Project Name : HiMang

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미래인터넷 포럼 서비스 WG 월례회의
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Project Description

1. Project Name: Novel Study of Highly Manageable Network and Service Architecture for New Generation (HiMang)
2. Management aspect of the project
   - Start/end of the project: 2010. 3. 1
   - Member organization : ETRI
   - PI and contact persons : Taesang Choi
3. Technical aspect of the project :
   - Research Area related to Architecture Component Blocks *: FI Management*
   - Problem spaces or motivation (description)
     - Increasing Managed Entities – Services and Devices
     - Increasing Management Tasks
     - Dynamic / On-demand Management
     - Managing New Types of Services and Resources: Virtual Router, etc.
     - Interconnection, Interoperability and Extensibility
   - Key idea or proposed solutions (description)
     - Autonomic, Context-aware, and Knowledge Plane Focus
     - Orchestration of the closed management loops across federated domains
4. More Info. : *(Web site address)*

Terminologies

- **Autonomic/Cognitive systems:** systems, which determine their behaviour, in a reactive or proactive manner, based on the external stimuli (environment aspects), as well as their goals, principles, capabilities, experience and knowledge.
- **Learning:** ability that enables the system to gradually obtain knowledge on how to handle complex situations. This can increase the speed of the decision making process, and also the degree of certainty on the quality of the decisions.
- **Self-management:** the process by which computer systems shall manage their own operation without human intervention. Self-management includes functionality required for self-configuration, self-optimisation, self-healing and self-protection.
- **Inference/Knowledge Plane:** the plane that understands the differences in command syntax as well as the underlying semantics of these networks

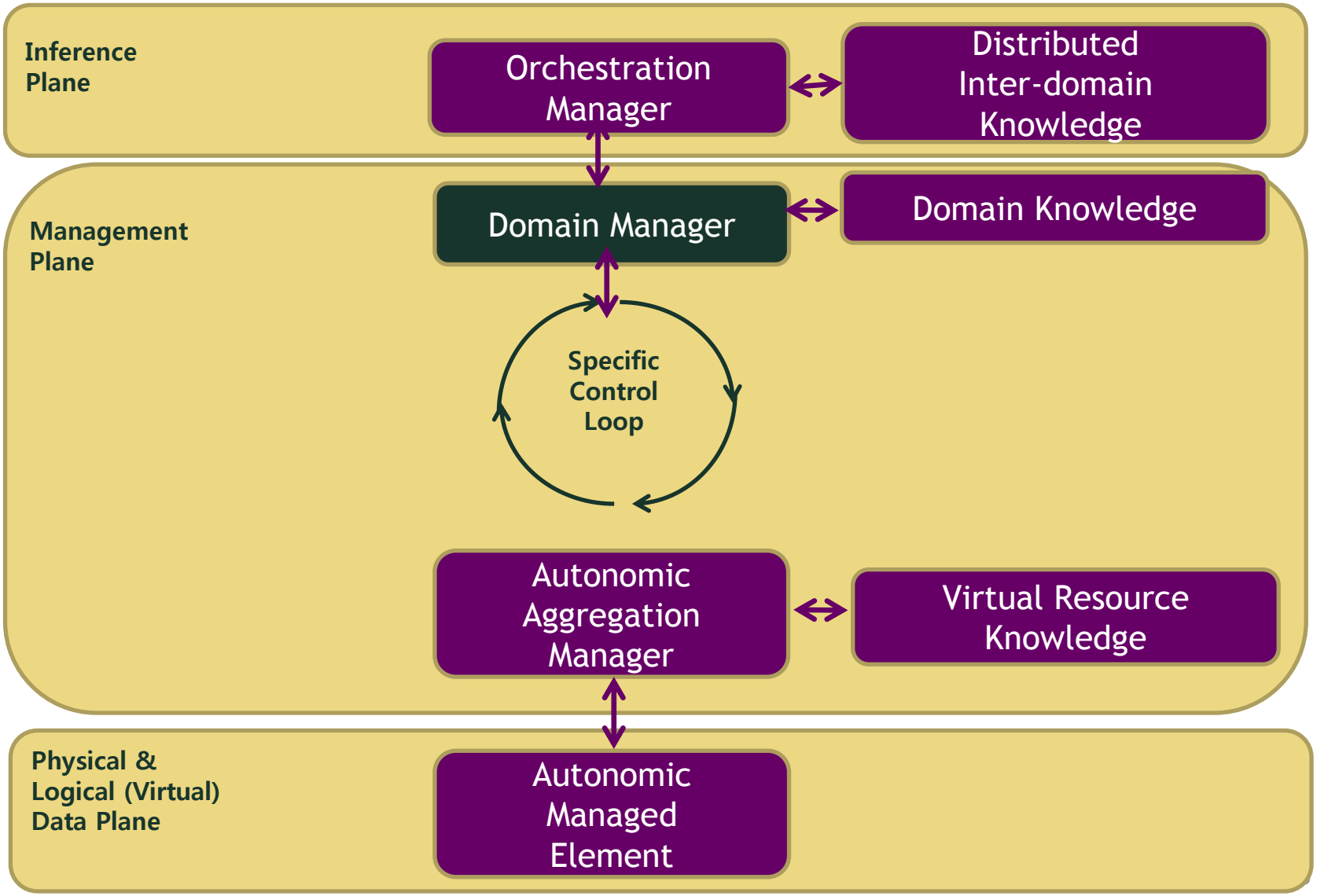
Design Goals and Requirements

- Increasing Managed Entities – Services and Devices
  - M2M, Internet of Things
- Increasing Management Tasks
  - Green Networking, Energy Efficiency, Smart Computing & Networking
- Dynamic / On-demand Management
  - Dynamic Process Management
  - On-demand service and resource configuration/provisioning related to on-demand subscribing or situation evolution
- Managing New Types of Services and Resources
  - Virtual Resources (e.g., Cloud computing, Virtual networks, Virtual Storages, etc.)
  - Dynamically provisioned or shared virtual infrastructure based on different types of virtual machines (e.g., virtual routers, virtual service components, etc.)
- Interconnection, Interoperability and Extensibility
  - Between network operators, service providers, and third parties
  - Higher level of integration
- Orchestration of the closed management loops across federated domains
- Autonomic, Context-aware, and Knowledge Plane Focus

Design Goals and Requirements, cont.

- To define a holistic autonomic management architecture that encompasses both the Evolutionary Approaches and the Revolutionary/Clean-Slate approaches
- To accommodate revolutionary clean-slate thinking to overcome the legacy management limitations
- To be applicable incrementally (evolutionarily) and "instantiated" for autonomic management of today's protocols and architecture
- Smooth Migration from the current Internet to Future Internet can be realized by applying Autonomicity principle
- To define Standardizable Specifications of the architectural functional entities and interfaces that guarantee interoperability

Proposed Model (or Architecture)



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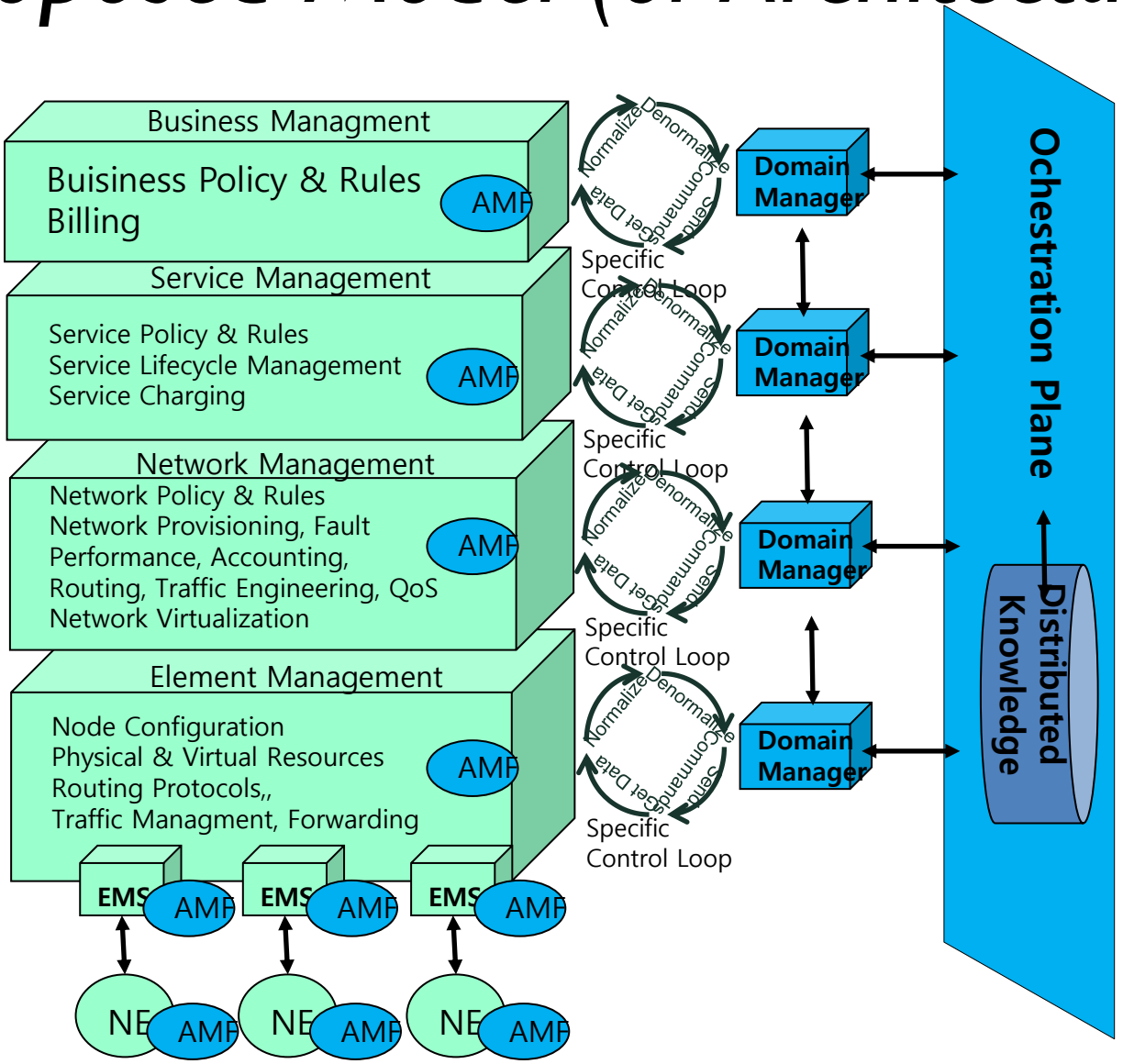

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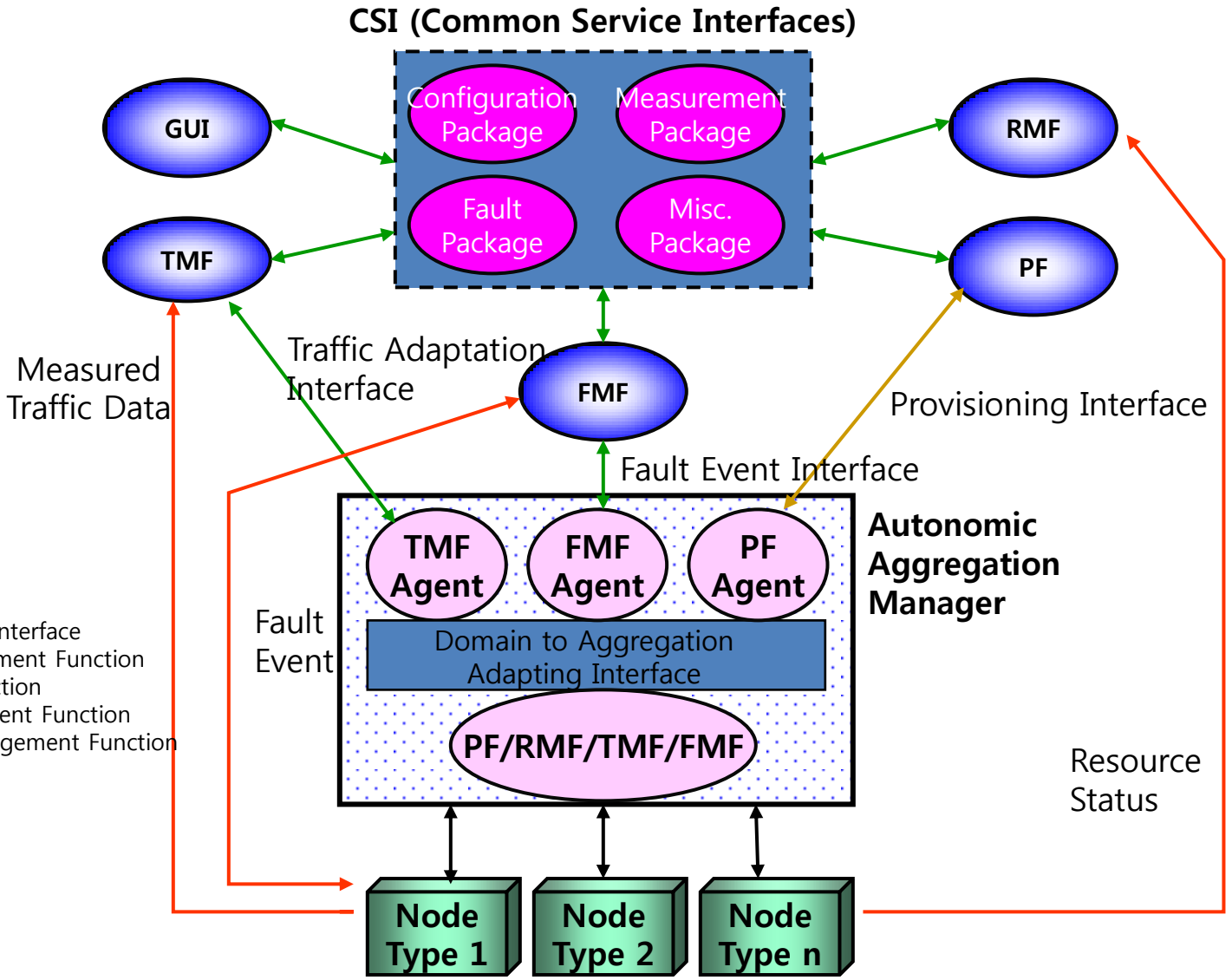
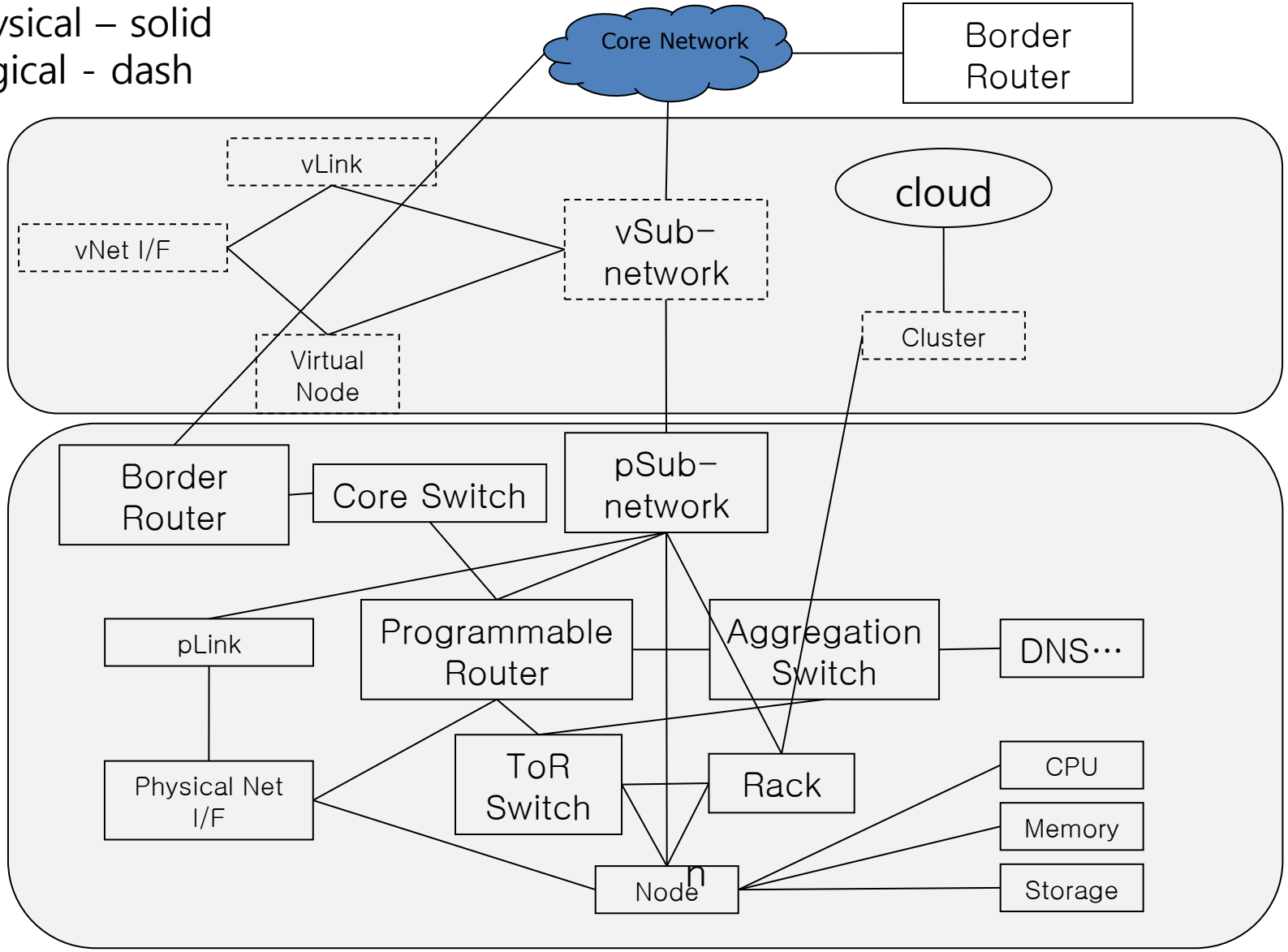


GUI – Graphical User Interface
TMF – Traffic Management Function
PF – Provisioning Function
FMF – Fault Management Function
RMF – Resource Management Function

Proposed Model (or Architecture)

Physical – solid
Logical - dash



Key Idea or Proposed Solutions

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Key Idea or Proposed Solutions, cont.

- A novel knowledge representation mechanism, based on models and ontologies, that enables a set of mappings to be defined between vendor-specific devices and a single normalized form
- A distributed architecture that separates the functions of the data, control, and management planes
- An extensible architecture that dynamically adapts the behavior of managed devices and services using *context-aware policies* to generate code using models
- A *self-aware* architecture that can (1) understand the set of currently executing operations and reason if about how they can be improved, (2) pro-actively detect divergence from goals and correct them using machine reasoning, and (3) record the efficacy of those actions
- A set of protocols for distributing, querying, retrieving, and managing semantic data
- A system that learns from experience – both from actions input by operators as well as from observation of how the system reacts to different events and actions