

Orchestration, Automation and Virtualisation in NRENs

- Survey -

Introduction

This survey has been sent through the GÉANT partner relations team to NRENs to be filled in by their senior network engineers. The responses provided should reflect the opinion of the NREN, not the personal views of the person filling in the survey.

The questions were coordinated by the Network Technologies and Services Development Work Package (WP6) of the GÉANT GN4-3 project. Please complete the survey by April 17, 2019 and email it to: gn4-3-wp6-wpls@lists.geant.org or submit online via survey monkey at <https://www.surveymonkey.com/r/OAV-in-NRENs>.

The survey was developed to complement the topics covered by the GÉANT NREN Compendium (see <https://compendium.geant.org/>).

The purpose of this survey is to:

- learn about the strategy and actions of each NREN related to network and service orchestration, automation and virtualisation (OAV);
- explore if there are common use cases, ideas, needs and issues in the community in the areas of automation, orchestration and virtualisation;
- recognise possible areas of collaboration both amongst NRENs and between NRENs and GÉANT;
- determine and recommend possible future work within Work Package 6 (WP6) of the GÉANT GN4-3 project that could be of benefit to as many partners as possible for identified use case(s).

For all questions that have free-text boxes please feel free to provide any additional explanation and information that we did not explicitly ask and you find relevant, including any potential requirements or prerequisites related to your answer. There is also a free text box at the end of the survey for you to add any extra comments.

All the information provided will be analysed to determine potential future work items for WP6. A summary of the findings will be presented for information and discussion at the “GN4-3 Future Service Strategy Workshop” in Amsterdam on 9/10 May 2019.

We may also initiate further more specific investigations, e.g., focus groups or expert discussion groups, on certain topics based on the survey findings, or we may wish to follow up with specific respondents about specific answers they have given. Hence we have asked for the contact details of the person(s) in each NREN completing the survey.

I. Information about the NREN

Please provide the following information:

*** 1. Name of your National Research and Education Network (NREN):**

*** 2. Your name and role (person or persons completing the survey)**

3. We would like to contact you in case of any additional questions. If you agree, please provide contact details.

Any personal data (your name, role and contact details) provided would be used only for the purpose of this survey data gathering and analysis on the basis of your consent which will be provided upon your fulfilment of the aforementioned data and will not be disclosed outside of the team working on this consensus building initiative in the project in any part of the process. The data controller of your data is GÉANT Association and you can find GÉANT's privacy notice here: <https://www.geant.org/privacy-notice/Pages/GEANT-Privacy-Notice.aspx>.

II. Your Existing Network and Services Platform

We would like to understand the current status of the systems that underpin your network deployment, so that we know more about the platform upon which you are building or could build future services using Orchestration, Automation and Virtualisation (OAV) principles.

4. What elements are your network's OSS (Operations Support System) and BSS (Business Support System) comprised of? What do you see as strengths and weaknesses of your OSS and BSS systems?

5. Does your organisation employ a data model such as the TM Forum Information Framework (SID), the DMTF Common Information Model (CIM), (IETF) YANG models, or something similar? If so, which one(s)?

6. Does your organisation follow the practices of any related process models, guidelines, standards or best practices such as TM Forum, MEF, IETF, ITIL or ISO 27000? If yes, which?

7. Do you or your organisation participate in / contribute to any standardisation communities or network operator fora related to automation? If so, which ones and why?

8. Do you use standard APIs for interoperation between your OSS and BSS components? If so, please provide examples.

9. What policies do you have today to control and manage changes to your network device configurations?

10. Do you have a networking / network services testbed within your organisation? Does it support evaluation and testing of orchestration, automation and virtualisation approaches? If so, please explain how.

III. Your Current OAV Use Cases and Services

In this section, we would like to explore any existing applications of OAV approaches to deploying and supporting services within your network.

11. What orchestration, automation, and/or virtualisation work is taking place in your organisation? For each of these work areas, please state whether it is in the strategy, development or production stage.

12. Of the above areas, which did you choose to implement first, and why?

13. Which software are you using for orchestration, automation, and virtualisation? Please include any open source tool(s), in-house software, commercial off-the-shelf software, third party bespoke systems, etc.

14. Have you implemented any inter-domain orchestration or automation? If yes, please give more details.

15. How would you rate the priority of the following orchestration, automation and virtualisation use cases (please choose all that apply and specify as many details as you find appropriate):

	none	low	medium	high	critical
Automated WAN connectivity, including network peerings					
Connectivity to cloud services					
Last mile connections / CPE provisioning					
Wireless networking					
Data centre networking enhancements					
Problem troubleshooting					
Configuration integrity					
Security operations centre enhancements					
Deploying NFV security (or other) functions to customers					

Do you have any other use cases? Please specify

16. Please describe multi-domain OAV use cases of interest to you that include:

- a) An institution / campus and your NREN
- b) Your NREN and GÉANT
- c) Your NREN and a cloud provider

17. Does your NREN offer or use virtualised services such as VPNs, VRFs, virtual circuits, virtual machines, or other type of abstracted overlays or slicing? If so, please list these.

IV. Your OAV Challenges and Priorities

In this section we are trying to understand your organisation's priorities but also the challenges you face in meeting those priorities, in the context of OAV.

18. What are the main operational priorities you are working on and major pain points you are trying to solve within your operational processes?

19. Do you face particular challenges in widening your orchestration, automation and virtualisation work? If so, please describe these.

20. Please indicate whether you plan to apply OAV principles to the following service areas in the next two years, and if so give example(s) for each:

- a) Hardware independent or technology agnostic control of the network
- b) Modular network provisioning and agility
- c) Network operations and maintenance, e.g., automatic monitoring, ticketing, fault analysis, management, etc.
- d) Consistent network elements updates and large control plane updates verification, e.g., improved accuracy and reduced errors
- e) Network connections
- f) Service ordering
- g) Cost efficiency improvements, e.g., green IT, federated shared infrastructure, etc.
- h) Network security, e.g., firewalls, VPNs, T&I, etc
- i) Other areas? Please specify.

21. What kind of skills do you consider that people in your organisation should have to approach orchestration, automation and virtualization? Do you consider that people in your organisation have the right skills? If not, what is missing?

22. Does your network engineering / Network Operations Centre (NOC) team have specific concerns around a movement towards increased automation? If so, what are they?

23. Which tools do you use or plan to use to ensure your automation platform is robust and will operate correctly, and that changes applied can be appropriately verified?

V. Your Future OAV Use Cases and Services

We would like to understand your plans and priorities for future use cases / services which would benefit from automation. Identifying NRENs that have made progress in one area may help other NRENs starting out in that area.

24. What plans do you have a) within the next two years, and b) beyond that timeframe for your future use of orchestration, automation and virtualisation?

a) within the next two years:

b) beyond that timeframe:

25. Do you plan to implement any inter-domain orchestration or automation in the future? If yes, please describe.

26. What is your view on allowing changes to your network configuration based on requests originated in another organisation, be that GÉANT, an NREN, a campus, or some other organisation?

27. What authentication and authorisation infrastructure do you believe is required to establish appropriate authorisation policy for handling service requests from your own network or for requests originated in another organisation, be that GÉANT, an NREN, a campus, or some other organisation?

28. If you do not use standardised APIs, would you be open to putting a “wrapper” around existing service endpoints to facilitate interoperability with third parties (other NRENs, etc.)?

29. What level of disaggregation from the physical hardware layer would you like to achieve in your organisation in the next 2-4 years, (e.g., through the deployment of white boxes with separate Network Operating Systems, etc.)?

VI. How can the GÉANT Community / the GÉANT Project help you?

This survey is seeking to build consensus around use cases for OAV within the GÉANT and NREN community, and to identify future work in WP6 that can deliver the maximum benefit and best value for that community.

30. Do you collaborate with GÉANT or other NRENs on network and service orchestration and automation? If so, for what scenarios or use cases?

31. Are there NRENs who you consider to be good examples of best OAV practice? Who? Why?

32. How can the GÉANT project assist you in your journey towards greater automation and orchestration of your services? Which of the following would you find useful:

a) providing data model(s)

b) providing methodology

c) providing training (please specify the topic)

d) developing software (please specify which)

e) providing a tool(s) / automation repository

f) or other ways (please specify):

33. Would you consider taking part in a pilot use case involving automatic inter-domain network or service orchestration with full/partial control given to other parties over your network slice? If yes, is there a particular pilot use case that would be of most interest to you?

34. How likely is your NREN to use a full OSS/BSS turn-key solution provided by a third party, e.g., a system integrator, a commercial OSS/BSS suite or GÉANT?

VII. Concluding Comments

This section allows you to add any other comments or information you think is relevant to the survey and its goals.

35. Please enter any additional comments or suggestions you may have:

Thank you very much for taking the time to fill in the survey!!!