



ATIS-0200013

ATIS Standard on -

**INTER-ADMINISTRATIVE DOMAIN
NFV TECHNICAL REQUIREMENTS**



As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global ICT companies to advance the industry's most pressing business priorities. ATIS' nearly 200 member companies are currently working to address the All-IP transition, network functions virtualization, big data analytics, cloud services, device solutions, emergency services, M2M, cyber security, network evolution, quality of service, billing support, operations, and much more. These priorities follow a fast-track development lifecycle — from design and innovation through standards, specifications, requirements, business use cases, software toolkits, open source solutions, and interoperability testing.

ATIS is accredited by the American National Standards Institute (ANSI). The organization is the North American Organizational Partner for the 3rd Generation Partnership Project (3GPP), a founding Partner of the oneM2M global initiative, a member of and major U.S. contributor to the International Telecommunication Union (ITU), as well as a member of the Inter-American Telecommunication Commission (CITEL). For more information, visit www.atis.org.

Notice of Disclaimer & Limitation of Liability

The information provided in this document is directed solely to professionals who have the appropriate degree of experience to understand and interpret its contents in accordance with generally accepted engineering or other professional standards and applicable regulations. No recommendation as to products or vendors is made or should be implied.

NO REPRESENTATION OR WARRANTY IS MADE THAT THE INFORMATION IS TECHNICALLY ACCURATE OR SUFFICIENT OR CONFORMS TO ANY STATUTE, GOVERNMENTAL RULE OR REGULATION, AND FURTHER, NO REPRESENTATION OR WARRANTY IS MADE OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. ATIS SHALL NOT BE LIABLE, BEYOND THE AMOUNT OF ANY SUM RECEIVED IN PAYMENT BY ATIS FOR THIS DOCUMENT, AND IN NO EVENT SHALL ATIS BE LIABLE FOR LOST PROFITS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. ATIS EXPRESSLY ADVISES THAT ANY AND ALL USE OF OR RELIANCE UPON THE INFORMATION PROVIDED IN THIS DOCUMENT IS AT THE RISK OF THE USER.

NOTE - The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to whether use of an invention covered by patent rights will be required, and if any such use is required no position is taken regarding the validity of this claim or any patent rights in connection therewith. Please refer to [<http://www.atis.org/legal/patentinfo.asp>] to determine if any statement has been filed by a patent holder indicating a willingness to grant a license either without compensation or on reasonable and non-discriminatory terms and conditions to applicants desiring to obtain a license.

Published by

Alliance for Telecommunications Industry Solutions
1200 G Street, NW, Suite 500
Washington, DC 20005

Copyright © 2016 by Alliance for Telecommunications Industry Solutions
All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher. For information contact ATIS at 202.628.6380. ATIS is online at < <http://www.atis.org> >.

Inter-Administrative Domain NFV Technical Requirements

Alliance for Telecommunications Industry Solutions

Approved March 8, 2016

Abstract

A number of multi-administrative domain Network Functions Virtualization (NFV) use cases have been documented in ATIS-0200012. These use cases are highly relevant to the needs of wireline, wireless, cable, and enterprise networks. Based on these use cases, this document establishes a high level architecture and associated requirements to enable new business opportunities based on open standards to the communications industry.

Foreword

The Alliance for Telecommunications Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The Network Functions Virtualization Forum (NFV Forum) provides the inter-provider technical requirements and solutions to help ICT companies realize the benefits of rapidly advancing software-defined networking and NFV technologies. This work is part of a sweeping evolution that is moving the industry from integrated, hardware-centric solutions to modular, hardware-agnostic frameworks by abstracting the hardware resources into a consistent operating environment for the software.

The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages. The word *may* denotes an optional capability that could augment the standard. The standard is fully functional without the incorporation of this optional capability.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, NFV Forum, 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, the NFV Forum, which was responsible for its development, had the following leadership:

Tom Anderson, NFV Co-Chair (Cisco)

Ben Campbell, NFV Co-Chair (Oracle)

Table of Contents

1	Executive Summary	1
1.1	Scope.....	1
1.2	Assessment and Conclusions.....	1
2	References	1
3	Definitions, Acronyms, & Abbreviations	1
3.1	Definitions	2
3.2	Acronyms.....	2
4	General Model and High-Level Architecture for Inter-Administrative Domain NFV	3
4.1	Inter-Administrative Domain NFV Service Models.....	5
4.2	Inter-Administrative Domain Architecture	6
4.3	Application of NFV Service Models to the Inter-Administrative Domain Architecture	7
4.3.1	<i>Network Functions Virtualization Infrastructure as a Service (NFVlaaS)</i>	7
4.3.2	<i>Virtual Network Function as a Service (VNFaaS)</i>	11
4.3.3	<i>Virtual Network Platform as a Service (VNPaaS)</i>	12
4.4	Routing and Service Function Chaining	12
5	Requirements	13
5.1	Architecture Requirements	13
5.2	Service Use Case Support (e.g., VNO, Roaming etc.)	15
5.3	Service Level Requirements.....	16
5.4	Administrative Requirements	17
5.4.1	<i>Ordering and Billing</i>	17
5.4.2	<i>Usage Terms and Conditions</i>	18
5.4.3	<i>Licensing</i>	18
5.4.4	<i>History Recording</i>	19
5.5	Security	19
5.5.1	<i>Trusted Computing and Remote Attestation</i>	20
5.5.2	<i>Data in Motion Considerations</i>	20
5.5.3	<i>Data at Rest Considerations</i>	20
5.5.4	<i>Data Sovereignty</i>	20
5.5.5	<i>Personal Data Privacy</i>	21
5.5.6	<i>“Lock Down” of Code, Scripts and other Resources</i>	21

Table of Figures

Figure 4.1	– Inter-Administrative Domain Architecture	7
Figure 4.2	– CAD has control of VIM	9
Figure 4.3	– CAD interfaces to VNFM in PAD	10
Figure 4.4	– CAD subcontracts orchestration to the PAD.....	11
Figure 4.5	– Example of Service Function Chaining Involving More Than One Producer Administrative Domain.....	13

Table of Tables

Table 1: Example CAD and PAD Roles for Candidate Use Cases.....	4
Table 2: Summary of Potential Service Models	15

ATIS Standard on –

Inter-Administrative Domain NFV Technical Requirements

1 Executive Summary

1.1 Scope

This document defines a high level architecture and associated requirements for support of inter-administrative domain Network Functions Virtualization (NFV). This architecture and these requirements support, but are not limited to, the use cases defined in [ATIS-0200012].

1.2 Assessment and Conclusions

The architecture defined in this document, based on a Consumer Administrative Domain and a Producer Administrative Domain, can enable new business opportunities by addressing use cases such as those defined in [ATIS-0200012]. This framework is applicable to the operation of all three NFV service models in an inter-administrative domain context: Network Functions Virtualization Infrastructure as a Service (NFVlaaS), Virtual Network Functions as a Service (VNFaaS), or Virtual Network Platform as a Service (VNPaaS). This architecture allows both complete Service Functions and/or NFV Infrastructure Capabilities to be traded between the Consumer and the Producer. From this architecture requirements have been derived that include the operational, administrative, and security aspects.

This architecture and these requirements provide a foundation for further standardization to enable open, discoverable, and interoperable NFV services in an inter-administrative domain context.

2 References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

[ATIS-0200012], *NFV Forum Use Cases*.¹

[ATIS-I-0000043], *Big Data Analytics Focus Group: BDA Data Value Chain Reference Model & Use Cases*.²

[ETSI GS NFV 001], V1.1.1, *Network Functions Virtualisation (NFV); Use Cases*.³

[NIST 800-145], Special Publication 800-145, *The NIST Definition of Cloud Computing*.⁴

3 Definitions, Acronyms, & Abbreviations

For a list of common communications terms and definitions, please visit the *ATIS Telecom Glossary*, which is located at < <http://www.atis.org/glossary> >.

¹ Available at: < <https://www.atis.org/docstore/product.aspx?id=28218> >.

² Available at: < <https://www.atis.org/docstore/product.aspx?id=28144> >.

³ Available at: < www.etsi.org/ >.

⁴ Available at: < www.nist.gov/ >.