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Policies: the Solution to IP Service Management?

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Background / Panel Role

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- (Tele)communications management and service engineering background
- Only recently involved in policy-based research
- Trying to assess if policies can lead to flexible, gracefully evolving systems used *together* with conventional approaches
- Will try to represent the puzzled designer / implementor who hears that policy-based management is a panacea but cannot see the why's and how's
- Some views and questions to both the IETF and policy theorists

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Some History

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- Policy-based management has existed in the research community since the early 90's
  - See IM, DSOM, NOMS proceedings
- Business / service management have been key aspects of the ITU-T TMN model for the management of telecommunication networks
  - M.3010 rec: "business management sets goals and targets rather than addressing their achievement; these goals are translated to service and network management actions"
- With the move to IP-based services it is clear that other management models are needed than SNMP-based device-specific management
  - The IP community discovers business/service management in the form of "policy-based networking"

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Policy-based Management

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- Three-tier architecture
  - A policy definition layer
  - A policy execution layer where decisions are made and configuration actions are taken
    - Policies are the input from above and network information (events) the input from below
  - A sea of network elements with managed objects
- Different model to the fixed (but parametrized) layered intelligence of TMN-like hierarchical systems
- Flexible model, the intelligence is expressed by policies which are evaluated and implemented
  - Can this really cover all needed activities, scale, etc.?

Issues with the Policy Language Approach

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- A policy language is clearly necessary
- But also need for an information model, repository, protocols and architectural framework
  - A language like Ponder should be part of a bigger picture
- Are authorization and obligation the only types of generic policy categorization?
  - Possibly too much influence of a particular problem domain i.e. security and access control
- Network input (events) a nice aspect, totally missing in the IETF approach
- The language approach has been evolving for years but without clear results yet
  - Possibility to influence the IETF approach which has no language but other parts of the picture

Issues with the IETF Policy Approach

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- Tries to provide business / service management for IP-based services
  - IP-based intelligent network, not just bit-pushing
- From policy definition to enforcement, targets, conditions, actions are needed
  - no information model
  - no policy language
- Only policy input to the policy server (or policy execution layer), no network information
  - cannot support reactive fault and performance management functionality (at least)
- Can a centralized policy decision point scale in a large domain?
- What about inter-domain policy?

No Hierarchical Policy Framework

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- The key missing point is a hierarchical layered policy framework
  - High-level declarative policies should consist of more specific lower level policies and so on
  - At the lowest layer, policies become configuration requests in network elements
- Policy at various levels should apply to managed objects at various levels e.g. element, network, service managed objects
- A layered policy framework should result in flexible management systems, able to adapt to evolving requirements without re-engineering
- We are looking into this for pro-active and re-active IP QoS management
  - The IST TEQUILA project: Traffic Engineering for QUality of service in the Internet at LArge scale

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Policies for Network Operations in Addition to Policies for SLAs

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- Policies on network planning and dimensioning
  - Example: 50% of my network resources should serve best effort traffic, 40% for various priority classes and 10% for the higher priority class (e.g. expedited traffic)
- Policies on dynamic resource management
  - If priority traffic cannot be accommodated in the assigned resources, increase them gradually at the expense of best-effort traffic but never go below 20% assigned resources for the latter
- Policies on static and dynamic SLS admission control
- We are looking at a hierarchical approach for realising such policies
  - Policy evaluation / execution at various levels

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Summary

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- Policy-based management is a great idea but difficult to design / engineer in a complete fashion
  - "It's good, if you can get it…"
- Many aspects still missing
  - Hierarchical policy decomposition
  - Complete information model
  - Instrumentation
  - Conflict detection & resolution
- Could be used together with more conventional management approaches, adding flexibility, supporting graceful evolution, etc.
- The fact that IETF is taking a policy approach is encouraging
  - Can we now hope for a solution after many years of research? ☺

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