Case Study:

Solving the Interconnect Challenge – end to end management is the key

Standardising, Virtualising and Automating "Solution Delivery"

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Charlie Muirhead
Founder and President - Nexagent

Agenda

► Who are Nexagent?

► What's the Challenge in Delivering Complex Solutions?

► A Totally New Approach

► What Capabilities does Nexagent's software offer

► What's the Status of Standards in this space?

► Conclusions and Call to Action!

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Nexagent: = Solution Delivery Automation

► **Target Market**
  › Carriers, Outsourcers, Integrators and VNOs
  › Delivering Advanced Network Solutions for multi-clients = Complex

► **Nexagent System 3.2**
  › Reference 'process model' for end-to-end lifecycle, BPM (Fuego), UDM
  › Process-driven Software for solution design, implementation & assurance
  › Nexagent Interconnect Architecture
  › Professional Services for Design, Build, Operate (optional) & Handover

► **Automation Benefits**
  › Efficiency, Flexibility, Service & Time To Market = Differentiation
  › 'Out of the Box' = live in <6 months (unlike most B/OSS projects)
  › ROI < 12 months

► **Market leader, Award winning & 100% Standards Compliant**

RED HERRING | **TORNADO INSIDER** Top 100 Private Tech Companies | **WORLD ECONOMIC FORUM** Tech Pioneer | **Gartner** Cool Vendor Network Services 2005 | **I E T F** | **MFA FORUM** | **IPsphere Forum** | **TeleManagement FORUM**

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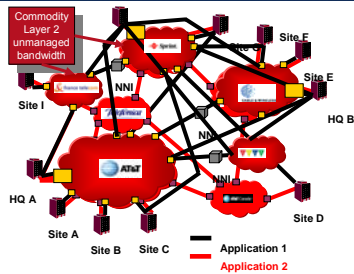automating multi-network environments

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What's the Challenge in Delivering Flexible, Customised, Advanced VPN Solutions?

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Challenges in Delivering Advanced Networked Solutions

Commodity Layer 2 unmanaged bandwidth

Site F
Site E
Site I
HQ B
NNI
NNI
NNI
HQ A
Site A
Site B Site C
Site D

Application 1
Application 2

Complex Transport and Network Layer

► VPN 'solutions' span 2 or more carriers

► MPLS NNI standards challenging

► Time consuming network integration

► Exponential N*(N-1) problem

► Dedicated per client = no leverage
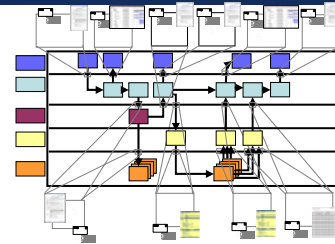
Manual Operational Processes

► Requires highly skilled staff

› Solution Design (bid team, contracts etc)

› Solution Fulfilment (project management)

› Solution Assurance (isolate, resolve)

► **Expensive + Inflexible + Complex**

The real challenge is moving to efficient, flexible, automated processes

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What does manual process mean for you business?

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Today's Silo'd Solution Delivery Methods

1 Design

Conventional Manual Solutioning
- ► Visio diagrams and Excel spreadsheets
- ► Best practice understood but rarely executed
- ► Complexity, cost & time limitations prevent 'what if' analysis to optimise WAN design
- ► Multiple copies and versions of data
- ► Manual change control and archival processes

2 Implement

Conventional Implementation/Provisioning
- ► Manual data re-entry
- ► Yet more design before you can implement
- ► Manual configuration scripting
- ► Manual Work Order generation
- ► Manual project tracking
- ► Separate systems for service monitoring provisioning

3 Assure

Conventional Service Assurance
- ► Very high volume manual data entry for service monitoring
- ► Limited service visibility and operational tests
- ► Susceptible to miss-configuration errors
- ► Multicarrier MPLS-VPN has new failure conditions that conventional tools don't spot
- ► Manual comparison of alarms to actual performance

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So, what are the options for automation?

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What are the Options for 'Solution' Automation?

► **Option 1 - Extend existing B/OSS tools**
  › Ask teams to change current B/OSS dev roadmap
  › …but most teams are maxed out on existing 'factory' roadmap

► **Option 2 – Create new 'solution delivery' overlay – Manual/DIY**
  › Leave existing B/OSS tools in place
  › Define central overlay management processes
  › Build tools in house – 3 years+ development

► **Option 3 – Create new 'solution delivery' overlay – new COTS**
  › Leave existing B/OSS tools in place
  › Define central overlay management processes + COTS tools
  › Initial loose coupling to existing B/OSS tools, then e-bonding
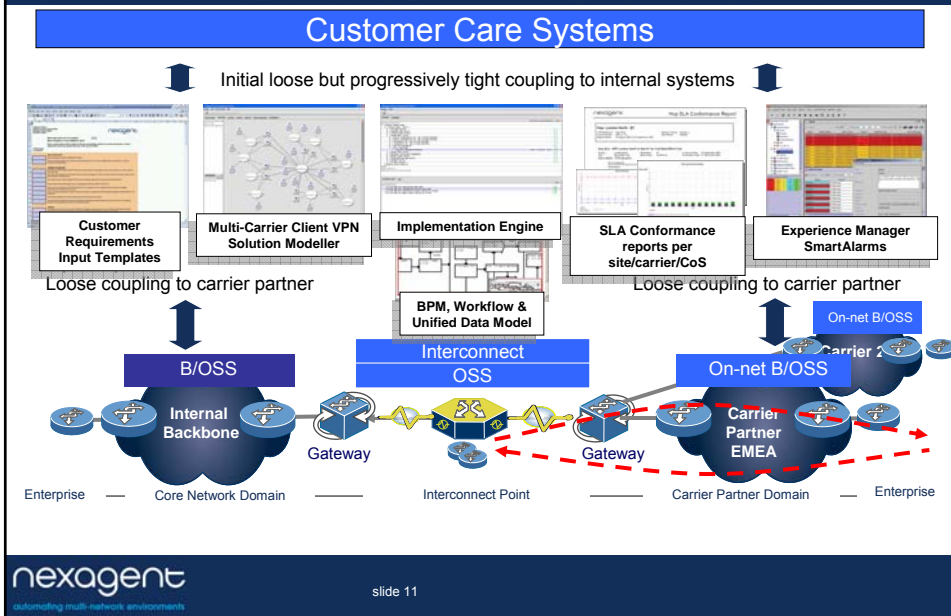
  ….option 1 impractical, option 2 takes too long and costs too much.

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Leave Existing BSS & OSS Tools in Place…

Customer Care Systems

On-net B/OSS

B/OSS

Internal Backbone

Enterprise

Gateway

Core Network Domain

On-net B/OSS

Carrier Partner USA

Carrier Partner EMEA

Gateway

Carrier Partner Domain

Enterprise

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…add overlay management to deliver 'Solutions'
Service Layer Abstraction Only

Customer Care Systems

Initial loose but progressively tight coupling to internal systems

| Customer Requirements Input Templates | Multi-Carrier Client VPN Solution Modeller | Implementation Engine | SLA Conformance reports per site/carrier/CoS | Experience Manager SmartAlarms |

Loose coupling to carrier partner

BPM, Workflow & Unified Data Model

Loose coupling to carrier partner

On-net B/OSS

B/OSS

Interconnect OSS

On-net B/OSS

Carrier 2

Internal Backbone

Gateway

Gateway

Carrier Partner EMEA

Enterprise — Core Network Domain — Interconnect Point — Carrier Partner Domain — Enterprise

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Automation Drives 3x+ Efficiency Improvement

(Assume 5% of customers migrate to automated solution delivery)	FTE Staffing without Automation	FTE Staffing with Automation	Reduction in FTE	Av. Ratio	Annual Savings
DESIGN PHASE					
• Pre-sales VPN design	7	2	5		
• Carrier RFQ management	4	1	3		
• Other (e.g. data collection)	8	5	3		
Sub-Total	**19**	**8**	**11**	**2.5 x**	**$1.7m**
IMPLEMENT PHASE					
• Final VPN implementation design	44	8	36		
• Configuration generation & work orders for carrier gateways, measurement systems, interconnections	98	4	94		
• Detailed fulfilment sequencing & scheduling	53	3	50		
• Other (e.g. acceptance coordination)	122	55	67		
Sub-Total	**319**	**70**	**248**	**4.5 x**	**$24.8m**
OPERATE AND MANAGE					
• Problem detection & isolation	75	23	52		
• Problem resolution	28	23	5		
• Outage planning & management	18	8	10		
• Other (e.g. SLA reporting)	5	4	1		
Sub-Total	**125**	**58**	**67**	**2.2 x**	**$6.7m**
TOTAL	**462**	**135**	**327**	**3.4 x**	**$33.2m**

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Benefits of Process Automation

1. Operational Efficiency
   › Reduce costs and improve productivity across all customers

2. Speed and Flexibility
   › To adapt rapidly to changing customer requirements

3. End to End Service Excellence
   › From automated configuration on probes and analysis

4. Time to Market
   › Leverages existing B/OSS systems, loose coupling

5. Increase Addressable Market
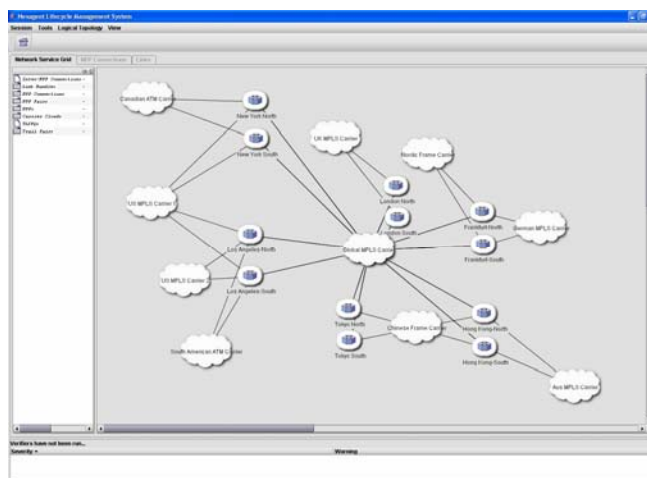   › Reduce 'bid' costs enables proposition to mid-size clients

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Detail and Process Walk-thru

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Everything Should be Underpinned by Good Process
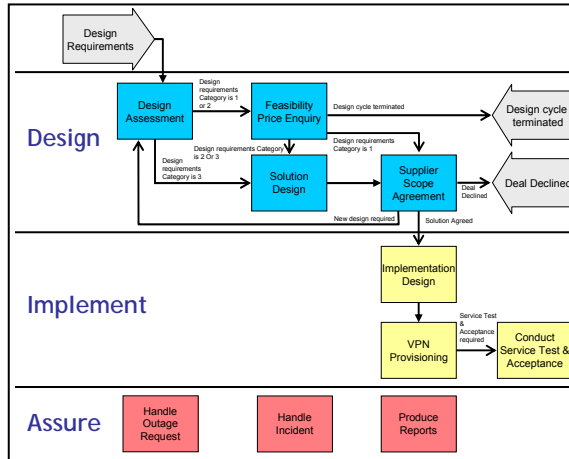
- **Comprehensive model for managing the enterprise multi-carrier VPN lifecycle**
- **Structured at different Levels of detail:**
  - **Level 1** : Conceptual Flow Diagrams & descriptions
  - **Level 2** : External Interface Diagrams & descriptions
  - **Level 3** : Business Process Models & descriptions
  - **Level 4** : Business Procedures & descriptions
- **Role based model for flexible use**
- **Methodology for efficient integration with existing OSS/BSS**

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Example View: Pre-connected Grid of Carriers

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Enterprise Solution Modeller & Planning

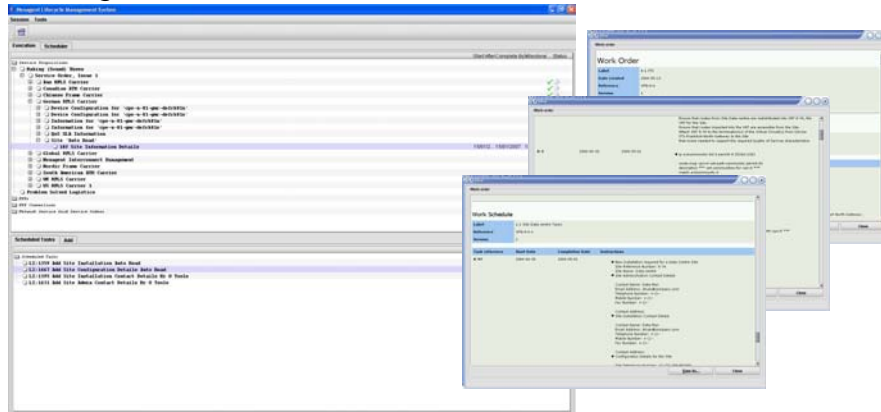► *Pre-Sales Solutioning and post-Sales Design*
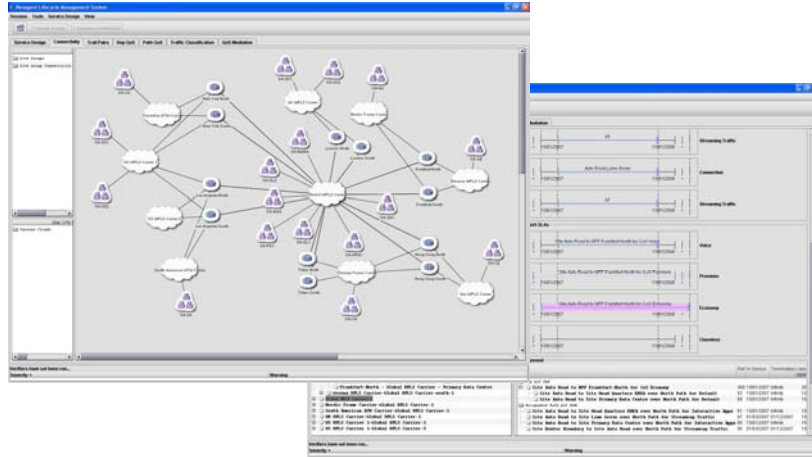
Example: Multi-client Solution Fulfilment = Complex!

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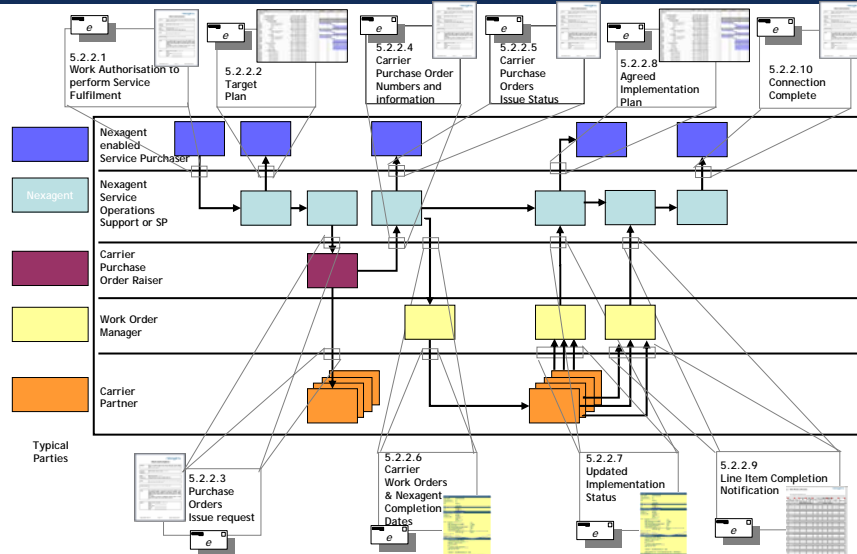
Implementation Engine

► *Automated generation of work orders and interconnect configurations*
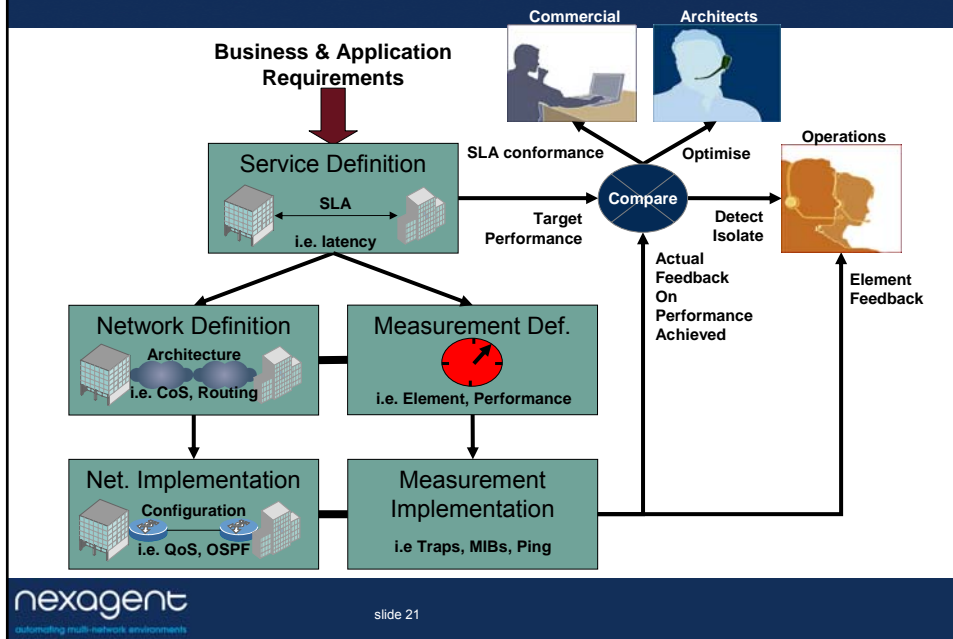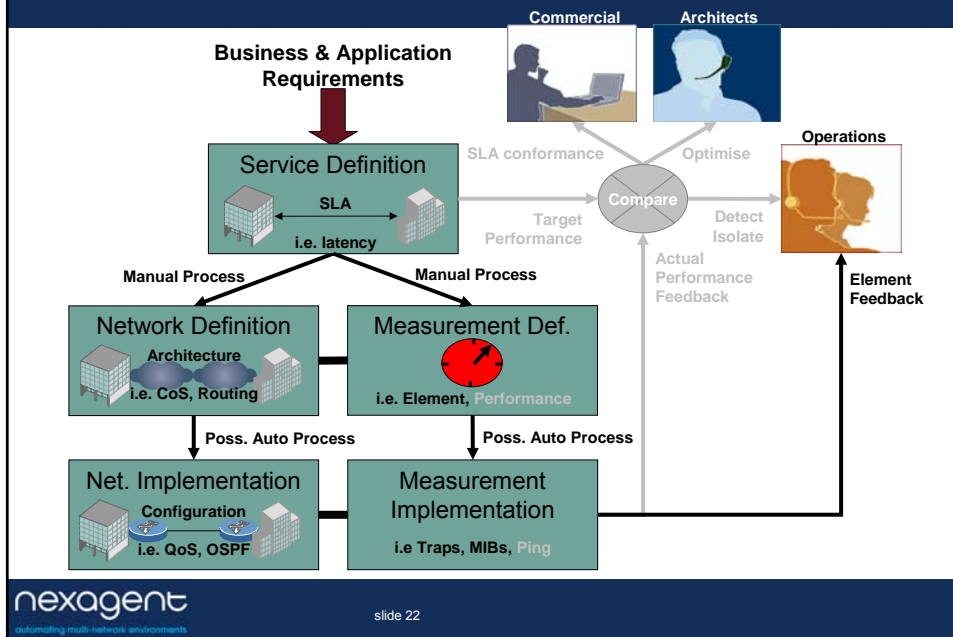

NG Application Assurance

Goal:

"Proactive Service Experience Management"

Across any carrier partner - from a standardised centralised system
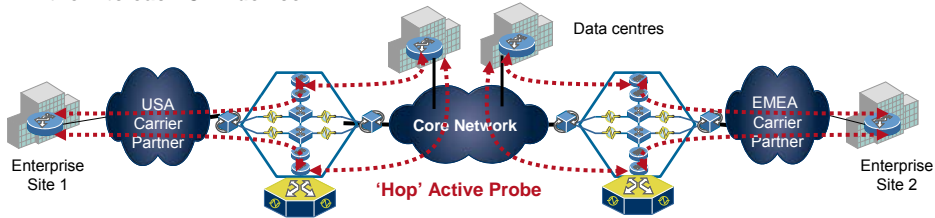
Service Experience Management – the Goal

Service Management – Real World Reality = GAP

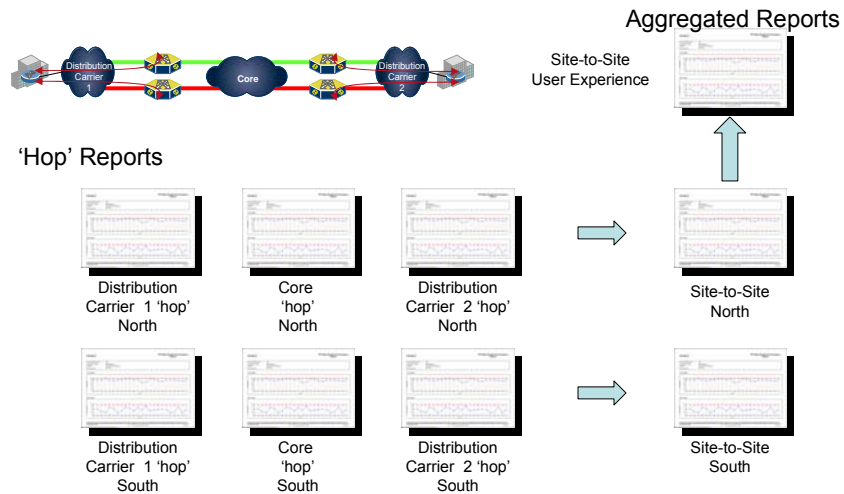## 'Independent' Per Hop Service Monitoring & Analysis

Nexagent-based Interconnects use Cisco SAA/IP-SLA-based instrumentation to measure experience of crossing each 'hop' in the data path by generating synthetic test packets on shadow routers inside the interconnect and sending them to each CPE device.
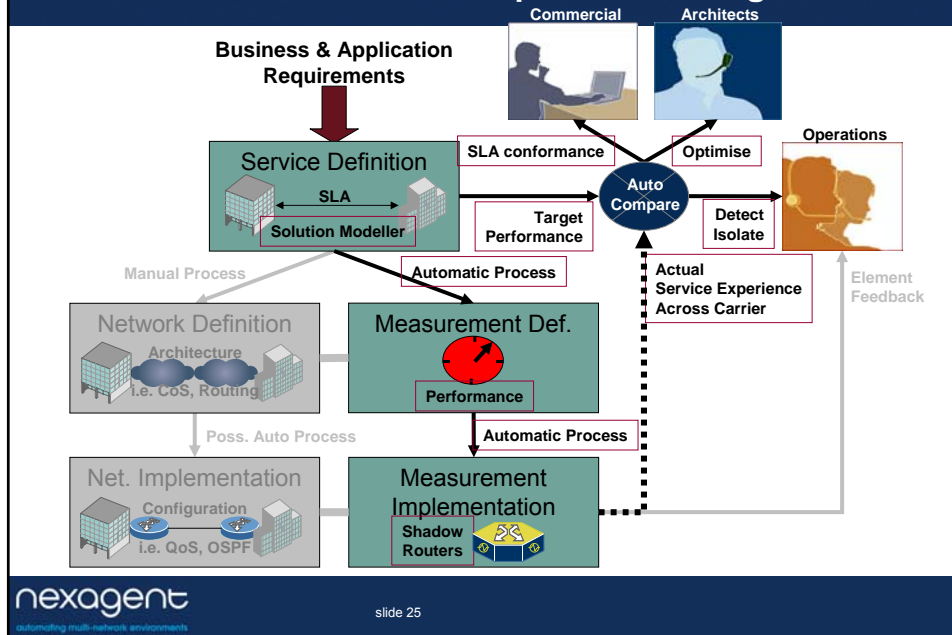

Data centres

USA Carrier Partner

Core Network

EMEA Carrier Partner

Enterprise Site 1

Enterprise Site 2

'Hop' Active Probe

Important for : Fault Isolation, SLA Conformance and Design Feedback

Note : Single Interconnect Point in path shown for clarity, in reality there will likely be a pair per city

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Automated Aggregation of Per Hop Reports

Aggregated Reports

Site-to-Site User Experience

Distribution Carrier

Core

Distribution Carrier 2

'Hop' Reports

Distribution Carrier 1 'hop' North

Core 'hop' North

Distribution Carrier 2 'hop' North

Site-to-Site North

Distribution Carrier 1 'hop' South

Core 'hop' South

Distribution Carrier 2 'hop' South

Site-to-Site South

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Benefits of Proactive Experience Management

► All about end to flow through of data = closed loop control

► Lower Cost
  › Less finger points – reduced opex
  › Better bandwidth optimisation
  › Automated carrier benchmarking

► Better Service
  › Reduced downtime – faster isolate, detect, resolve
  › Better performance for RT applications – Citrix, IPT
  › Better capacity planning

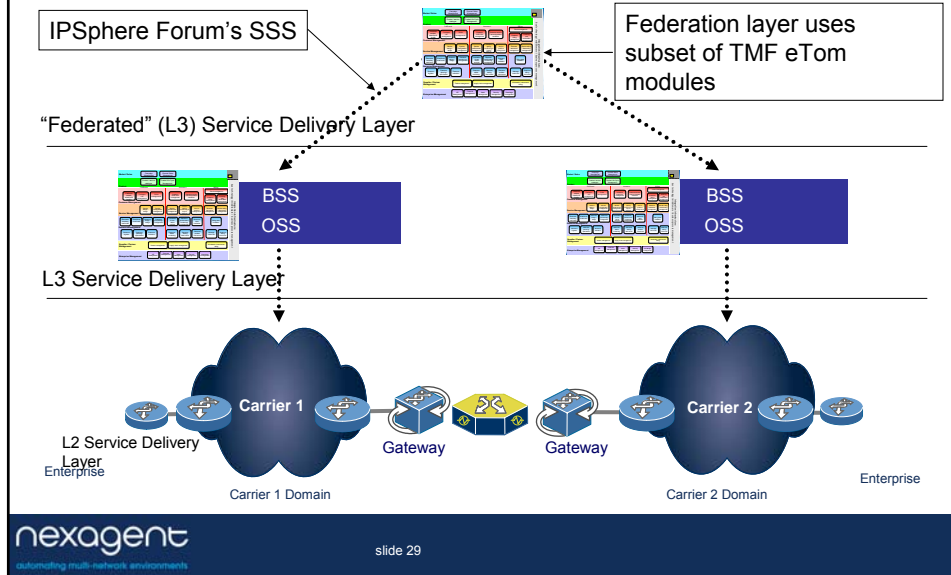nexagent
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So, where are we on with the standards?

TMF and Leveraging TAM?
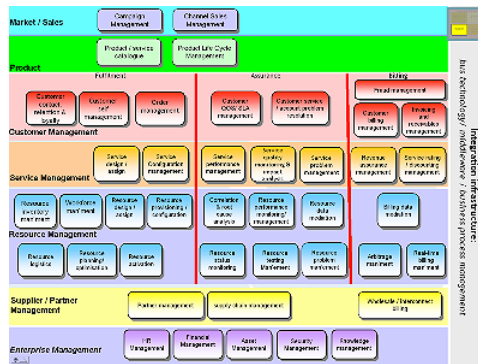
The Telecom Application Map lays out Key Functional Areas

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Service Federation @ TMF & IP Sphere Forum

IPSphere Forum's SSS

Federation layer uses subset of TMF eTom modules

"Federated" (L3) Service Delivery Layer

BSS
OSS

BSS
OSS

L3 Service Delivery Layer

Carrier 1

Gateway

Gateway

Carrier 2

L2 Service Delivery Layer

Enterprise

Carrier 1 Domain

Carrier 2 Domain

Enterprise

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Conclusions

► Ever more demanding and customer-specific enterprise requirements

► Customisation & heterogeneity create huge operational complexity

► Mass Customisation Platform is Essential
  › Reusable, Flexible Supply-Chain, Operational Efficiency

► Standards will help and TMF and IP Sphere Forum - great progress

► Hierarchical / Management Overlay works = EDS/Nexagent

  1. Please join us in the standards efforts

  2. Come and talk to Nexagent if you want leapfrog your competition

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