concepts

• Domain Identity – The network is secure by default
• Discovery
• Intent
• Abstraction
• Autonomic Reporting
• Decentralisation and Distribution
• Modularity
• Independence of Function and Layer
• Full Life Cycle Support: Beyond Deployment
Reference Model of an Autonomic Node

- Intent
- Feedback loops

Autonomic Node

- Autonomic User Agent
- Autonomic Service Agents
- Network-Knowledge (Discovery)
- Autonomic Control Plane

Self-Knowledge

Standard Operating System Functions
Need for Standardisation

Intent

Feedback loops

Autonomic Node

Self-Knowledge

Autonomic User Agent

Autonomic Service Agents

Network-Knowledge (Discovery)

Autonomic Control Plane

Discovery Messaging ...

Standard Operating System Functions