Report from SDOs/Fora Industry Workshop

Industry Forum Workshop on *"Autonomic Management & Control (**AMC**) of Networks and Services, **SDN**, and **NFV**, as complementary emerging paradigms: From silo approach to cross-SDO combined approach"*

Follow-up Workshop to IEEE Globecom 2013 Industry Forum Sessions
Date: 5th June 2014, co-located at TMForum Meeting and hosted by TMF
Location: Nice Acropolis Convention Centre 1 Esplanade Kennedy 06000 *Nice, France*

Report compiled by notes takers: *Ranganai Chaparadza; John Strassner; George Dobrowski; Tayeb Ben Meriem and Seven Wright*

1. Summary of the main points discussed and the outcome

The main objectives of this initiative and its history were summarized by the Chair (Dr. Ranganai Chaparadza).

- This workshop built momentum by coming together as separate SDOs/Fora that were interested in continuing to build synergies and jointly reach out (as one team) to stakeholders and technical experts in the research community and industry. The urgent need for synergies in standardization on emerging networking paradigms was very evident. More importantly, different SDOs/fora are covering different aspects of the same and similar subjects. Hence, there is a need to converge the running work items and roadmaps in the

various groups, and provide a forum to which experts from research projects and industry can contribute.

- Industry standardization roadmaps and priorities were presented to various stakeholders who need this as input in order to align their activities with this vital input from the industry. Organizations that are driving R&D programs in Europe (e.g., the European Commission with its Horizon 2020 program), Asia, and the USA, will also find this input helpful in order to align their work to this input. This will help unify disparate standardization activities in various SDOs/Fora towards fulfilling the needs of industry as presented by the SDOs/Fora. Such R&D programs are a source for useful standardization resources (technical experts, committed time and financial resources) that can support industry in standardization activities.
- Ways to pursue different levels of Industry harmonization in building effective synergies for the benefit of the industry at large were discussed. The focus was Industry Harmonization for Unified Standards on SDN, NFV, Autonomic Management & Control (AMC) of Networks and Services, and how this is related to other existing topics (e.g., NGMN NGCOR). The benefits of doing this include efficient use of standardization resources (experts and committed time) as well as fostering information sharing and collaboration of various groups by SDOs/Fora.
- Create a White Paper to coordinate the actions among interested SDOs on SDN, NFV, and AMC (Autonomics), with a focus on how SDN and NFV move forward to embrace Autonomics.
- Plan for the upcoming Industry Forum Globecom 2014 Session.
- Plan for identifying synergies in NFV, SDN, and AMC among interested SDOs, and how to define a concrete plan of action to work on these synergies to the mutual benefit of the interested SDOs and industry at large.

More details on the Objectives of the Initiative can be found in the Workshop Agenda: http://www.tmforumlive.org/ieee/:

Workshop Objectives and Draft Agenda prc

1.1. The following Groups gave presentations

- **Important Note:** All the presentations from the various Groups are accessible at this URL: xxx
- **TMForum** general presentation and the TMF ZOOM Project: (presentation accessible at the given URL)
- **ETSI NFV**: ETSI NFV ISG portal was used in summarizing the achievements of the ETSI NFV)note that NFV#7 is 29 July- 1st Aug at Santa Clara):
  http://www.etsi.org/technologies-clusters/technologies/nfv
  http://docbox.etsi.org/ISG/NFV/Open/
- **Broadband Forum (BBF)**: (presentation accessible at the given URL)
- **OMA**: (presentation accessible at the given URL)
- **ETSI NTECH/AFI WG**: (presentation accessible at the given URL)
- **IEEE NGSON** (presentation accessible at the given URL)
- **ITU-T SG13 and JCA**: (presentation accessible at the given URL)

1.2. Instruments through which Harmonization or Coordination Activities could potentially be achieved were presented

- **ITU-T JCA-SDN**: is a non-technical body. Its focus is the coordination of topics that are related to SDN. Since NFV and AMC (Autonomics) have some aspects connected to SDN, they can

also be considered in JCA-SDN. More details on what is possible to do in JCA-SDN as harmonization/coordination can be found in ***section 3.7***.

- **Multi-SDO**: A body focused on the implementation of NGMN NGCOR, among other efforts. The scope goes beyond this, and other topics can be taken onboard. A forum for a joint working group (JWG) between SDOs is one possible structure for collaboration, but some skepticism of the effectiveness of such mechanisms was raised. As such, the concept of a JWG raised some concerns. Whether the concerns raised can be addressed remains to be seen. More details on this can be found ***section 3.8***.
- **IEEE SDN and NFV ET subcommittee**: Main focus is SDN and NFV coordination activities. Drive the academic and industry discourse on SDN/NFV. The committee also aims to provide a framework for SDN/NFV development in the larger context of IT transformation, and to coordinate with other emerging technologies sub-committees. Also, to support the organization of related events.

Note: These presentations are also accessible at this URL: xxx

1.3. What we agreed can be minimally achieved by Multi-Group collaboration on Industry Harmonization on Standards for SDN, NFV and AMC (Autonomics)

- Taxonomy Harmonization (e.g. of architectures and associated concepts, models, etc) by 2 or more Groups through bi-lateral liaisons or multi-lateral liaisons, respectively.
- Creating and continuously updating an inventory describing the types of work items (concrete topics) being addressed by which Group, and how they map to each other. The ITU-T JCA has some initial input that could be considered; this could be extended with the items to be compiled from the various SDOs.
- Creating and continuously updating a list of items we are identifying as either gaps in standards or items for potential collaboration by 2 or more groups, through bi-lateral liaisons or multi-lateral liaisons, respectively. We already started identifying items for potential collaboration (bilateral or multi-lateral) during the presentations by various groups.
- While the various existing instruments through which some multi-group harmonization/coordination activities could be created were presented and understood, we cannot at this stage say whether we could start some multi-group coordination activities, because we need to first pursue the path of performing the tasks listed below:
    - Work on Taxonomy Harmonization and start compiling an inventory describing the types of work items (concrete topics) being addressed by particular Groups (focus is on SDN, NFV and AMC) and how they relate to each other. Use this input at some point to discuss again on when/whether some formal multi-group coordination could be endorsed through the harmonization/coordination instruments presented at the workshop—provided that concerns such as those highlighted on the concept of Joint-Working Groups in Multi-SDO can be addressed. We decided that there is need to draw lessons from the experience of Multi-SDO.
    - In compiling the mapping of work items/topics to SDOs/Fora, we will need to answer the question: "***What problem covers Multiple Groups (focusing on the SDN, NFV and AMC paradigms scope)***?" We also need to understand different types of Abstractions in Architectural Frameworks, and how different Organizations are affected by these abstractions.
    - Compile the White Paper, which will be maintained and updated as a living document, for use in communicating Harmonization activities to various

stakeholders and the global audience. The **white paper needs to state the problem**, what is the increased value, and pin down solid business drivers.

- Continue to use various conference platforms such as IEEE Globecom Industry Forum Sessions, ITU Telecom 2014, FIA (Future Internet Assembly), and other large conferences. At IEEE Globecom 2014 in Austin, Texas, the SDOs/Fora will run the following Industry Forum Workshop, and the White Paper will also be presented to a wider global audience: ***Industry Harmonization for Unified Standards on SDN, NFV, Autonomic Management & Control (AMC), 5G, Unified Management of Converged Nets, and (IPv6 in the picture)***

- It is expected that consolidated industry requirements for AMC (Autonomics), SDN and NFV, through unified standards (architectural frameworks), should be *telecom operators-driven* and guided by the key SDOs/Fora that are addressing the topics and are seeking to collaborate. This includes, but is not limited to, ETSI NTECH/AFI, TMF-ZOOM, IEEE NGSON and NGMN on AMC' other key groups include ETSI NFV, BBF, ITU-T SG13 & SG2, OMA, 3GPP, OMG SDN WG, IEEE SDN & NFV ET subcommittee, ONF and OIF, IPv6 Forum, which are working on SDN and NFV related aspects. It is also understood that the topics of Autonomics, SDN and NFV are part of the 5G related topics in NGMN (which already has a liaison established with AFI on the subject of Autonomics (AMC)).

1.4. The List of all the Organizations that were invited

Some of the invited groups could not make it to attend the workshop due to a clash with their Group meetings, and requested updates from the workshop. The invited Groups include: *TMF, IPv6 Forum; ETSI NTECH/AFI; ETSI NFV; BBF; NGMN; OMG SDN WG; IEEE NGSON WG; ITU-T SG13 and SG2; 3GPP SA5; Multi-SDO; ONF; OIF; OMA; OpenDaylight; IEEE SDN and NFV Sub-Committee; SDNCentral; and other Groups that are working on SDN and/or AMC and 5G related topics*.

The more detailed notes from the Workshop

2. Introduction

Ranganai Chaparadza provided an introduction for the workshop. This workshop is a follow-up to discussions triggered by the Industry Forum Session at Globecom 2013, when a number of industry representatives from multiple SDOs spoke on SDN, NFV, and AMC (Autonomics) objectives.

3. Part 1 – Overview of Relevant Work from SDOs

The first part of the workshop was focused on attending SDOs to provide overviews of their relevant work. These presentations will be publically available at this URL xxxxx.

3.1. TM Forum

John Strassner, Huawei and chair of the new ZOOM (Zero-touch Operations, Orchestration, and Management) project, gave an overview of its purpose and objectives. The goal is "controlled evolution". While a radical, disruptive approach to OSS/BSS and orchestration is probably needed,

there is little ability for Carriers to digest such an approach. Hence, ZOOM will seek to advance the state-of-the-art on several key issues, including model-driven engineering, policy management, and dynamically orchestrating the reconfiguration of networked resources to meet changing needs. This latter is key. Most SDOs are not specifically focused on management, and the static approach doesn't work in dynamic environment of SDN and NFV. The ZOOM charter has 13 deliverables, of which user stories and use case analysis, defining a new information model, management and orchestration architecture, and policy management are the highest priority; all of these are being actively worked on. A brief review of six different Catalyst demos was provided to illustrate six key deliverables (model, REST APIs, management architecture, metamodel and enabling dynamic adaptation, DevOps, and SLA management). The TM Forum is soliciting proposals from all SDOs for its next meeting (Digital Disruption, December, Santa Clara), but inputs are due by July at the Action Week in Morristown, NJ, July 21-25th (same week as IETF Toronto).

3.2. ETSI NFV ISG

Steven Wright, AT&T and Infrastructure working group co-chair, provided an unofficial discussion that summarized where NFV currently is and some thoughts as to NFV Phase 2. NFV has (recently published or has drafts of) eight specifications (Infrastructure Overview, Interfaces and Abstractions, Compute Domain, Hypervisor Domain, and Network Domain, plus NFV Performance and Portability Best Practices, NFV Security Problem Statement, and VNF Architecture). The current focus of NFV is to perform a consistency check among its various WGs; this is estimated to take the better part of this year. Final specifications will be released early in 2015. It envisaged that NFV will have its duration of activities extended, though the particular form (e.g., TC vs. PP vs. ISG) has not yet been decided.

3.3. BBF

George Dobrowski, Huawei, and co-chair of the Service Innovation & Market Requirements (SIMR) working group, provided an overview of activities in the BBF. The BBF is focused on addressing the needs of the multi-service broadband network (MSBN). It is also working on applying SDN and NFV techniques, orchestration, and seeking to define how to interoperate between legacy, SDN, and NFV. Current BBF projects include an intelligent cloud broadband network, how SDN is used in broadband networks, service chaining, and how NFV can be introduced into existing MSBNs. Development of three applications of virtualization includes an enhanced residential gateway (vRG), a business gateway (vBG) for enterprise environment, and a fixed access network (pending) enabling concept of virtual Operators. In addition, work has been initiated on extending the MSBN to support Data Center hosting, a large NFVI (and/or Cloud), enabling not only incremental evolution of the MSBN but also enable Operators to become software defined operators. The focus of the BBF work is on how the system works once NFV and/or SDN is introduced. For example, how does provisioning flow, and how is traffic engineering and management affected.

We had a fairly long Q&A for this presentation. Highlights:

- BBF analysis is determining the implications of SDN separated control and data planes, what functions to virtualize, how to virtualize network functions, and which are not practical. This will result in architectural changes of the MSBN as needed.

- The BBF identified an information model for future work. This is a possible area of collaboration; however, the BBF must first work more on function decomposition, so that flow-through provisioning can be properly addressed. Action item: continue to work this collaboration
- Question on ontologies and learning, and how this applies to flow through. John Strassner briefly described the FOCALE architecture, based on DEN-ng and used in several FP7 projects. The idea was to represent facts using an information model, and then use ontologies to reason and learn about the facts (e.g., prove/falsify hypotheses, such as for root cause analysis, enabling the system to learn and grow its knowledge base). The important point is that since the network evolves, the underlying knowledge base must also evolve, and it is less important to provide a definition of a managed object than it is to provide an explanation of how that managed object is used in the system. Robin agreed, and said that you can't simply hand off a managed object to an OSS. If you truly want to do flow-through, then you need to decouple managed objects with operations.
- Robin/Klaus: we need to document that operators need autonomics, and link these to SDOs. One of the problems with NGMN was that it had strong technical and academic drivers, but was weak on business drivers. This is why it didn't have the impact it should have. Operator-driven requirements for SDN, NFV and AMC (autonomics) should be the ones to strongly use as drivers.
- ***Next meeting June 23-27 Denver will include NFV BoF, may need to do one on Autonomics as well (@Dublin?)***

3.4. OMA

Kipeng Li, Huawei, Technical Plenary Vice-Chair. APIs are a key enabler for virtualization. API exposes specific capabilities for application developers for service development. Exposure layer is an intermediation layer, based on REST, which enables wireless operators to allow network infrastructure to be virtualized independently when deploying APIs, ensuring access control and security between core network and services using it. OMA has a number of APIs published for service enablers. OMA is still considering how to relate service enablers and NFV/ SDN. In principle, no change is required for their APIs, whether the underlying resource is implemented in hardware or software. OMA enablers are essentially protocols, and NFV is not defining protocols. BBF and OMA have a liaison relationship approximately 4 years old on the BBF Home Working Group associated with wireline device management, but each organization has developed its own Device Management protocol, object and data models. TMF has defined a number of APIs and questioned if TMF could collaborate with OMA as well as with the BBF to ensure fixed wireline and wireless harmonization. OMA has had internal discussions of SDN and NFV, but work is still in progress and not available external to OMA. It was also pointed out that OMA and TMF collaboration could be enhanced through Catalysts and other API Harmonization. Next OMA meeting is September.

3.5. ETSI E2NA/NTECH/AFI

Tayeb Ben Meriem, Orange, NTECH/AFI WG Rapporteur and acting AFI WG Chair, presented the work initiated in ETSI AFI on autonomics. AFI fused a number of leading autonomics efforts/models, including FOCALE, IBM-MAPE, 4WARD, Knowledge Plane for the Internet, and other models, and developed the Generic Autonomic Network Architecture (GANA), as a unified Reference Model for Autonomic Networking, Cognitive Networking and Self-Management. The AFI presented how the GANA Model incorporates the notion of Software-Driven Networking (Software-Empowered

Networks). Conceptually, this provides a broader picture of SDN—of which Software-Defined Networking is a subset. Software-Driven Networking in GANA is achieved through the design principles for Autonomic Functions ("Decision-making Logics") as "control software modules" that can be loaded into nodes/networks and can be replaced as needed. The AFI presentation provided a clarification on the contrast of automated management and autonomic management, while providing the definition of Autonomic Management & Control (AMC) of Networks and Services. AFI also presented their work on the integration of the ETSI GANA Autonomic Management & Control (AMC) Reference Model with SDN and NFV architectural frameworks. NTECH believes that NFV should include the possibility of autonomic interactions within and between VNFs.

There are a number of work items AFI is working on, and two of the already matured documents that were completed at the ISG level in AFI as GSs are becoming TSs in ETSI / NTECH. The AFI was transformed from an ISG to a WG within the E2NA/NTECH TC. Specifically, AFI transitioned from pre-standardization activities to standardization activities, and is now working on standardization of Autonomic Management & Control (AMC) technologies for the management of diverse networks and services. The history and acknowledgment of the European Commission's support in helping industry create the AFI ISG in 2009, as an instrument for transforming research results on Self-Management in Future Internet into pre-standardization, were presented. AFI is working on Autonomic Management & Control (AMC) of Networks and Services, and is considered the focal point on AMC related standards that build upon the liaisons established between AFI and other Groups in other SDOs. AFI has established liaisons with other standardization groups in order to introduce *autonomicity* in the various reference architectures owned by the various groups by instantiating the GANA model onto a particular reference architecture. A GANA instantiation creates an *autonomically-enabled reference architecture* for use in requirements analysis pertaining to autonomic functions design and incorporation into the architecture. For example, AFI is instantiating the GANA Model onto the BBF reference architecture based on TR101 to create an Autonomically-Enabled BBF Reference architecture. Other GANA instantiations are for Mesh, ad hoc, IMS, and other reference architectures. From this workshop the following have been identified as items for potential collaboration with other Groups:

- With TMF-ZOOM, AFI can work together with TMF ZOOM on harmonization of AMC-related taxonomy. This could, for example, include architectural elements, the information model, and policy-based automation. Since the GANA incorporates concepts from FOCALE as well, the AFI and TMF ZOOM can also work together on specifications concerning the instantiation of the GANA MBTS in specific network environments, while taking into account the integration of GANA and SDN frameworks. Such collaboration could potentially also bring in collaboration with OMG SDN WG, the ONF NBAPI WG, and OpenDaylight.
- Evolution of Information Models as impacted by AMC, and the development and use of Ontologies in AMC, could bring about collaboration between TMF ZOOM, ETSI NTECH/AFI, and other groups.
- ETSI/AFI has started collaborations with other groups in ITU-T, namely SG2/WP2, SG13/Q16, and SG15/Q14, on the subject of Standardization of Network Resilience & Survivability, Recovery, Autonomic Fault-Management and Autonomic Security Management in Evolving & Future Networks. The topic includes need for "Semantic Alarm Models". Other groups could also join the AFI and ITU-T SG2/WP2, SG13/Q16, and SG15/Q14, in multi-groups collaborations on this topic, as the work is just starting.

AFI Liaisons with Groups:

- AFI and Broadband Forum (BBF): *Autonomicity and Self-Management in BBF Architecture*
- AFI and 3GPP: Autonomicity and Self-Management Functions in the Backhaul and Core Networks to complement SON in the RAN and also their global synchronization with SON
- AFI and NGMN: NGCOR Requirements calling for Autonomics-Awareness in the Management Architecture and NGCOR Evolution
- AFI in Multi-SDO Initiative: AFI to specify Autonomics and Self-Management for various NGCOR Use Cases and the Converged Management of Fixed and Mobile Networks
- AFI and TMF ZOOM (liaison is going to be established on evolution of Information & Data Models as impacted by Autonomics and Self-Management)
- AFI and ITU-T SG13: Autonomic Management and Control in FN Architecture and in NGN
- AFI and ITU-T SG2, SG15: Autonomic Management and Control in NGN and other Architectures
- AFI and CAC in the USA and also with NIST: CAC and AFI have regular exchange of invitations and information including invitation to events), and liaison with NIST is expected to be established soon
- AFI and IEEE (Liaison envisaged, contacts have been established)
- AFI and OMG SDN WG (contacts established and a Liaison is to be established)
- AFI and NMRG (This Liaison/collaboration can also be formalized like the other Liaisons)

3.6. IEEE NGSON

Wenjie Zhu, Huawei. NGSON is standardizing a framework of IP-based service overlay networks, where said networks can be context-aware, dynamically adaptive, and self-organizing. NGSON is conceptually between applications and lower level service and transport layers (e.g., SDP, SDF (now DSRA), IMS, and others). NGSON has three projects: P1903.1 (advanced content delivery protocols), P1903.2 (service composition protocols and service chaining), and P1903.3 (protocols between the overlay management functional entity and other functional entities to enable self-organizing management). Service enablers were discussed; these could be deployed in distributed fashion on NGSON nodes. The goal is to create a service ecosystem. Slides included some positioning relationships with SDN and NFV, but this may require further clarification. There were suggestions made on correcting the points mentioned concerning VIM. There is potential for collaboration with ETSI AFI and TMF on the subject of Autonomic Services Management.

3.7. ITU-T SG13 and JCA

Takashi Egawa, NEC, Chair ITU-T JCA-SDN and ITU-T SG13. The ITU-T JCA is not for engineers; it has more legal and government related discussions. Generally speaking, the role of ITU-T: – inter-governmental treaty organization. It is primarily for collecting roadmap type information across other SDOs. ITU-T JCAs collects inputs from all SDOs on their work associated with SDN technology, and will make it publicly available. The purpose of JCA-SDN is to understand the relevant work of other SDOs (any work that has something to do with SDN, even NFV or AMC aspects that have link to SDN related concepts, frameworks or interfaces), and then recommend what standardization work should be done in the ITU-T. SG13 will be the lead study group. JCA-SDN can play the role of ***endorsing*** (*rubberstamping)* any work done elsewhere (e.g., as harmonization work done by multiple groups) on any work that has something to do with SDN (meaning even NFV and AMC, provided they touch on some SDN related concepts, frameworks or interfaces), by creating an ITU-T Recommendation (JCA-SDN would simply receive input and is not responsible for the technical content, except to wrap the content as an ITU-T Recommendation). On the topic of Autonomic Management & Control (AMC) of Networks and Services, SG13 and AFI have established liaison pertaining to the support and work involved on the Y.AMNSA Framework for Autonomic

Management in Future Network (FN) Architecture. The work on the Y.AMNSA is expected to continue, and interested contributors can now join the activities.

3.8. 3GPP, Multi-SDO and NGMN NGCOR

Christian Toche, Huawei, Multi-SDO Convener. Regarding 3GPP SA5, there was no specific presentation on SA5 activities related to SDN and NFV, but there was an indication by Christian that SA5 will be able to share more information on the SDN- and NFV-related SA5 plans when the work and activities have started taking a more solid shape (there is work that is just starting on NFV).

The starting point for the Multi-SDO effort was FMC with focus on management interfaces for converged management of fixed and mobile networks. 3GPP and TMF have worked together in the past, and are involved together with other SDOs in Multi-SDO. NGMN developed the NGCOR requirements document (over 500 pages), but it is not a standard. However, it provides high-level requirements, which are being implemented by the individual SDOs. The BBF and 3GPP collaboration on FMC interworking involves policy and traffic management, and defining new interfaces between fixed and wireless network to support FMC Interworking. However, ongoing convergence was not part of the NGCOR effort; this was done separately.

Discussion of specific topics that are a common problem across SDOs is important, and needs to be done. Having a coordination and/or harmonization group that does not develop standards is difficult to support. The BBF is very nervous about Multi-SDO because the organization is not quite official, yet they are providing open access to documents without any fully developed IPR. The lessons learnt with the Multi-SDO Joint Working Group (JWG) concept needs to be shared, as there are concerns on this that still need to be clarified. Discussion – deja vue – multi-SDO NGMN/NGCOR 2 years ago – to what extent was that successful?—Lessons learnt need to be shared. What's new on these activities (what is now expected)? Some SDOs are missing in these activities (e.g., MEF)? What are the achievements and the potential for engagement with Catalysts?

3.9. TM Forum ZOOM and Autonomics

John Strassner. While the SID is a good information model, it doesn't have the right level of abstractions for autonomic management. It also needs updating to address nearer-term needs, as described in the ZOOM working group.

SDN and NFV lack appropriate software abstractions for this as well. Autonomics is about understanding data from the environment, and determining the best course of action to take. This is orthogonal to current SDN and NFV efforts, which are more focused on simplifying existing problems. In addition, SDN is more focused on the control-to-device (southbound) layer, and NFV so far is focused on virtualization, not management. Instead, what is needed is to raise the level of abstraction, embrace automation, learn from that, and then evolve automation into autonomics. Autonomics has had a few mis-starts, due to its inherent complexity, so it is important to be pragmatic. For autonomics, a "model-driven everything" approach is needed; this is beyond the model-driven architecture proposed by the OMG. We need to return back to true OO design, and look at a model not just as a collection of classes, but as a set of actors that govern behavior.

The Policy Continuum was described as a review to show how behavior can be described by linking the business to the network. Models represent facts; ontologies represent meaning; first order (or

higher) logic is used for decision-making. Several examples of FOCALE and other subsequent management architectures were provided.

4. White Paper Discussion

Ranganai presented the current Draft proposal of the White Paper. One of the objectives is to provide external communications to the industry by aligning the views and contributions of multiple SDOs that are already addressing this topic area. The focus should be on the relevant activities within those organizations addressing NFV, SDN, and AMC (Autonomics). This enables the various SDOs to help each other, and to present a unified set of complementary standards that harmonizes their efforts, avoids duplication of efforts, and maximizes shared resources.

We discussed a proposal to change from Industry Forum (IF) session to a workshop in Globecom 2014. The reason is that sessions are 1.5 hours, which is not enough time, even if we are given two sessions (which is not likely). Ranganai proposes we do a workshop for ½ day. This was supported.

The following points were agreed to:

- We would provide a summary of the reports given during the workshop by the participating SDOs.
- The white paper needs to state what is the problem, what is the increased value, and pin down solid business drivers. We should submit a Draft of the White Paper to the IEEE MENS (Management of Emerging Networks and Services) Globecom 2014 Workshop (whose deadline is 15th July, but we will have time for improvement by September 2014 for submitting a reduced version of the White Paper). This will enable us to have the White paper published by IEEE Globecom later and be accessible via IEEExplore. Ranganai, as MENS co-chair, will make this an "invited paper" so as to allow us to continue working on the longer version of the white paper to be presented in December during our workshop on ***Industry Harmonization for Unified Standards on SDN, NFV, Autonomic Management & Control (AMC), 5G, Unified Management of Converged Nets, and (IPv6 in the picture).***
- The topics that are of interest or relevant to just 2 SDOs, but not of interest to the larger set of SDOs, should be handled by the interested SDOs, which can move forward independent of this activity. In this case, they should inform this group of efforts at future teleconference coordination meetings.
- Ranganai Chaparadza, Tayeb Ben Meriem, and John Strassner offered to support (thanks John) this work. They will act as the primary editors of the white paper, and they will update the current draft and send out the updated version for review and more contributions from the various SDOs.
- Other targets could be ITU Telcom 2014 (FIA is closed), and other bodies in other regions (US, Japan, …).

Note, BBF, Globecom2014 and ITU Telecom 2014 are all the same week !

5. Participants to the workshop

Name	Company or Standardization/Forum Group Represented	E-mail

Tayeb Ben Meriem	Orange, ETSI E2NA/NTECH/AFI	tayeb.benmeriem@orange.com
Ranganai Chaparadza	IPv6 Forum & rep in ETSI E2NA/NTECH/AFI; IEEE Globecom 2014 Industry Forum Chair	ran4chap@yahoo.com
John Strassner	Huawei; TMF ZOOM	john.sc.strassner@huawei.com; strazpdj@gmail.com
Steven Wright	AT&T Services Inc; ETSI NFV	sw3588@att.com
Kenneth Dilbeck	TMF	kdilbeck@tmforum.org
David Milham	TMF	dmilham@tmforum.org
George Dobrowski	Huawei; Broadband Forum (BBF)	georgedobrowski@mail01.huawei.com
Robin Mersh	Broadband Forum (BBF)	rmersh@broadband-forum.org
Takashi Egawa	NEC; ITU-T JCA-SDN, ITU-T SG13	egawa@ieee.org
Robert Cohen	TMF – Enterprise Cloud	bcohen@tmforum.org
Klaus Martiny	Deutsche Telekom AG, NGMN-NGCOR	klaus.martiny@telekom.de
Massimo Banzi	Telecom Italia, NGMB-NGCOR	massimo.banzi@telecomitalia.it
Chrsitain Toche	Huawei; 3GPP SA5; Multi-SDO	christian.toche@huawei.com
Hui Li	Huawei (IEEE NGSON ?)	Hui.Li@huawei.com
Wenjie Jerry Zhu	Huawei; IEEE NGSON	jerry.zhuwenjie@huawei.com
Kepeng Li	Huawei; OMA	likepeng@huawei.com
Michael Behringer	Cisco; ETSI AFI	mbehring@cisco.com
Jean-Marie CALMEL	ORACLE (TMForum ?)	jean-marie.calmel@oracle.com
Masakatsu Fujiwara	NTT	masa.fujiwara@hco.ntt.co.jp
Stephen Fratini	Ericsson (TMForum?)	stephen.fratini@ericsson.com
Ciprian Popoviciu	Nephos6; IEEE Sub-committee: SDN and NFV	chip@nephos6.com
Pekka Olli	TeliaSonera, NGMN-NGCOR	Pekka.Olli@teliasonera.com

Invited persons who could not manage to attend the workshop due to clash with other meetings/schedules:

Name	**Organization**	**E-mail**
Thomas Reibe Bernard Barani, and Pertti Jauhiainen	Invited guest(s) from European Commission (EC).	Can be made available if requested
Manish Patil (organizing committee member)	Dell, OMG SDN WG Chair	Can be made available if requested
Francisco-Javier Ramón Salguero (organizing committee member)	Telefonica, ETSI NFV	Can be made available if requested
Klaus Moschner (organizing committee member)	NGMN	Can be made available if requested
Stefan Engel-Flechsig (organizing committee	NGMN	Can be made available if requested

member)		
Mehmet Ulema (organizing committee member)	Manhattan College, IEEE NGSON Chair	Can be made available if requested
Wang Zhili	BUPT, ITU-T SG2	Can be made available if requested
Niranth	Huawei, IEEE NGSON	Can be made available if requested
Andrea Pinnola	Telecom Italia, OMA	Can be made available if requested
Cecilia Maria Corbi	Telecom Italia, OMA	Can be made available if requested
Latif Ladid (organizing committee member)	IPv6 Forum	Can be made available if requested
Didier Bourse	Alcatel-Lucent, as invited guest from Research community	Can be made available if requested
Zoltán Lajos Kis	Ericsson, ONF	Can be made available if requested
Dan Pitt	ONF Executive Director	Can be made available if requested
Fabian Schneider	NEC, ONF	Can be made available if requested