« INTEGRATED HOLISTIC DECISIONS TRADE-OFF BASELINE FOR VIRTUAL IP MULTIMEDIA SUBSYSTEM »

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SUMMARY

1. Network Functions Virtualization (NFV): Context, Strategic Issues, Case Study

2. Motivation of Our Approach: Why SE Approach?

3. Operational Analysis Outcomes

4. Functional Analysis and Decisions Trade-Off for an Optimal Architectural

5. Discussion, Perspectives

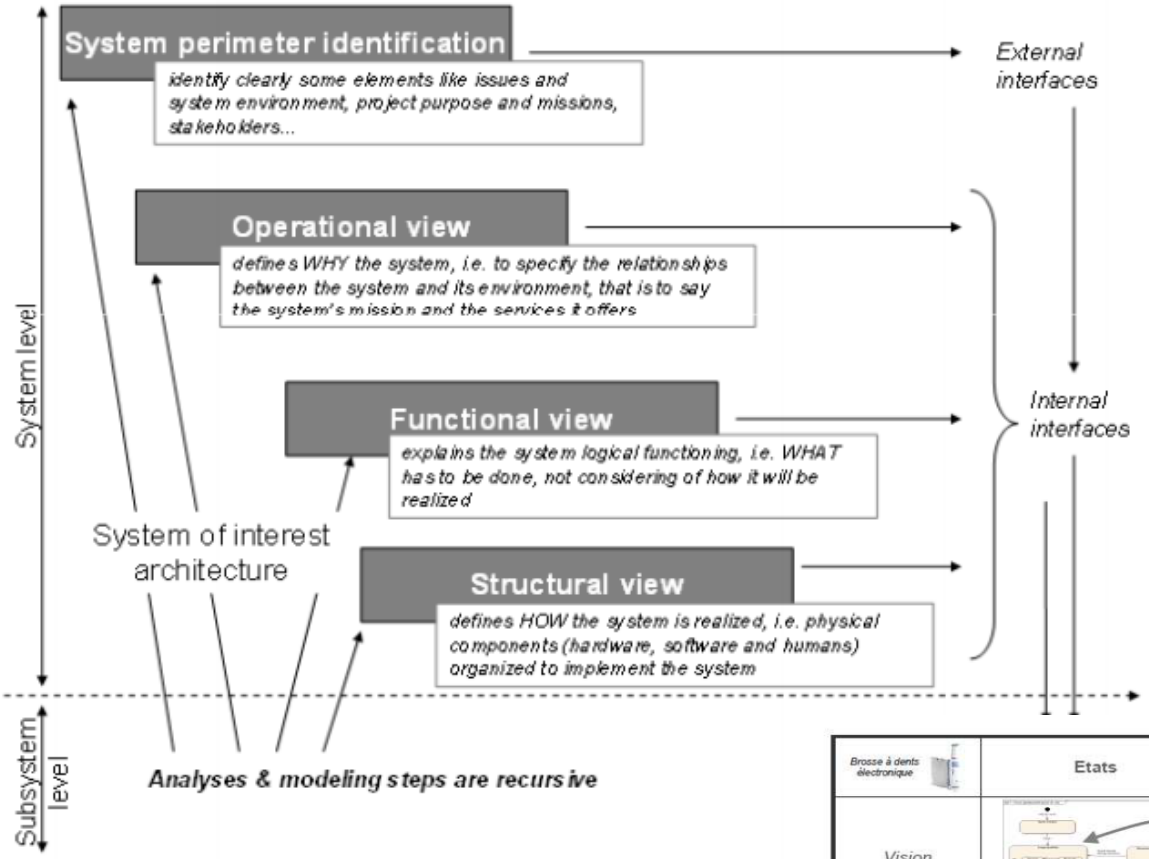
1. Network Functions Virtualization

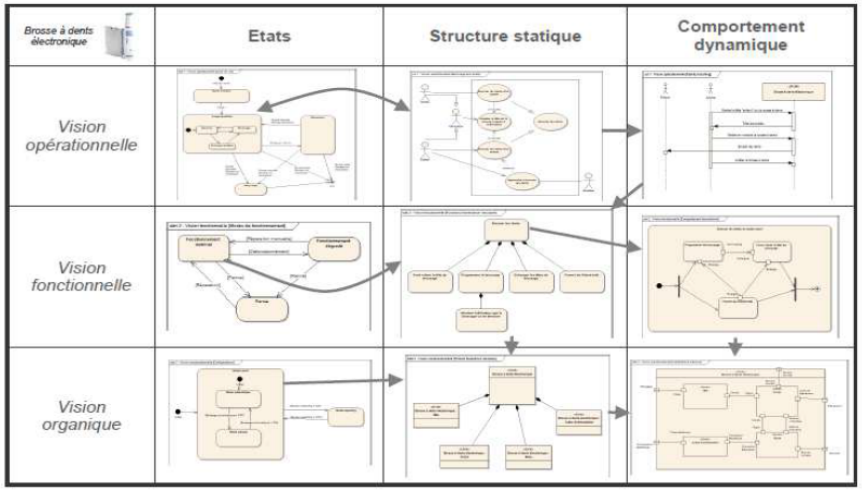
NFV is the greatest transformation of Telecommunications industry, revolutionizing architectures, value/service chains and economic models.

- The Prboblem Question is:

  the transition from monolithic to virtual architectures (which includes the dynamics of functional organization), while meeting the standards driven functional and performance constraints and stakeholders conflicting strategic objectives.

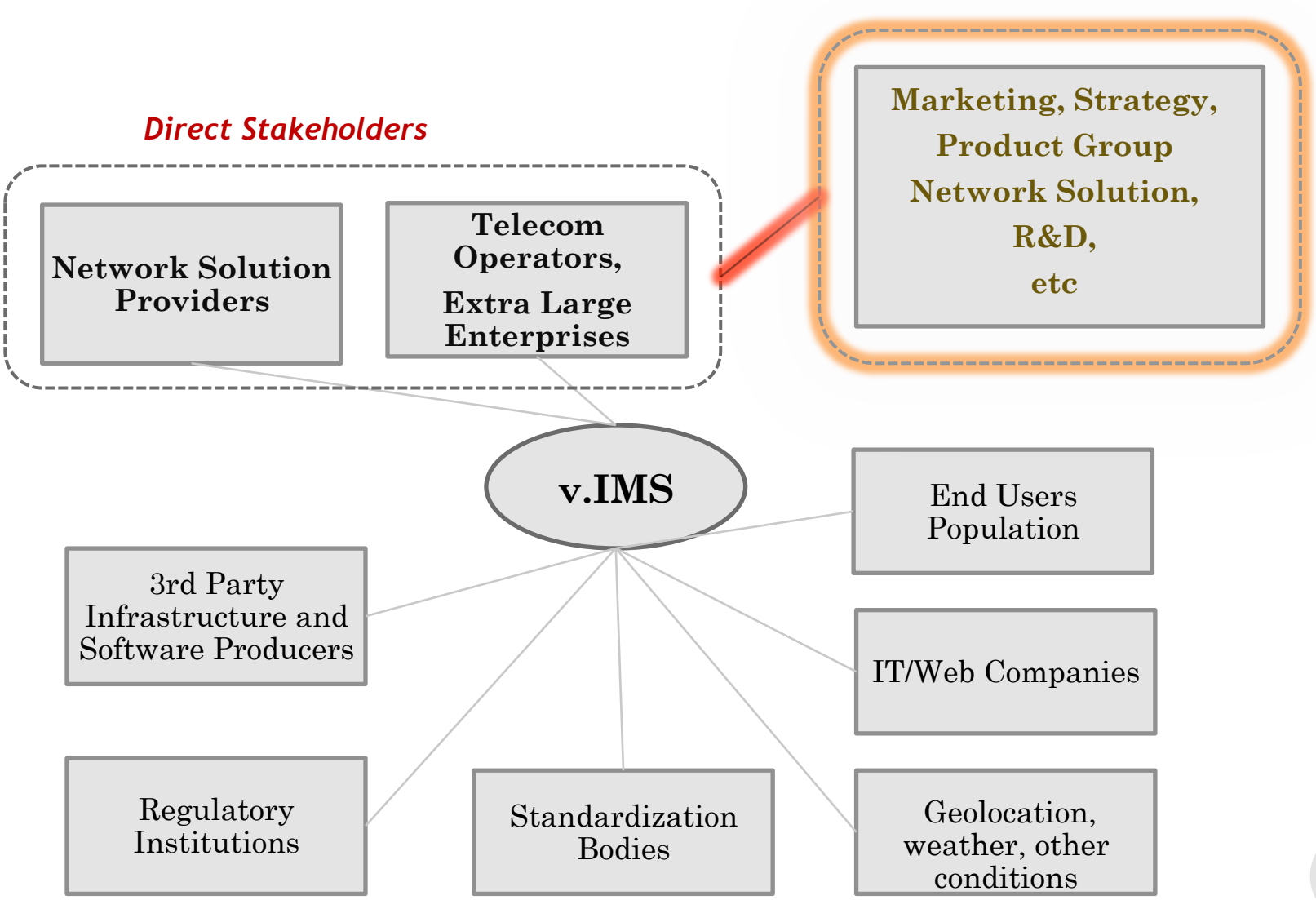
2. Why SE Methods and Architectural Framework?





SySML models implemented within the Architectural Framework:
Adapted from D. Krob (ref. [7], [8])

3. Operational Analysis:
Virtual IMS Environment: Stakeholders Analysis



4. Operatonal Analysis: Detailed Stakeholders Needs Analysis

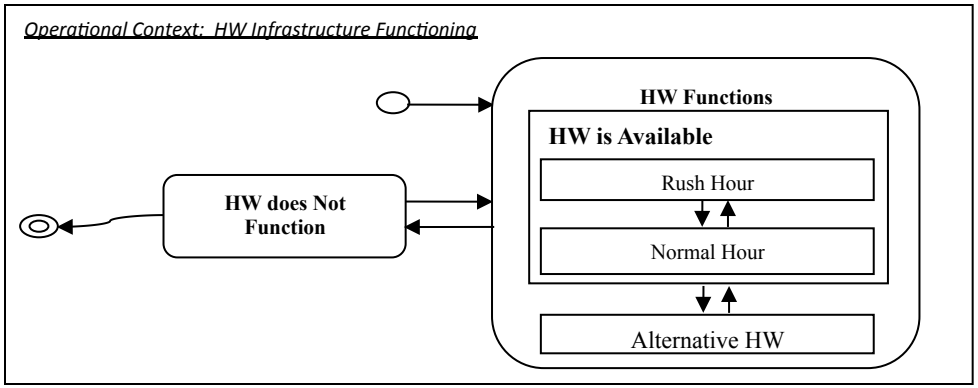
Table1: Macro Needs

N1	Operators want a system that will support significantly higher traffic loads
N2	Operators want a robust system
N3	Operators want assurance for the maintenance and support
N4	Operators want capabilities to easily deploy/support new applications/services
N6	Operators want significant savings of CAPEX and/or OPEX
N7	Operators want operational easiness: i.e. to drastically reduce time to market
...	.....

Table2: Macro Needs Refinement

N2.1	Operators want an automatic adjustment of resources allocation for traffic growth and de-growth
N2.2	Operators want maximal availability and speed for huge traffic rates
N2.3	Operators do not want to feel the physical limitations of the system
N2.4	Operators want predictable behavior of network functions
...	

5. Operational Analysis Otcomes

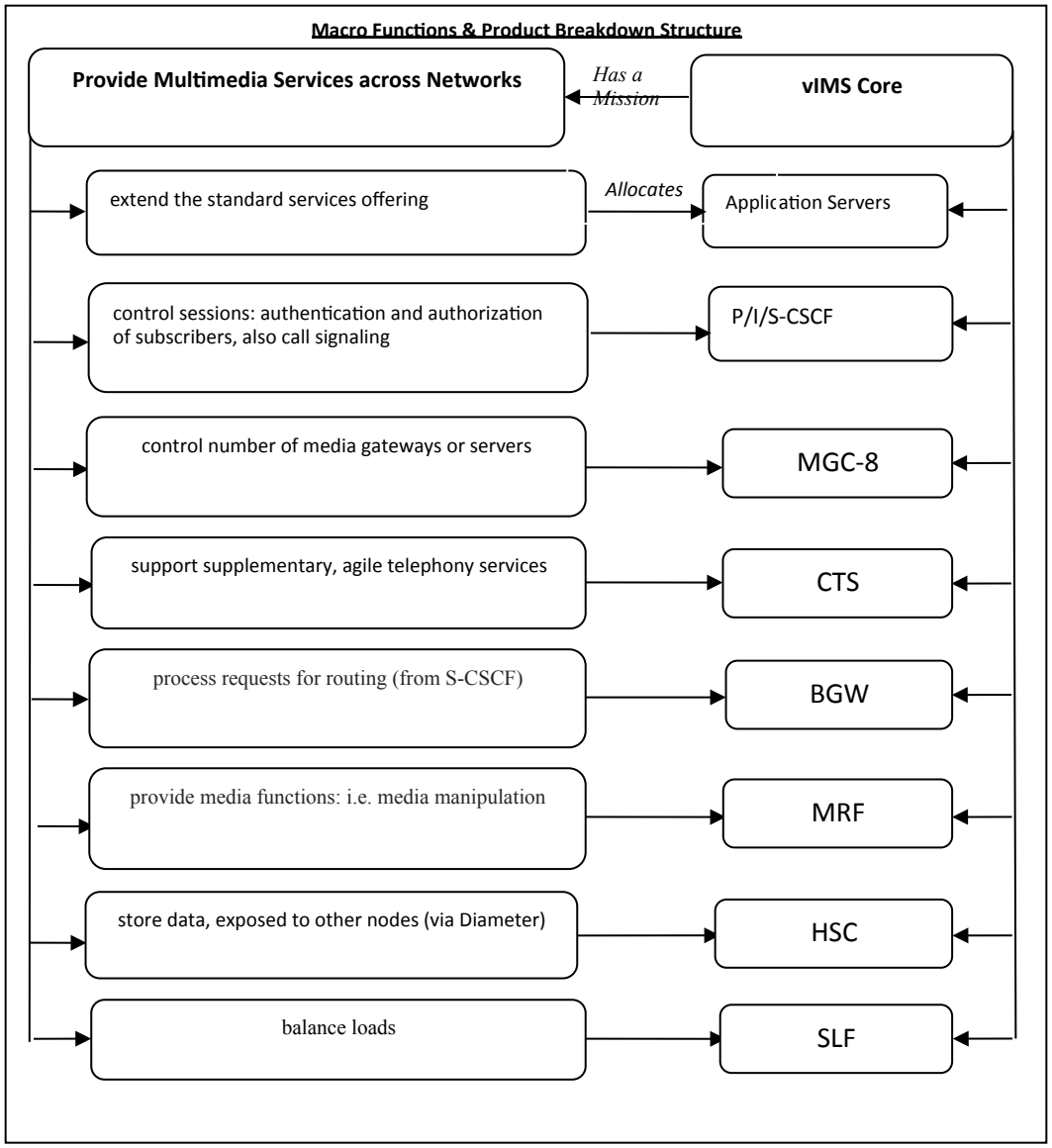


Operational Scenarios

× The system lacks capacity (memory or CPU)
× Hence new virtual machines are initiated (automatically)
× The system then transmits the needed amount of traffic with the new VMs

States of vIMS			States of Hardware Infrastructure		
OPERATE Phase	vIMS does Not Function				
	vIMS is Deployed		HW Functions	HW is Available	Normal Hour
				Alternative HW	Rush Hour
			HW does Not Function		
	vIMS Functions	New Virtual Machines Instantiated			

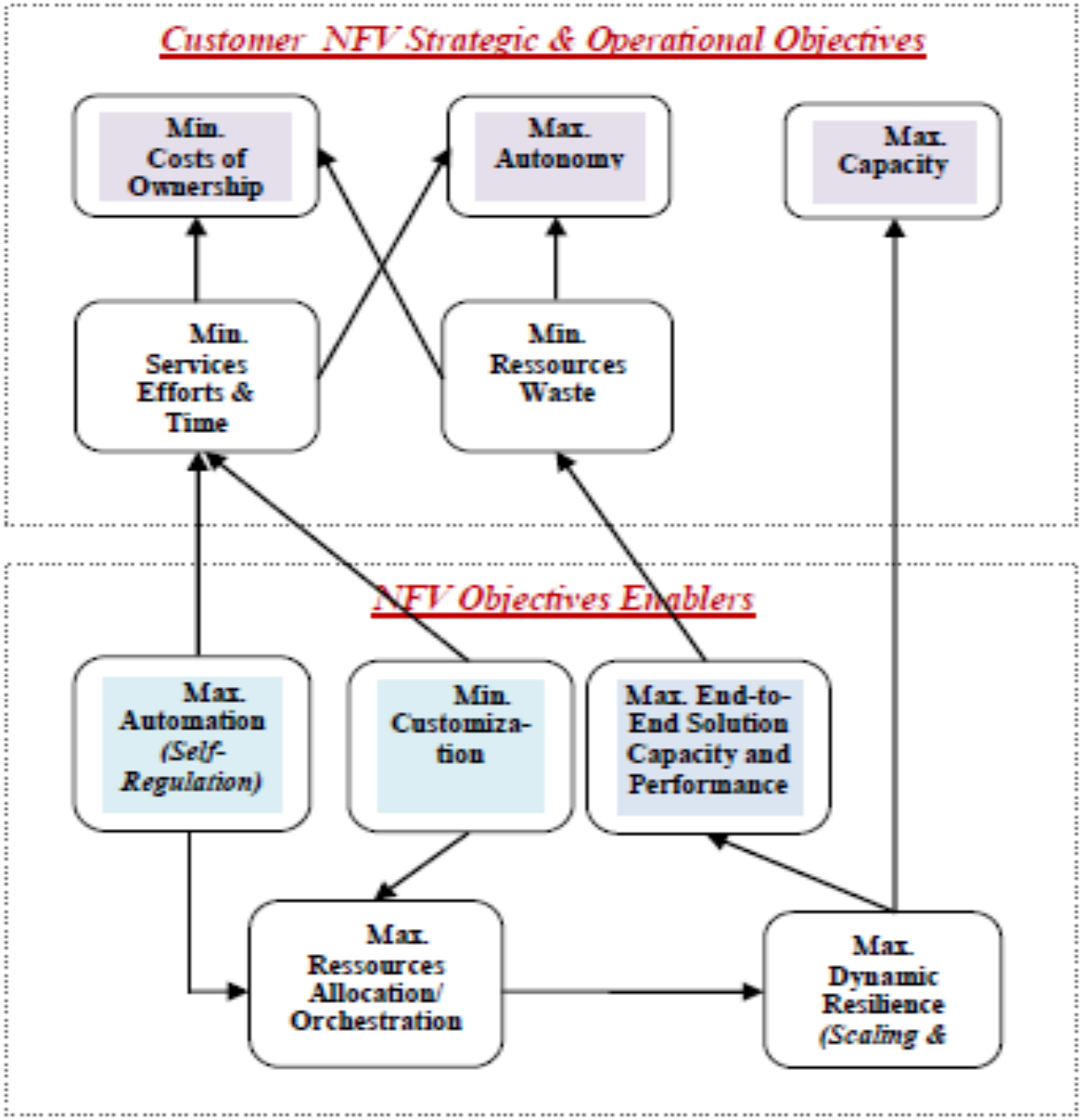
6. Towards Functional Analysis



7. Multi-Objective Optimization Model Inputs

N	General Traffic Model Parameters	Measure Units	Values
TM1	Min. number of CPU Cores	Unit	
TM2	Min. number of Core Network Elements	Unit	
TM3	Min. Dynamic Memory	GB	
TM4	Min. Direct Attached Storage	GB	
TM5	Min. Block Storage (Cinder)	GB	
TM6	Min. Object Storage	GB	
TM7	Min. Estimated Performance	Msgs/Sec.	
TM8	Max. Response/Ressources Allocation Latency	Sec.	< 2
TM9	Max. Failure Latency	Sec.	
TM10	Max. Failures/Incidents per Year	Percentage	
	Min. Availability	Percentage	

8. Trade Off Analyses for Optimal Virtual Architecture



9. Discussion, Perspectives

NFV redefines Telecom architectures:

→ *The abstraction of functional capabilities from specific HW changes the paradigm of ways of thinking and engineering required to build the networks.*

→ *The challenge facing both Telecom Service providers and Equipment Providers is to manage the transformation from monolithic to virtualized systems, while maintaining the same level of reliability, control and sharing of risks.*

THANK YOU!

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