Framework for Validating Heterogeneous Networks and Solutions

DAVE SNYDER & LIZETTE VELÁZQUEZ
September 2014
Framework for Validating Heterogeneous Networks and Solutions

**CONTENT**

<table>
<thead>
<tr>
<th>MOTIVATION AND CONTEXT</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Problem: Requirements and Goals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>METHODOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy and Framework</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPLEMENTATION APPROACH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Strategy</td>
</tr>
<tr>
<td>Mobile Back-haul Implementation Example</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONCLUSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results, Conclusions and Next Steps</td>
</tr>
</tbody>
</table>
Framework for Validating Heterogeneous Networks and Solutions

MOTIVATION AND CONTEXT

Solution Verification & Validation Program

- multi-technologies
- multi-use & multi-user
- multi-customers

Cost effective
Continuous quality assurance
Holistic and collaborative
e2e field grade lab environment

I&V Engineer’s Dilemma
Complexity
Framework for Validating Heterogeneous Networks and Solutions

**METHODOLOGY**

<table>
<thead>
<tr>
<th>PRINCIPLES</th>
<th>INPUT</th>
<th>DOMAIN BASED ANALYSIS</th>
<th>DELIVERABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design for Change</td>
<td>customer requirements</td>
<td></td>
<td>Topologies</td>
</tr>
<tr>
<td>Design Invariants</td>
<td>use cases scenarios</td>
<td></td>
<td>Use Cases Super-Set</td>
</tr>
<tr>
<td>End to End</td>
<td>Architectures topologies configurations</td>
<td></td>
<td>Test Cases Super-Set</td>
</tr>
<tr>
<td>Value and Validity</td>
<td>multi-users multi-use requirements</td>
<td></td>
<td>Rules</td>
</tr>
<tr>
<td></td>
<td>operations business processes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Operations & Process for Change**
Framework for Validating Heterogeneous Networks and Solutions

IMPLEMENTATION APPROACH

★ Change is not an accident, it is part of the Program design

Meta-Design Approach for Collaborative Design Effort

Integration Engineer

Design Engineer

High/Low Level Design

Low Level Design

Optimize

Implement

Test

Skills Development

Method of Procedures

Test Results

Integration Engineer

Delivery Engineer

Test Engineer

Field Support

Reusable Test Strategy

- Reusable Lab Environment
- Use Case Super Set

★ The validation framework helps us manage the change
Framework for Validating Heterogeneous Networks and Solutions

MOBILE BACKHAUL IMPLEMENTATION EXAMPLE

Reusable Lab Environment

★ Multiple Architectures
★ Re-configurable
★ Duplex Architecture
★ Emulates the Field

Use Case Super Set

★ Validate:
  ✔ New Products
  ✔ New Configurations
  ✔ New Releases

★ Update for New Features
★ Update for New Functionality
★ Used for Regression Subsets
Framework for Validating Heterogeneous Networks and Solutions

CONCLUSIONS

Results

- Efficient use of internal validation resources balancing trade-offs
- Strategic re-use of existing lab environments
- The initiate of knowledge sharing and development

Quality - Implementation Example

Next Steps

- Apply the framework to other types of domains in the services area
- Continue to use it in current and future programs
Framework for Validating Heterogeneous Networks and Solutions

• DAVE SNYDER & LIZETTE VELÁZQUEZ
• September 2014