
Title*: **Liaison Statement to IETF regarding Comments on ANIMA WG charter from ETSI NTECH AFI and suggested synergies and collaboration**

from **Source*:** ORANGE

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Contribution **For*:**

Decision	
Discussion	X
Information	

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ABSTRACT: *This contribution proposes a LS to IETF regarding comments on ANIMA WG charter from ETSI NTECH AFI and suggested synergies and collaboration*

LIAISON STATEMENT

Title: Liaison Statement to IETF regarding Comments on ANIMA WG charter from ETSI NTECH AFI and suggested synergies and collaboration

Approved date: 2014-11-19

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We hereby propose ideas on IETF related work that could be carried out par ANIMA WG to complement the work in ETSI NTECH/AFI WG on *Evolution of Management towards Autonomic Future Internet (AFI)* to prevent duplication of work and effort already undertaken by ETSI NTECH AFI for years. Supplementary details can be found in the Annexes. This input may be vital to IETF groups that are working on topics that are closely related to the work of ETSI NTECH/AFI WG.

1. Overall description: Comments on the ANIMA WG Charter

The ETSI NTECH AFI working group is aware that IETF recently created a new working group on autonomic networking named “ANIMA”. We reviewed the draft charter description for ANIMA and would like to provide a set of comments and suggestions on how the two groups could collaborate and complement each other.

2. Actions: Suggested synergies

2.1. IETF related work that could be carried out in IETF/ANIMA WG to complement the work in ETSI NTECH/AFI WG

We think at least the following collaboration topics should be of high interest to both parties:

- The process of analysis of requirements for autonomic behaviors in networks, in management tasks and in network automation (in general) in order to design autonomic functions and associated communications on the basis of instantiation of the GANA model [1] onto target reference architecture, requires answers to questions such as:

- What protocols (could be IETF protocols) can be used by the instantiated of GANA Functional Blocks (FBs) on the reference points of the FBs to communicate and to convey data/information
- In the target environment, are there protocols that already exist and could be used as the vehicles
- to communicate the FBs messages and data/information on the reference points, or should new IETF protocol(s) be designed for that?
- What messages, data format and control semantics should the FBs communicate to implement the requirements for autonomic behavior and/or automation in general
- Are special IETF protocols required to be introduced?

Those questions imply that IETF protocols and solutions can be introduced to address them. This may lead to a number of ANIMA WG drafts being introduced. The requirements analysis is an ongoing process in ETSI NTECH/AFI, and the outcome can feed input to such ANIMA WG related activities.

- ETSI NTECH/AFI has produced a Technical Specification (recently published) [2] [3] on Scenarios, Use Cases and Requirements for Autonomic/Self-Managing Future Internet. ANIMA WG experts can also perform analysis of those scenarios, use cases and related requirements for autonomic behaviors, in order to derive ANIMA WG based solutions to addressing such requirements.

2.2. Workshops and Tutorials

ETSI NTECH/AFI welcomes the idea of co-organizing workshops or can be invited to meetings where they can give a tutorial on AFI work on Autonomic Networking related Specifications, such as the AFI GANA Reference Model for Autonomic Networking, Cognitive Networking and Self-Management, and its instantiations onto various reference architectures toward autonomics-enabled networks, e.g. during IETF events. For example, ETSI NTECH/AFI does co-organize workshops with ITU-T SG13, SG2 and SG15, and also with other Multi-SDOs/Fora.

Thank you,
Looking forward to progressing to the next level of our collaboration,

ETSI NTECH AFI Working Group

3. Annexes

3.1. Annex 1: ETSI NTECH/AFI WG achievements, roadmaps and Liaisons with other standardization groups

3.1.1. Main achievements from specifications perspective

The ETSI NTECH/ AFI WG was launched in 2009 as an ETSI Industry Specification Group (ETSI / ISG [3]), and is now a standards track group on *Evolution of Management towards Autonomous Future Internet (AFI)*. AFI WG has now produced the first set of autonomic networking specifications. The specifications include:

- Scenarios, Use Cases and Requirements for Autonomic/Self-Managing Future Internet [2],
- Generic Autonomic Networking Architecture (GANA) Reference Model [1][4].

The GANA Reference Model for Autonomic Networking, Cognitive Networking and Self-Management [1] is a Holistic and Unifying Model that unifies main concepts from leading models of autonomic networked systems, namely: IBM-MAPE [10][11], FOCAL [12], 4D [16], Knowledge Plane for the Internet [13], CONMan [14], GENI [15], and others (a table summarizing the unified aspects of the various models is available in ETSI GS AFI002 specification[1]). The work on GANA was based on studying the various models and their limitations (e.g. on scopes of abstractions for self-management in a network architecture), in order to fuse important concepts from these models together to create a holistic and unified model. The GANA is a *Hybrid Model*, enabling designers of Autonomic Functions (referred to as “GANA Decision-making-Elements/Engines, or DEs”) to combine and interwork both centralized autonomic management & control (where centralization is needed) and distributed autonomic management & control (where distribution is needed), via the use of nested Hierarchical Control Loops that are driven by their associated hierarchical Decision Elements (DEs). Autonomic Functions (i.e. DEs) introduced into management and control planes of the network enable the overall network and its network devices/nodes to exhibit at various abstraction levels of functionality autonomies’ *self-** features/capabilities. Such *self-** are for instance, auto-discovery of information, components, services and resources in order to perform self-configuration; self-management; self-organization, self-optimization, self-learning and reasoning, as well as automation of some O&M tasks. Autonomic Functions (AFs), i.e. GANA DEs, can be designed and introduced into the network to enrich the autonomic behaviors of the network by dynamically adjusting protocol parameters and configurations to adapt to various challenges and changes in the network. Among those changes, we can list (e.g., load on links, risks of node failures in certain conditions, network damage, mobility and QoS requirements of traffic flows and volumes, network goals, and policy changes by the operator).

As a “generic” model for Autonomics-Enabling Functional Blocks (FBs) and their associated Reference Points, the GANA is a conceptual model that is abstracted from details that are implementation-oriented and is not constrained by limitations of the current implementation-oriented network architectures and their associated protocols. A GANA implementation guide can be found in [6]. This enables the GANA reference model to be applied to any implementation-oriented reference network architecture (current ones and future network architectures) in instantiating the Autonomics-Enabling FBs and Reference Points to introduce/enable autonomies in a particular target architecture. In the complete picture of Autonomics in networks, AFI calls it **Autonomic Management & Control (AMC)** of Networks and Services. AMC is about Autonomics (e.g., control loops, decision making, and the application of knowledge) introduced in the Management Plane as well as Autonomics introduced in the Control Plane. The distinguishing property of AMC is that both the Management Plane and the Control Plane are affected, regardless of whether they are distributed or centralized. There is now ongoing work in AFI on the integration of the GANA with SDN and NFV Reference Models (refer to Report and slides from the Initiative on Industry Harmonization for Unified Standards on AMC, SDN and NFV: <http://www.tmforumlive.org/ieec/>, and also [5][7][8]).

3.1.2. Ongoing specification work within liaisons with other SDOs

AFI has established liaisons with other standardization groups in order to introduce autonomicity (i.e. Autonomics) in the various reference architectures owned by the various groups, by instantiating the GANA model (FBs and their associated Reference Points) onto particular reference architectures. For this, AFI established liaisons with the relevant groups as listed in the Annex 1. A GANA instantiation creates an Autonomicity (Autonomics)-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 various existing architectures:

- Instantiation of AFI GANA Model onto BBF reference architecture based on TR101 to create an *Autonomicity-Enabled BBF Reference architecture*.
- Instantiation of AFI GANA Model onto Mesh / Sensor networks [9],
- Instantiation of AFI GANA Model onto ad hoc networks,
- Instantiation of AFI GANA Model onto IMS,
- Instantiation of AFI GANA Model onto EPC.

Once the instantiation of the GANA onto a target network architecture has been completed, then designers of autonomic behaviors of the instantiated GANA FBs and associated Reference Points move on to analyze the requirements for autonomic behaviors in the particular target architecture. Hence produce control-loops designs as well as detailed specifications of the communications involving the FBs and the messages and data they communicate on their associated reference points. The FBs include the Autonomic Functions (GANA Decision Elements (DEs)) that drive the specific control-loops required. This process of requirements analysis to design autonomic behaviors answers the questions such as:

- What protocols (could be IETF protocols) can be used by the instantiated FBs on the reference points of the FBs to communicate and to convey data/information?
- In the target environment, are there protocols that already exist and could be used as the vehicles to communicate the FBs messages and data/information on the reference points, or should new IETF protocol(s) be designed for that?
- What messages, data format and control semantics should the FBs communicate to implement the requirements for autonomic behavior and/or automation in general? Are special IETF protocols required to be introduced?

Overall, the requirements analysis involves designs and specification of Autonomic Functions (GANA DEs) that are required to realize autonomic behaviors within the Management Architecture and/or within the Control-Plane of the target reference network architecture.

3.2. Annex 2: References

- [1] ETSI GS AFI 002(now being converted to an ETSI TS): *Autonomic network engineering for the self-managing Future Internet (AFI): **GANA Architectural Reference Model for Autonomic Networking, Cognitive Networking and Self-Management***. This ETSI Specification is publicly available since April 2013: http://www.etsi.org/deliver/etsi_gs/AFI/001_099/002/01.01.01_60/gs_afi002v010101p.pdf . **NOTE:** This GS Spec is now being transformed into a TS Specification.
- [2] ETSI TS 103 194 V.1.1.1 (2014-10): *Network Technologies (NTEC); Autonomic network engineering for the self-managing Future Internet (AFI): Autonomic network engineering for the self-managing Future Internet (AFI); **Scenarios, Use Cases and Requirements for Autonomic/Self-Managing Future Internet***. This ETSI Specification is publicly available, since October 2014 URL: http://www.etsi.org/deliver/etsi_ts/103100_103199/103194/01.01.01_60/ts_103194v010101p.pdf
- [3] ETSI AFI Industry Specification Group: *Autonomic network engineering for the self-managing Future Internet (AFI):* (<http://portal.etsi.org/afi>) ; and now AFI WG in NTECH https://portal.etsi.org/NTECH/NTECH_AFI_ToR.asp
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- [5] R. Chaparadza, Tayeb Ben Meriem, Benoit Radier, Szymon Szott, Michal Wodczak, Arun Prakash, Jianguo Ding, Said Soulhi, Andrej Mihailovic: **SDN Enablers in the ETSI AFI GANA Reference Model for Autonomic Management & Control (emerging standard), and Virtualization Impact: In the proceedings of the 5th IEEE MENS Workshop at IEEE Globecom 2013, December, Atlanta, Georgia, USA**
- [6] R. Chaparadza, Tayeb Ben Meriem, Benoit Radier, Szymon Szott, Michal Wodczak, Arun Prakash, Jianguo Ding, Said Soulhi, Andrej Mihailovic: **Implementation Guide for the ETSI AFI GANA Model: a Standardized Reference Model for Autonomic Networking, Cognitive Networking and Self-Management: In the proceedings of the 5th IEEE MENS Workshop at IEEE Globecom 2013, December, Atlanta, Georgia, USA**
- [7] IEEE Globecom 2013 Industry Forum Sessions (IF24 & IF26): **Emerging Standards in Autonomic Management, SDN & NFV, and Unified Management of Converged Networks: 9-13 December 2013, Atlanta, Georgia, USA:** <http://www.ieee-globecom.org> ;
- [8] Joint SDOs/For a **White Paper: Industry Harmonization for Unified Standards on Autonomic Management & Control of Networks and Services, SDN, NFV, and 5G**. **Note:** This White Paper is expected to be published in 2014, and readers are encouraged to follow-up and read the joint SDOs/Fora White Paper when it gets published.

- [9] Szymon Szott, Michal Wódczak, Ranganai Chaparadza, Tayeb Ben Meriem, Kostas Tsagkaris, Apostolos Kousaridas, Benoit Radier, Andrej Mihailovic, Marek Natkaniec, Krzysztof Loziak, Katarzyna Kosek-Szott, Michal Wagrowski: **Standardization of an autonomicity-enabled mesh architecture framework, from ETSI-AFI group perspective: Work in progress (part 1 & part 2):** In the proceedings of the 4th IEEE MENS Workshop at IEEE Globecom 2012, December, Anaheim, California, USA
- [10] IBM White paper: **An architectural blueprint for autonomic computing:** June 2005.
- [11] J.O. Kephart, and D.M. Chess, "The Vision of Autonomic Computing", *IEEE Computer*, January 2003.: <http://users.soe.ucsc.edu/~griss/agent-papers/ieee-autonomic.pdf>
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