Concurrent Remote Management of CPE by multiple Service Providers

H. Balemans Alcatel-Lucent
A. De Smedt Thomson
F.T.H. den Hartog TNO
J. Önnegren Ericsson
Summary

- Remote Management – What and Why?
- The problem with Multi-Provider CPE Management
- Scope & Assumptions
- Terminology
- The three Multi-Provider Management Models
- Models Assessment – Pros & Cons
- Conclusions
The Complex Home

- Increasing number of devices, connected by a home network
- Increasingly complex to install, configure and troubleshoot
- Needs to be simpler to drive large scale adoption
Remote Management – Why?

➢ Benefits
   • For the end user:
     – Ease of use
     – Fast response to new installation, subscription
   • For the Service Provider:
     – Less need to send technicians
     – Central diagnostics, testing and problem fixing

➢ Issues
   • Privacy concerns of the end user
   • Additional infrastructure (servers, management system)
With multiple providers, conflicts may arise on shared resources

Conflicts may lead to service degradation or complete outage
Scope & Assumptions

- End user has only 1 (physical) HG for all services
  - Long term view in Home Gateway Initiative
  - Short term: end user may have multiple boxes (1 per provider?) – not considered here

- HG and other CPE managed automatically
  - Configuration
  - Diagnostics and testing

- Roles and Business entity relationships are not defined here
  - Who “owns” what - is not discussed
Terminology

- **RCE**: Remotely managed Customer Equipment
  - Any device (HG or other) that is remotely managed

- **ACS**: Auto-Configuration Server
  - Server in the network that downloads configuration data to RCE autonomously as per policies and profiles defined by OSS

- **OSS**: Operations Support System
  - The management systems that define profiles, policies, etc. which are used to instruct ACSs

- **NBI**: NorthBound Interface (to OSS)
  - Management interface for Network Elements

- **CWMP**: CPE WAN Management Protocol (TR-069)
  - For exchanging management information between RCE and ACS
Model #1: The “RCE” Model

- Each provider has own ACSs, defines configuration policies through own OSS
- Conflicts to be resolved in RCE
- RCE communicates with multiple ACSs, not compliant to TR-069
Model #2: The “ACS” Model

- Each RCE is configured by one and only one ACS, compliant with TR-069
- ACS configuration policies defined through OSSs from different providers
- Conflicts to be resolved in ACS
Model #3: The “OSS” Model

- Single point of contact for SPs per region
- RCE configuration controlled by one party
- Conflicts to be resolved in OSS, before deployment on ACS
“RCE” Model Assessment

Pros

• Maximum degree of freedom for Service Providers
• Fast deployment because of direct access

Cons:

• Reactive model (service interruptions before problems are solved)
• Low visibility of conflicts at Service Providers
• All ACSs must be queried when rebooting RCE (longer boot time)
• Increased cost of RGW
• Providers need own ACSs (expensive for large scale deployment)
• TR-069 assumes 1 ACS only
“ACS” Model Assessment

➢ Pros:
  • Large degree of freedom for Service Providers
  • Ideally no service interruption
  • ACS costs are shared among Service Providers
  • One ACS per RCE (minimum boot time)
  • TR-069 compliant

➢ Cons:
  • Trial-and-error model (try deployment of policy until ACS accepts)
  • Low visibility of conflicts at Service Providers
  • Increased cost of ACS
  • Service Provider must contact all ACSs in regions of deployment
“OSS” Model Assessment

➢ Pros:
  • Proactive model (detect problems before they arise)
  • High visibility of conflicts at Service Providers
  • Only 1 point of contact per deployment region
  • ACS costs are shared among Service Providers
  • One ACS per RCE (minimum boot time)
  • TR-069 compliant

➢ Cons:
  • Access to ACS and RCE is restricted to 1 provider – risk for monopolistic behaviour
Conclusions

😊 “RCE” model requires changes in CWMP standard
😊 “RCE” model has highest risk of service interruption
😊 Boot procedure of RCE will take long in “RCE” model
😊 In “ACS” model, ACS may not have enough RCE knowledge to resolve conflicts
😊 The “OSS” model is the least expensive in Capex and Opex
😊 “OSS” model assumes single party ownership / control of HG

… leading to:

➔ “OSS” model seems most viable
  • Home Gateway Initiative reached the same conclusion
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