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Deliverable D3.5

NREN Satisfaction Survey

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Abstract

This deliverable presents the results and analysis of the sixth NREN Satisfaction Survey conducted in January and February 2018, covering the GÉANT organisation, the GN4-2 project, the GÉANT network and network operations, the GÉANT service portfolio, GÉANT collaboration and community activities, and the GÉANT Compendium. The survey objectives were to assess satisfaction with GÉANT's activities; assess the importance of and satisfaction with specific aspects, products and services; help GÉANT better understand the community's needs; and determine how and where to focus future efforts.

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Executive Summary

The 2018 National Research and Education Network (NREN) Satisfaction Survey carried out and managed by GN4-2 Networking Activity 3 Partner, User and Stakeholder Relations, Task 1 European and Global NREN Account Management (NA3 T1), was the sixth in the survey initiative that began in 2012. The objectives of this and previous NREN Satisfaction Surveys were to assess satisfaction with GÉANT's activities; assess the importance of and satisfaction with specific aspects, products and services; help GÉANT better understand the community's needs; and determine how and where to focus efforts in the future. The survey covered the GÉANT organisation, the GN4-2 project, GÉANT network operations, the GÉANT service portfolio and GÉANT collaboration and community activities.

As in the previous two years, the survey was open to all interested parties in the GÉANT community and, as with last year, was widely promoted via multiple channels. This promotion effort boosted the response rate significantly – by nearly 50% – when initiated in 2017, and the rate remained steady in 2018. In total, 70 individuals from 34 of 39 NRENs opened and answered the survey, the numbers nearly unchanged from 2017 (when it was completed by 73 individuals from 34 of 39 NRENs) and compared to 49 completed responses from 33 different NRENs in 2016. This response rate illustrates steady support for and appreciation of the inclusive approach initiated in 2016 and continued to date.

Overall, a high level of satisfaction was maintained throughout, with only slight changes compared to the previous year. The high level is in part a reflection of the success of the improvement plan put in place after the 2017 survey to address respondents' comments and suggestions.

Specific highlights include:

- Organisation: Confidence remains strong in GÉANT's ability to serve its members. "Working with people from GÉANT is almost always a joy, regardless of location."
- Project: A high level of satisfaction was expressed for the management of the GN4-2 project. "Excellent project management office"; "The PMO does a great job."
- Services: Overall, network-based services were considered to be very high quality, and a significant improvement in both deployment and perceived quality of perfSONAR is apparent. 100% "Excellent" or "Good" ratings for overall performance and reliability of the GÉANT network, GÉANT connectivity with global R&E networks, and ability of the GÉANT Operations Centre to respond to technical issues.
- Service Portfolio: The GÉANT service portfolio is meeting current and future needs. "Looking at the current discussions (white papers) I expect lots of good stuff."; "excellent Cloud service management and procurement assistance".

- Collaboration Activities: The perceived importance of collaboration and community-wide events remains high.

“TFs, SIGs, and community activities such as REFEDS and TNC are the key value of the GÉANT collaboration.”

Areas where work is needed in order to increase satisfaction include:

- Project: More transparency in the areas of project finances, staff allocation, cost and usage of services.
- Service Portfolio: Raise awareness of the service availability and status, and make services more easily accessible.
- Service Portfolio: Increase efforts in T&I, Security, & Privacy.
- Collaboration Activities: Address ongoing demand by the community for more training.

The results of this survey are being shared with the entire community, and will feed into the wider intelligence-gathering activities of NA3.

While the results show that constituents are in general satisfied, GÉANT community needs and views must be constantly monitored and taken into account, and relationships nurtured. Accordingly, based on the results and stakeholder feedback, improvement activities are being initiated, particularly in the areas identified above, with the aim of maintaining, or if possible exceeding 2018 results in 2019.

1 Introduction

The 2018 National Research and Education Network (NREN) Satisfaction Survey, carried out and managed by GN4-2 Networking Activity 3 Partner, User and Stakeholder Relations, Task 1 European and Global NREN Account Management (NA3 T1, also known as the Partner Relations team), was the sixth in the survey initiative that began in 2012. This section describes its objectives, scope and methodology.

1.1 Objectives

The objectives of this and previous NREN Satisfaction Surveys were to:

- Assess satisfaction with GÉANT's activities.
- Assess the importance of and satisfaction with specific aspects, products and services.
- Help GÉANT to better understand the community's needs.
- Determine how and where to focus efforts in the future.

1.2 Scope

The range and diversity of questions remained the same as the previous year, to allow comparison. The goal was to assess and measure GÉANT NREN satisfaction over five key areas of activity:

- GÉANT organisation.
- GN4-2 project.
- GÉANT network operations.
- GÉANT service portfolio.
- GÉANT collaboration and community activities.

The survey also included a question on how the GÉANT Compendium is used, and ended with an open question inviting respondents to identify the one improvement that would help GÉANT better serve their NREN.

1.3 Methodology

The 2018 NREN Satisfaction Survey was identical to the 2017 version in order to achieve a strong level of comparison. The questions therefore remained the same and followed the same format and categorisation.

As in 2017, the option to enter “No opinion (N/O)” or “Not applicable (N/A)” was made available where relevant. This helped clarify that respondents were not expected to answer every question but rather were encouraged to respond to the questions relevant to their work and experience. To focus more clearly on understanding real trends in levels of satisfaction, these “N/O” and “N/A” responses were removed from the analysis so that the percentages were based on the total of respondents actually responding to the specific issue addressed in the query.

In addition, in the Service Portfolio section, actual usage data was taken from GÉANT service managers rather than survey responses since the survey responses to “Does your NREN use this service?” were sometimes found to be incorrect.

An invitation to take part in the survey was initially sent by GÉANT’s CEO to the GÉANT General Assembly members and Access Port Manager (APM) representatives on 9 January 2018 and a follow-up reminder was sent on 23 January 2018. In total, this led to a mailing list of 135 individuals from 39 GÉANT NRENs (all those directly connected to the GÉANT network and contributing to the cost-share model). The mail was sent using the GÉANT MailChimp account, allowing follow-up on open and click activity. An invitation to take part in the survey was also included in all subsequent weekly project news updates sent by the Project Management Office. The survey itself was built and developed using the SurveyMonkey [[SurveyMonkey](#)] online survey tool, a familiar model and used in previous NREN Satisfaction Surveys.

As in the previous year, the survey was open to all interested parties in the GÉANT community. Recipients of the initial invitation were encouraged to distribute the survey link to as many staff members as they deemed suitable.

The survey was open for five weeks, and closed on 14 February 2018.

1.3.1 Follow-Up Activities

An essential part of the survey methodology is to share and discuss the survey results with the appropriate GÉANT organisation and project personnel, so that the necessary actions – of whatever scale and timeframe, from long-term strategic to immediate procedural improvements – can be taken based on the NRENs’ needs, satisfaction levels and comments. Information about 2018 follow-up activities is provided in Section 10 Conclusions and Next Steps.

2 Response Analysis

This section provides details of the response rate and of the respondents' field of expertise.

2.1 Response Rate

The survey response rate remained steady in terms of the absolute number of individuals who submitted responses, maintaining the increase of nearly 50% over 2016. (Prior to 2016, the Satisfaction Survey allowed only one response per NREN.) In total, 70 individuals from 34 out of 39 NRENS opened and answered the survey, compared to 73 individuals from 34 of 39 in 2017 and only 49 completed responses from 33 NRENS in 2016. This response rate illustrates steady support for and appreciation of the inclusive approach initiated in 2016 and continued to date, which allows an unlimited number of individuals within an NREN – as many as are interested – to complete the survey.

The multiple responses per NREN may be seen as a positive indication of the individuals' interest in GÉANT, and that they welcome the opportunity presented by the survey to give their feedback and voice their opinion.

Table 2.1 below shows the number of responses, by NREN, for 2016–2018.

NREN	2016	2017	2018	Change 2018
ACOnet	2	2	1	-1
AMRES	1	3	1	-2
ANA	0	1	0	-1
ANAS	0	0	2	2
ARNES	1	2	2	–
Asnet-AM	1	1	2	1
Belnet	0	1	0	-1
BREN	2	0	2	2
CARNet	2	5	2	-3
CESNET	1	2	2	–
CYNET	1	1	2	1
DFN	1	9	5	-4

NREN	2016	2017	2018	Change 2018
EENet	2	1	1	–
FCT / FCNN	2	2	0	-2
GARR	0	4	1	-3
GRENA	1	1	2	1
GRNET	2	1	1	–
HEAnet	4	3	2	-1
IUCC	1	2	2	–
JISC	2	2	5	3
LITNET	1	2	1	-1
MARnet	1	1	1	–
MREN	1	1	1	–
NIIF – HUNGARNET	2	1	2	1
NORDUNET	0	0	3	3
PCSS	1	1	1	–
RedIRIS / RED.ES	1	3	3	–
RENAM	1	1	2	1
RENATER	1	2	3	1
RESTENA	1	3	2	-1
RoEduNet	2	0	1	1
SANET	1	1	0	-1
SURFnet	3	8	7	-1
SWITCH	3	2	4	2
UIIP NASB	1	1	1	–
ULAKBIM	1	1	1	–
University of Latvia	1	0	1	1
University of Malta	0	1	0	-1
URAN	1	1	1	–
Total	49	73	70	-3

Table 2.1: Number of responses by NREN (country)

2.2 Respondents by Field of Expertise

While the survey questions were designed to cover a broad variety of subjects, it was vital to collect data from as evenly distributed a variety of roles and areas of expertise as possible, to render the results meaningful. For example, if the vast majority of the respondents were employed in technical roles, survey results addressing finance and value or marketing support would have limited significance. Therefore, it was made clear, via the addition of “No opinion” and/or “Not applicable” options that respondents were not expected to answer every question, but rather should focus on areas relevant to their work and experience.

As shown in Table 2.2 below, the actual results did in fact reflect the diversity of the community to a large degree, with relatively even distribution, therefore strengthening the validity of the results.

Please describe your role in the NREN (select all that apply):						
	2016		2017		2018	
Answer Options	Count	%	Count	%	Count	%
General management	19	38.8%	28	38.4%	30	42.9%
Technical management	17	34.7%	21	28.8%	23	32.9%
Financial management	2	4.1%	2	2.7%	3	4.3%
Services management	8	16.3%	15	20.5%	20	28.6%
Network management	18	36.7%	16	21.9%	20	28.6%
Other (please specify)	8	16.3%	17	23.3%	14	20.0%
Answered question	49		73		70	

Table 2.2: Distribution of respondents by area of expertise or role

This relatively even distribution also testifies to the value of the decision made in 2016 to solicit responses from the widest population possible. In 2016, the first year the “one response per NREN” model was terminated, there was a fundamental change in the respondent type, with 73% of respondents being from technical rather than management positions. After just two years, there appears to be an eagerness for NREN contacts to spread an even broader “response net”, as well as a willingness and desire on the part of a more diverse range of professionals to express their opinion and have their voices heard. In addition, more individuals see themselves as having multiple roles in their organisations.

3 GÉANT Organisation

3.1 Overview

Respondents were presented with a series of six questions addressing their level of satisfaction with the GÉANT organisation in its role as an organisation that develops, delivers and promotes advanced networks and associated e-infrastructure services to support open innovation, collaboration and knowledge sharing among members, partners and the wider research and education networking community. The six questions addressed the following:

- Importance of and satisfaction with GÉANT activities:
 - Managing the GN4-2 project and finances.
 - Operating the GÉANT network and providing network services.
 - Managing regional projects.
 - Organising community knowledge-sharing events and training.
 - Providing middleware / Authentication and Authorisation Infrastructure (AAI) services.
 - Running Task Forces and Special Interest Groups (SIGs).
- Confidence in GÉANT's ability to serve members in the best possible way.
- Rating six primary GÉANT functions on a scale from "Excellent" to "Poor":
 - Value for money.
 - Promoting the interests of R&E networking to the EC.
 - Promoting NREN interests internationally / with global regional partners.
 - Effectiveness of the General Assembly as the main membership decision-making forum.
 - GÉANT invoicing and billing processes.
 - Keeping NRENs informed of services and activities.
- Use of and satisfaction with GÉANT communications tools:
 - GÉANT website [[GÉANT website](#)].
 - *CONNECT* magazine.
 - PeaR Community News.
 - GÉANT Project Office News.
 - GÉANT Facebook page.
 - GÉANT Twitter feed.
 - GÉANT LinkedIn page
- The accessibility of GÉANT staff.
- The responsiveness and quality of interaction with GÉANT staff.

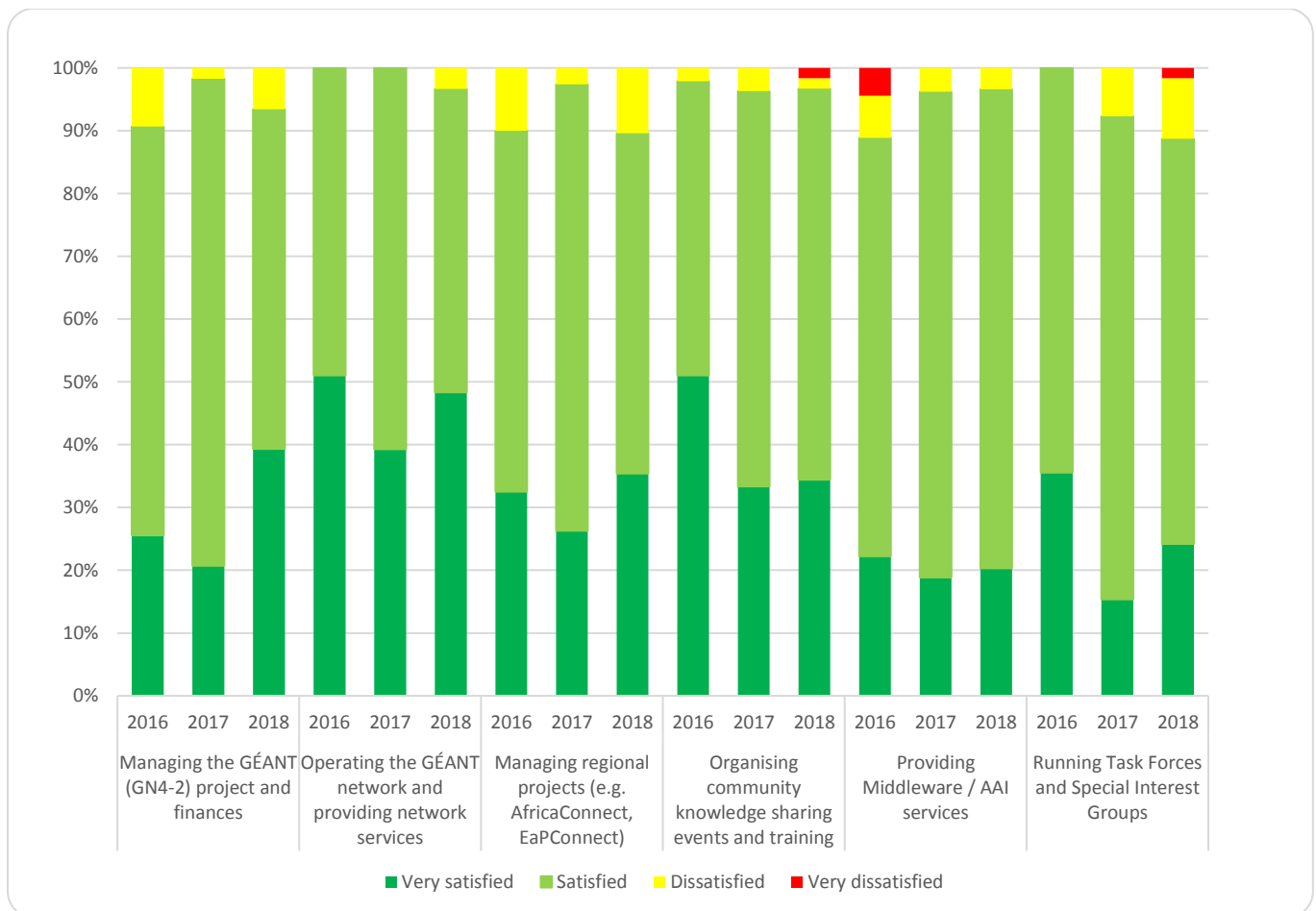
In the data below, “n” represents the total number of respondents who answered the question. It is important to note that the percentages for each option are based on the number of responses received for that option, which may not be the same as the total number who answered the question, and may also differ from the other options within the question, since respondents were not obliged to answer all the options within a question. In calculating the percentages, responses of “No opinion” or “Not applicable” were removed to enable comparison with the previous survey. The numbers behind the graphs are provided in Appendix A.

These six questions were identical to those in the 2016 and 2017 survey, allowing comparative analysis.

3.2 Importance of and Satisfaction with GÉANT Activities

3.2.1 Results

How satisfied are you with this activity?



2016: n=48; 2017: n=62; 2018: n=67 (n = number of respondents who answered the question)

Figure 3.1: 2016, 2017 and 2018 results for satisfaction with GÉANT activities

3.2.2 Analysis

Overall, a high level of satisfaction was expressed in the GÉANT organisation's primary roles, though with a slight increase in the number of "Dissatisfied" (and, in two cases, "Very dissatisfied") responses for all but one of the activities.

In 2018, as in 2017, an overwhelming majority of the 67 respondents to this question indicated they were "Very satisfied" or "Satisfied" in areas deemed important to their NRENS.

The number of NRENS who indicated they were "Very satisfied" increased at an average of 54% across all activities vs (-16%) in 2017. The highest increase was witnessed for the activity of managing the GÉANT (GN4-2) project and finances; one respondent commented that the PMO "does a great job", another that the PMO is "excellent".

The overall satisfaction level for each of the six activities, i.e. combined percentage of "Very satisfied" and "Satisfied", is shown in Table 3.1 below.

GÉANT Organisation Activity	Overall Satisfaction Level
Managing the GN4-2 project and finances	93%
Operating the GÉANT network and providing network services	96%
Managing regional projects	89%
Organising community knowledge-sharing events and training	96%
Providing middleware / AAI services	96%
Running Task Forces and Special Interest Groups	89%

Table 3.1: Overall satisfaction levels for GÉANT Organisation activities

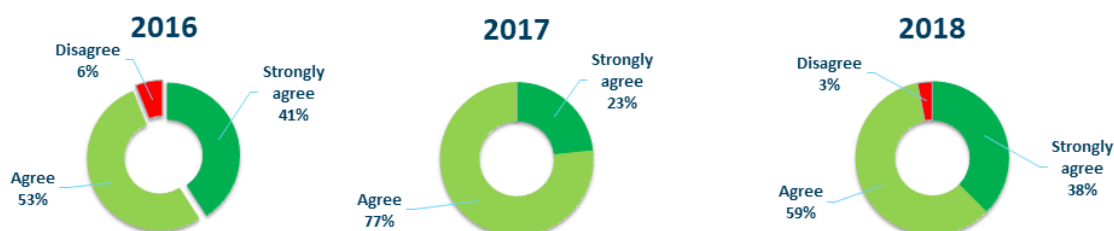
The reasons for the "Dissatisfied" and "Very dissatisfied" responses, still a small minority (the lowest combined total being 2 responses, or 4% of the total for that part of the question, for organising community knowledge-sharing events and training, and 7 responses, or 12% of the total, for running Task Forces and SIGs), will be followed up as part of the improvement activities.

In the individual comments, respondents noted room for improvement in the management of GN4-2 project finances, specifically budget, finance reporting and financial transparency. They also expressed the desire for GÉANT to continue, and improve, inter-NREN community support and service levels, with a need to improve decision-making time and information dissemination across all areas of activity.

3.3 Confidence in GÉANT’s Ability to Serve Its Members

3.3.1 Results

I am confident in GÉANT’s ability to serve its members in the best possible way.



2016: n=49; 2017: n=62; 2018: n=67

Figure 3.2: 2016, 2017 and 2018 results for confidence in GÉANT’s ability to serve its members (n = number of respondents who answered the question)

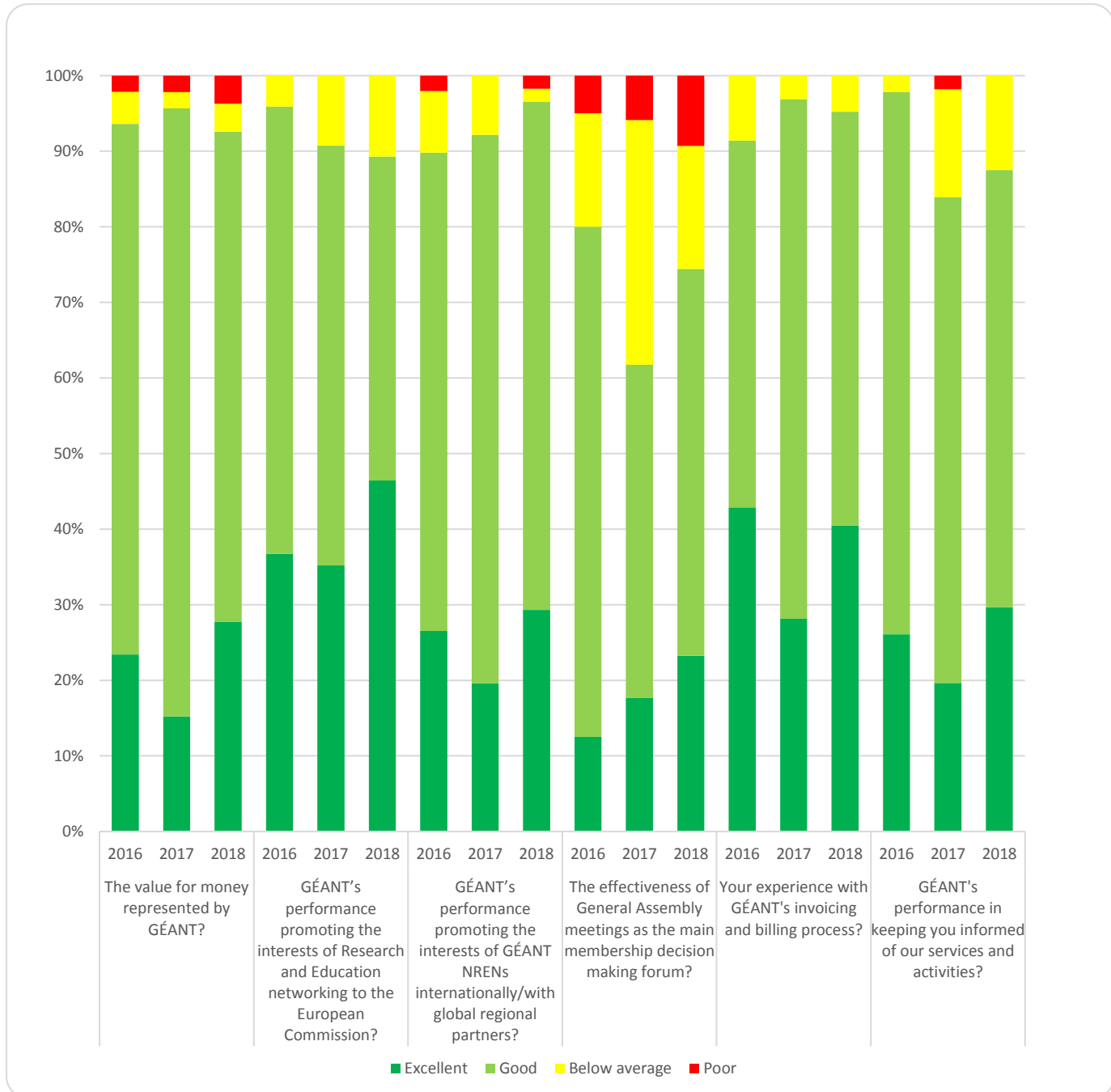
3.3.2 Analysis

In 2018, when presented with the statement, “I am confident in GÉANT’s ability to serve its members in the best possible way”, 62 of 67 respondents, or 97% who expressed an opinion, were in agreement, compared with 100% in 2017 and 93.9% in 2016. Only 2 respondents (3%) disagreed with this statement in 2018 (versus 0 in 2017). However, it is noteworthy that the number of NRENs who “Strongly agree” that GÉANT is able to serve its members increased substantially from 23% in 2017 to 36% in 2018. As part of the improvement activities, there will be a follow-up with the respondents who stated “Disagree”, to establish whether any specific actions can be identified.

3.4 Rating Six Primary GÉANT Functions

3.4.1 Results

How would you rate the following:



2016: n=49; 2017: n=59; 2018: n=64 (n = number of respondents who answered the question)

Figure 3.3: 2016, 2017 and 2018 results for rating six primary GÉANT functions

3.4.2 Analysis

Overall, a high level of satisfaction was expressed in how the GÉANT organisation carried out its primary functions.

In 2017, concerns were raised regarding the overall lower rating of “Excellent” or “Good” for specific parameters. The 2018 data results indicate a significant increase in the “Excellent” rating, which is at its highest level since 2016. The greatest increase in “Excellent” rating was posted for the following functions:

- GÉANT’s performance promoting the interests of R&E networking to the European Commission.
- GÉANT’s performance promoting the interests of GÉANT NREs internationally/with global regional partners.
- GÉANT’s performance in keeping NREs informed of GÉANT services and activities.

The overall satisfaction level for each of the six functions, i.e. combined percentage of “Excellent” and “Good”, is shown in Table 3.2 below.

GÉANT Organisation Activity	Overall Satisfaction Level
The value for money represented by GÉANT	93%
GÉANT’s performance promoting the interests of Research and Education networking to the European Commission	89%
GÉANT’s performance promoting the interests of GÉANT NREs internationally/with global regional partners	96%
The effectiveness of General Assembly meetings as the main membership decision-making forum	74%
NREs’ experience with GÉANT’s invoicing and billing process	95%
GÉANT’s performance in keeping NREs informed of its services and activities	88%

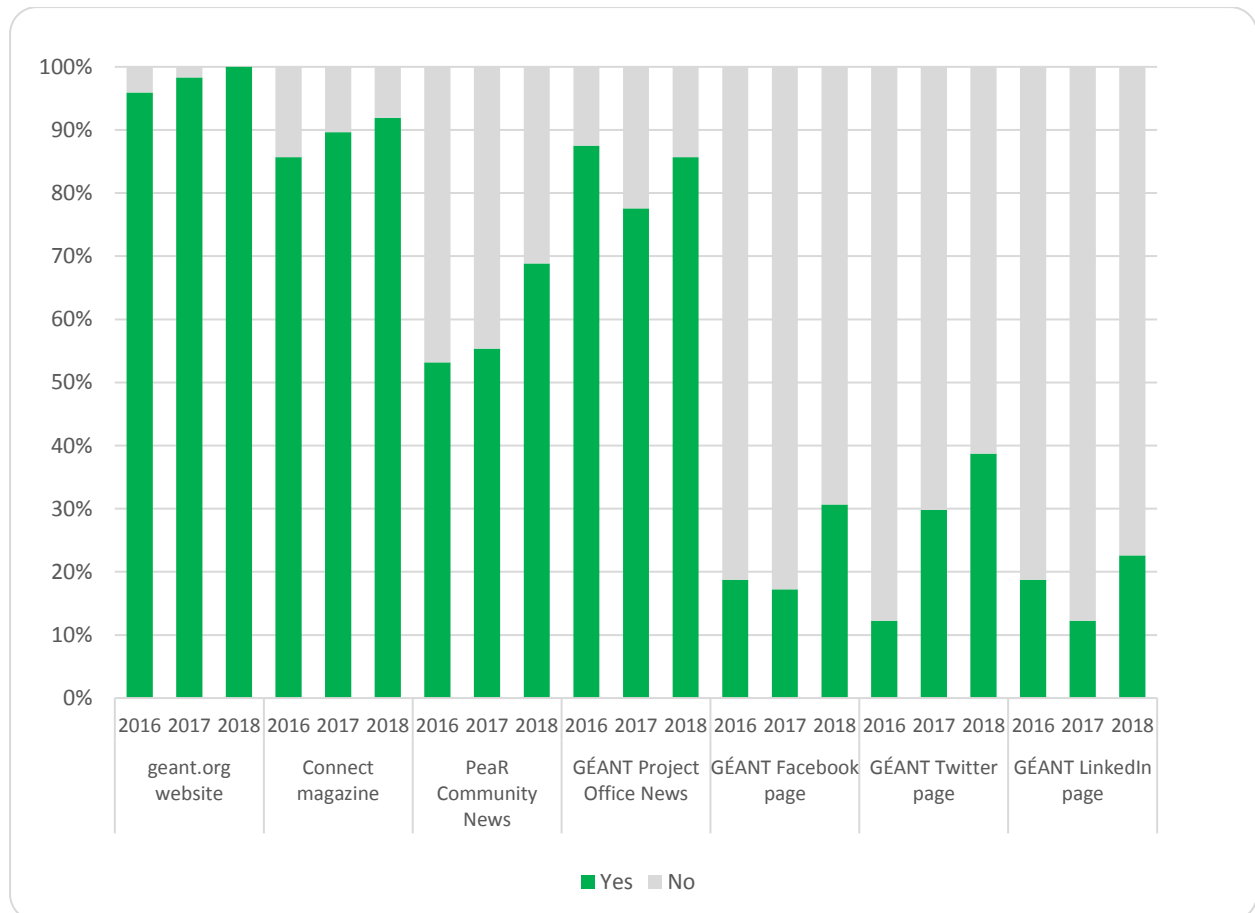
Table 3.2: Overall satisfaction levels for GÉANT’s primary functions

The continued lower satisfaction with the General Assembly as an effective main membership decision-making forum for the GN4-2 project will be addressed in the improvement activities. Its ability to serve its members, to act as an effective decision-making body and to set strategic direction were also mentioned in the individual comments. At the same time, respondents acknowledged the GA’s importance, and suggested more frequent meetings. While there was an increase in the number of “Excellent” ratings (from 6 to 10 and “Good” (from 15 to 22), and an overall increase in satisfaction from 62% to 74%, it is clear that the relevancy and effectiveness of the General Assembly and how it operates should be examined by GÉANT’s Project Management Office.

3.5 Use of and Satisfaction with GÉANT Communications Tools

3.5.1 Results

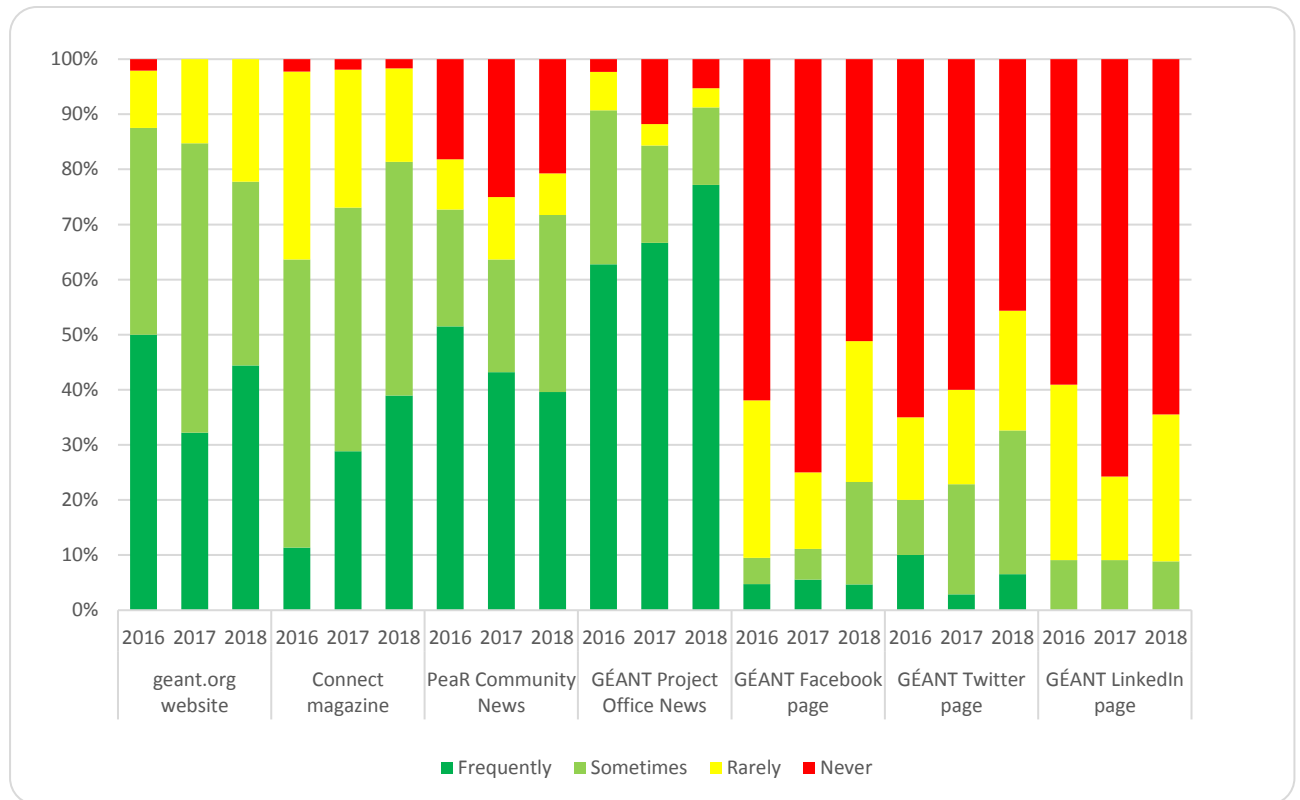
Do you use the following communication tools?



2016: n=49; 2017: n=60; 2018: n=63 (n = number of respondents who answered the question)

Figure 3.4: 2016, 2017 and 2018 results for use of communication tools

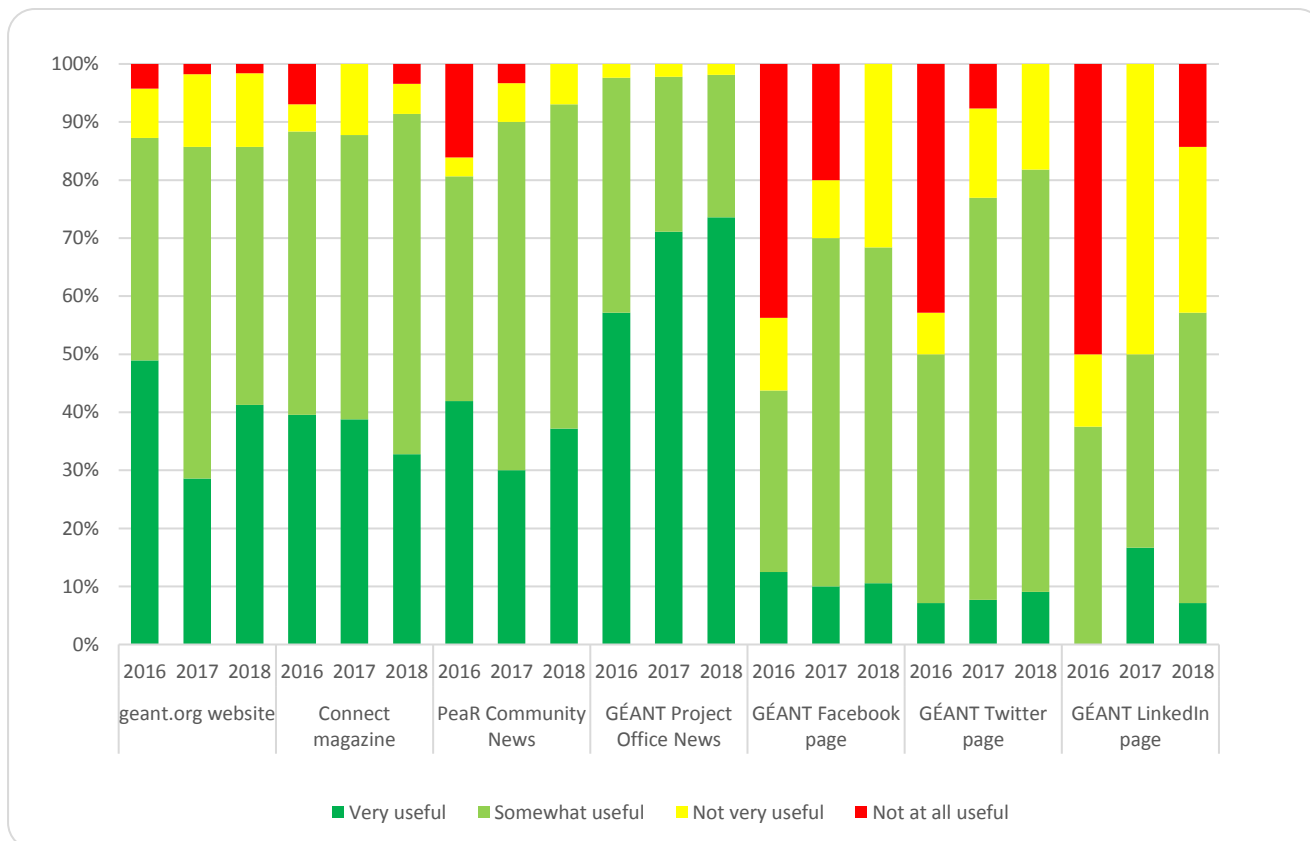
How often do you use it?



2016: n=49; 2017: n=60; 2018: n=63 (n = number of respondents who answered the question)

Figure 3.5: 2016, 2017 and 2018 results for how often communication tools are used

How useful do you find it?



2016: n=49; 2017: n=60; 2018: n=63 (n = number of respondents who answered the question)

Figure 3.6: 2016, 2017 and 2018 results for usefulness of communication tools

3.5.2 Analysis

The number of NRENs using the communication material increased considerably (63% overall, vs. 54% in 2017) and is at its highest level since 2016. It is noteworthy that the number of NRENs who indicated they do not use these tools decreased significantly in comparison to 2017 (37% vs. 46%). The most used tools are the GÉANT website, *CONNECT* magazine and the Project Office News (100% of respondents reported use of the website; 92% for *CONNECT* and 86% for the Project Office News). All three graphs, but Figure 3.4 in particular, show that the community favours the more traditional tools (website, *CONNECT* magazine, PeaR, PO News email) over social media (Facebook, Twitter, LinkedIn). The addition of a dedicated social media officer is expected to boost the social media accounts' effectiveness.

Community respondents clearly continue to find project communications materials useful. The regular Project Office News remains highly regarded, even with a slight decrease in "Very useful" ratings. This is mitigated by the increased value of the Twitter feed: respondents are using other channels for updates on project news. The GÉANT website and *CONNECT* magazine remain the traditional "work horses" of the project and the community, and most community members are familiar with them and refer to them. The perceived usefulness of *CONNECT* magazine continued to grow, and the (small) number of respondents who rated it "Not very useful" or "Not at all useful" saw a fall in comparison

with 2017, with a combined total of 5 respondents, or 8%, in 2018, as against 6 respondents, or 12%, in 2017).

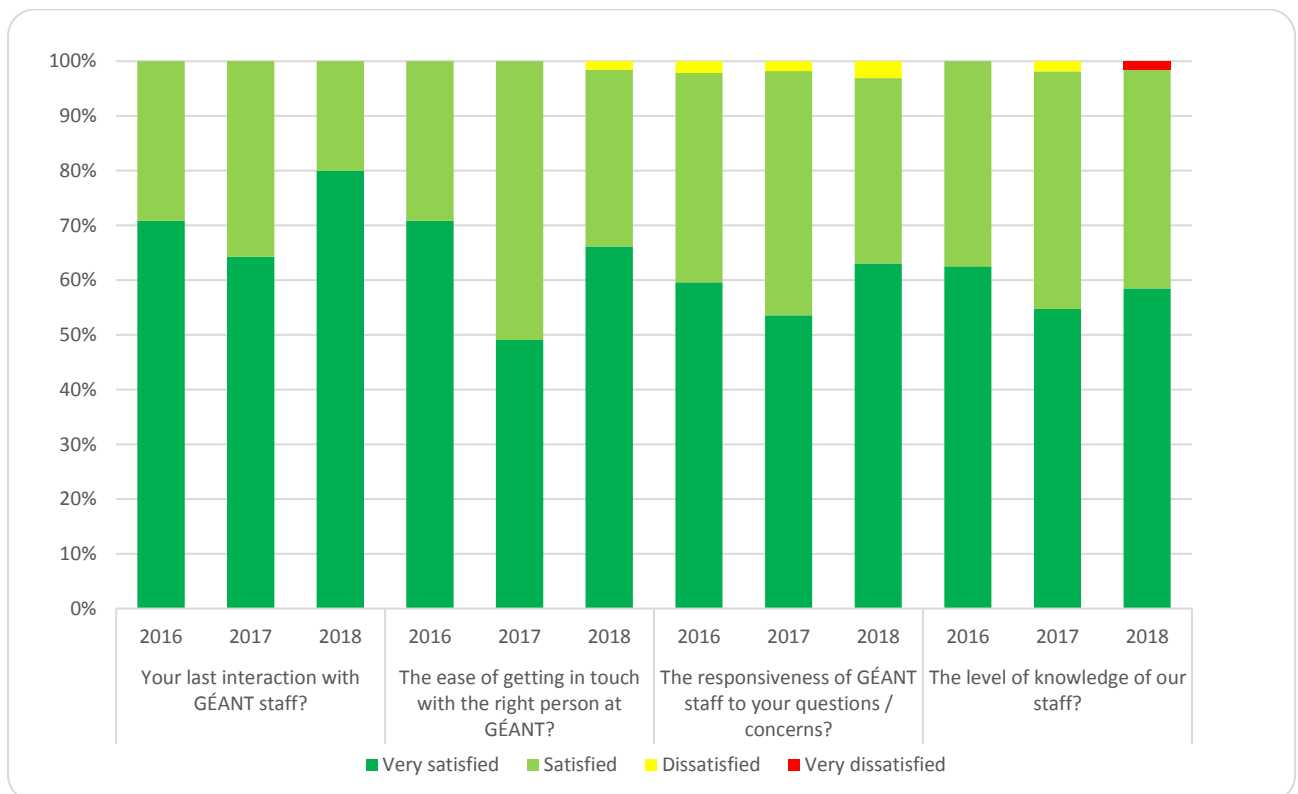
In terms of usefulness, the community clearly highly valued the regular Project Office News, with a 29% increase over 2017. PeaR Community News increased by 48% (40 respondents in 2018 vs. 27 in 2017), and *CONNECT* magazine by 23%. The social media accounts still do not have the traction expected. The addition of a social media officer is expected to boost their effectiveness.

In the individual comments, respondents indicated that the perceived lack of a clear process creates confusion and that finding information among the GÉANT intranet, project intranets and the GÉANT public website is confusing. Respondents also called for better promotion of the channels. These points will be addressed in the improvement activities. Reinforcing the usefulness ratings, one respondent observed that “newsletters such as PeaR and Project Office News are highly useful for staying up to date”.

3.6 Responsiveness of and Quality of Interaction with GÉANT Staff

3.6.1 Results

How satisfied were you with the following relating to your last interaction with GÉANT staff:



2016: n=49; 2017: n=56; 2018: n=65 (n = number of respondents who answered the question)

Figure 3.7: 2016, 2017 and 2018 results for satisfaction with GÉANT staff

3.6.2 Analysis

Of the 65 respondents in 2018 who answered the question as to whether they had had interaction with GÉANT staff in general (question not shown in this document), 64 reported an interaction with GÉANT staff in the past six months, compared to 58 out of 60 in 2017 and 48 out of 49 in 2016. This is a positive sign of greater overall engagement.

Equally positive, satisfaction with the responsiveness of the staff has remained steadily high (97% of respondents either “Satisfied” or “Very satisfied”, with a marked increase in the number of “Very satisfied” responses). The perceived and experienced lack of ease in getting in touch with the right GÉANT personnel will be addressed in the improvement activities.

4 GN4-2 Project

4.1 Overview

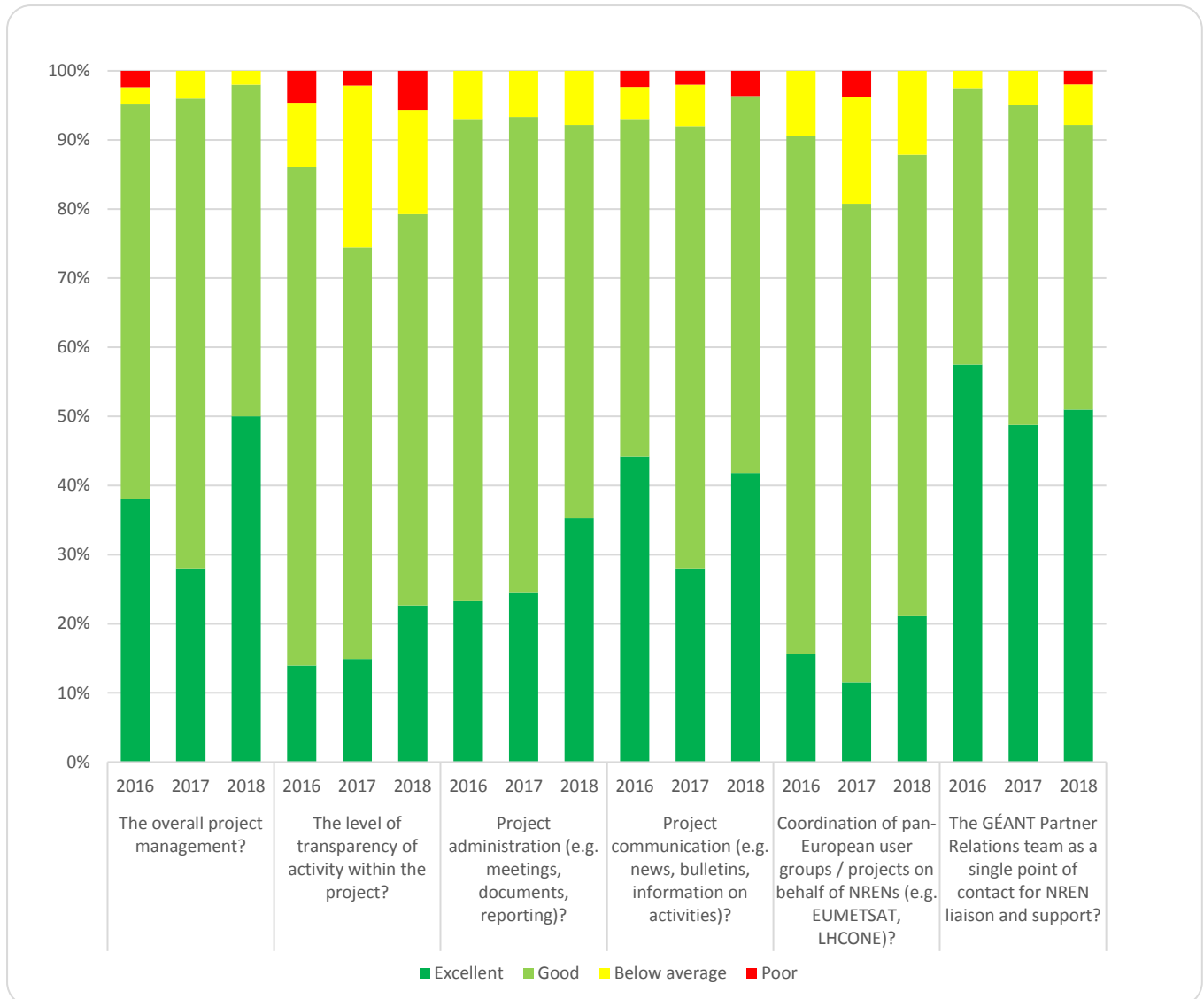
This section of the survey comprised one question to rate the level of satisfaction with the management of the GN4-2 project. Six indices were rated:

- Overall project management.
- Level of transparency of activity within the project.
- Project administration (e.g. meetings, documents, reporting).
- Project communication (e.g. news, bulletins, information on activities).
- Coordination of pan-European user groups / projects on behalf of NRENs (e.g. EUMETSAT, LHCONE).
- The GÉANT Partner Relations team as a single point of contact for NREN liaison and support.

For an explanation of “n” and of the percentages in the data below, please refer to Section 3.1.

4.2 Results

How would you rate the following relating to the GN4-2 project?



2016: n=45; 2017: n=59; 2018: n=64 (n = number of respondents who answered the question)

Figure 4.1: 2016, 2017 and 2018 results for satisfaction with the management of the GN4-2 project

4.3 Analysis

There were 64 responses to the question relating to the GN4-2 project vs. 59 in 2017.

Overall satisfaction remained very high, with the percentage of respondents rating most elements of the project as “Excellent” increasing considerably compared to 2017.

The number of respondents who perceived the overall project management as excellent jumped from 14 in 2017 to 25 in 2018, which is a 79% increase.

As well as growth in the “Excellent” rating – in every area – the combined “Below average” and “Poor” levels dropped in half the areas. Where these did not drop, or increased, an analysis of the results shows that the views come from new respondents. As these views have previously not been captured, the improvement activities will look to address these specifics and act on them. It can be deemed positive that new respondents are engaging in the feedback process and see that by expressing their views via the survey change will follow.

Although overall satisfaction increased in the area of transparency, stronger views were expressed via the “Poor” rating. Comments received were specifically with regard to financial transparency (see also Section 3.2.2).

Alongside this, the individual comments have identified perceived areas for improvement, which will be addressed in the improvement activities. For example, one NREN mentioned there are often issues of “reserves”, “deferred income” and difficulty understanding the actual cost of the network and staff allocation, another that there is lack of information about cost and usage of services.

5 Satisfaction with the GÉANT Network and Operations

5.1 Overview

This section of the survey encompassed a series of questions asking users to rate the quality and general operation of the GÉANT network, and the activities of the Operations Centre.

With regard to the network, users were asked to rate:

- Overall performance and reliability.
- Operation and management.
- Connectivity with global R&E networks.
- Service and Technology Forum as a means for Access Port Managers (APMs) to receive and share information.
- Ability of the Operations Centre to respond to technical issues.

With regard to the Operations Centre, users were also asked how it rates in relation to new or upgraded service rollouts.

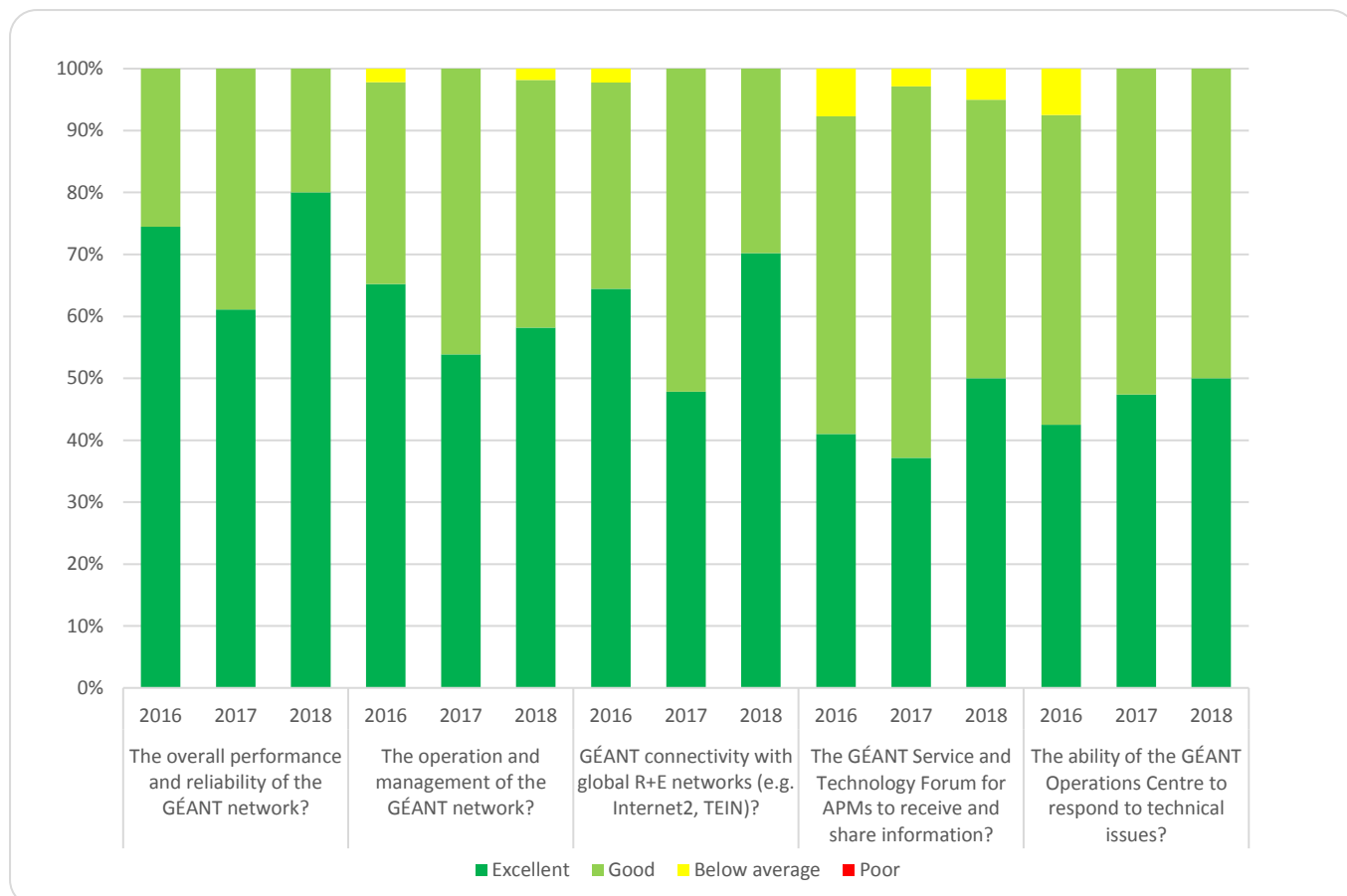
This was followed by a question asking users to rate the level of network security, including specifics on subscriptions to two GÉANT security services: Network Security Handling and Response Process (NSHaRP) and Firewall-on-Demand (FoD).

For an explanation of “n” and of the percentages in the data below, please refer to Section 3.1.

5.2 Overall Quality, Performance and Management

5.2.1 Results

How would you rate the following relating to the GÉANT network:



2016: n=47; 2017: n=59; 2018: n=64 (n = number of respondents who answered the question)

Figure 5.1: 2016, 2017 and 2018 results for rating the GÉANT network

5.2.2 Analysis

Overall satisfaction remains high. “Excellent” ratings continued to rise across the board, in particular for overall performance and connectivity with global R&E networks; all five areas received an “Excellent” rating from at least 50% of respondents. Two respondents rated the GÉANT Service and Technology Forum for APMs “Below average” (whereas 38 respondents rated it either “Excellent” or “Good”), which will be followed up in the improvement activities.

The feedback via individual comments included the opinion that “The role of the APMs and the function of the APM meetings remains unclear. Some items are brought to the APMs, others to the GA or directly to each NREN, with no clear logic.” One respondent noted that there is a need for a service/model for short-term dedicated capacity interconnects, such as guaranteed bandwidth and

low jitter, for data transfer and real-time video. Another recommended that network operations should have better and more frequent involvement of NRENs in change management and optimisation. Again, these will be followed up in the improvement activities.

5.3 Interaction with the Operations Centre

5.3.1 Logging an Issue

5.3.1.1 Results

In 2018, 20 of the 48 respondents reported that they had interacted with the Network Operations Centre over the last six months. These absolute numbers are presented in Table 5.1 below, as they usefully reflect the scope of the Operations Centre activity and its use.

	YES			NO		
	2016	2017	2018	2016	2017	2018
Have you logged an issue with the GÉANT Operations Centre in the last 12 months?	29	23	20	15	16	28
Was your issue resolved in a timely matter?	28	22	16	3	1	2
Was it easy to find the right person to talk to?	28	22	18	4	1	1
Did the person fix the problem?	28	21	18	3	1	1
Was it easy to raise a ticket with the GÉANT trouble ticketing system?	–	18	19	–	0	1

Table 5.1: 2016, 2017 and 2018 results for logging an issue with the Operations Centre

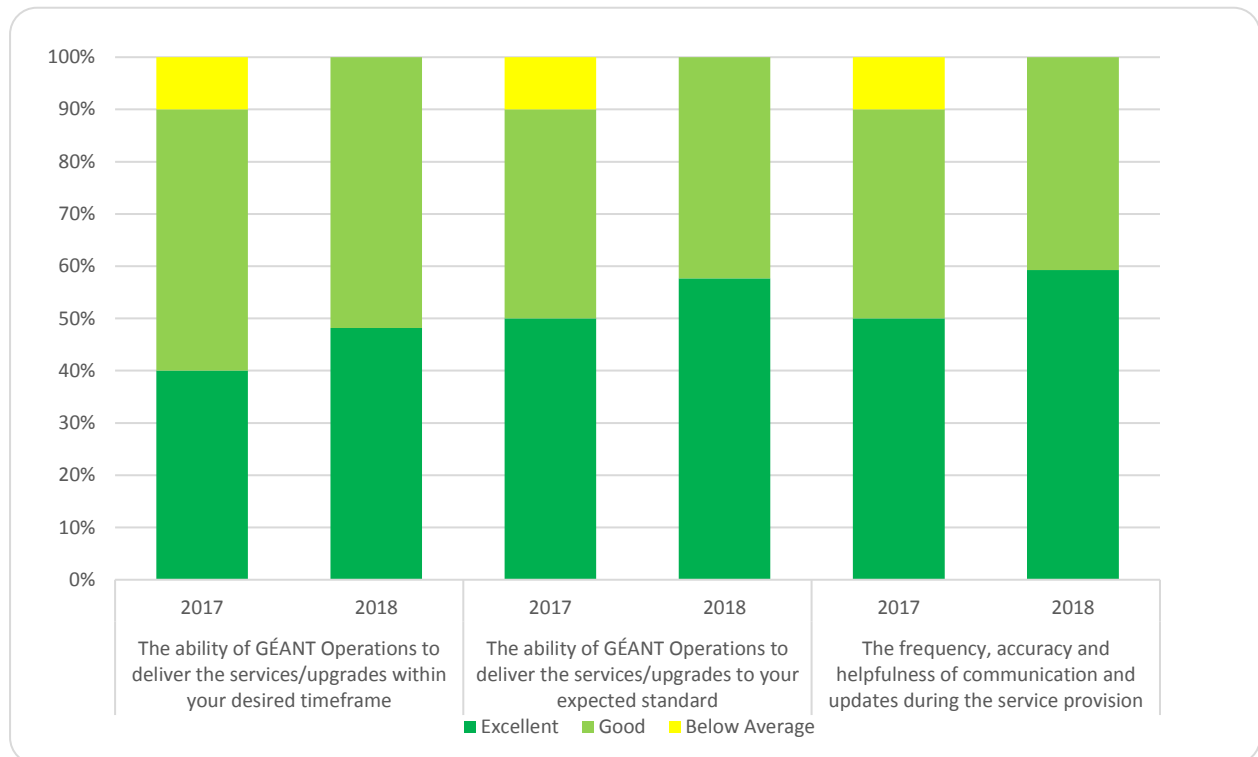
5.3.1.2 Analysis

Overall, there were no major changes compared with the previous year. There was a slight increase in the number of respondents who logged an issue and felt that their issue was not resolved in a timely manner (2 of the 20 respondents vs. 1 of 23 in 2017). All but one reported that it was easy to find the right person to talk to fix a problem. Nineteen responded that it was easy to raise a ticket with the GÉANT trouble ticketing system, and only one reported that it was not. It appears that the efforts invested by the Operations Centre into resolving issues reported in 2016 have delivered positive results in user satisfaction. It is to be noted that this is the first year the number of respondents in this category who did not log an issue was greater than the number who did. Further investigation is needed to establish the reason for this.

5.3.2 New or Upgraded Service Rollouts

5.3.2.1 Results

In 2017 and 2018, the survey included a question asking users to rate the Operations Centre’s performance as it relates to new service rollouts or service upgrades. The results are summarised in Figure 5.2 below.



2017: n=14; 2018: n=32 (n = number of respondents who answered the question)

Figure 5.2: 2017 and 2018 results for new or upgraded service rollouts

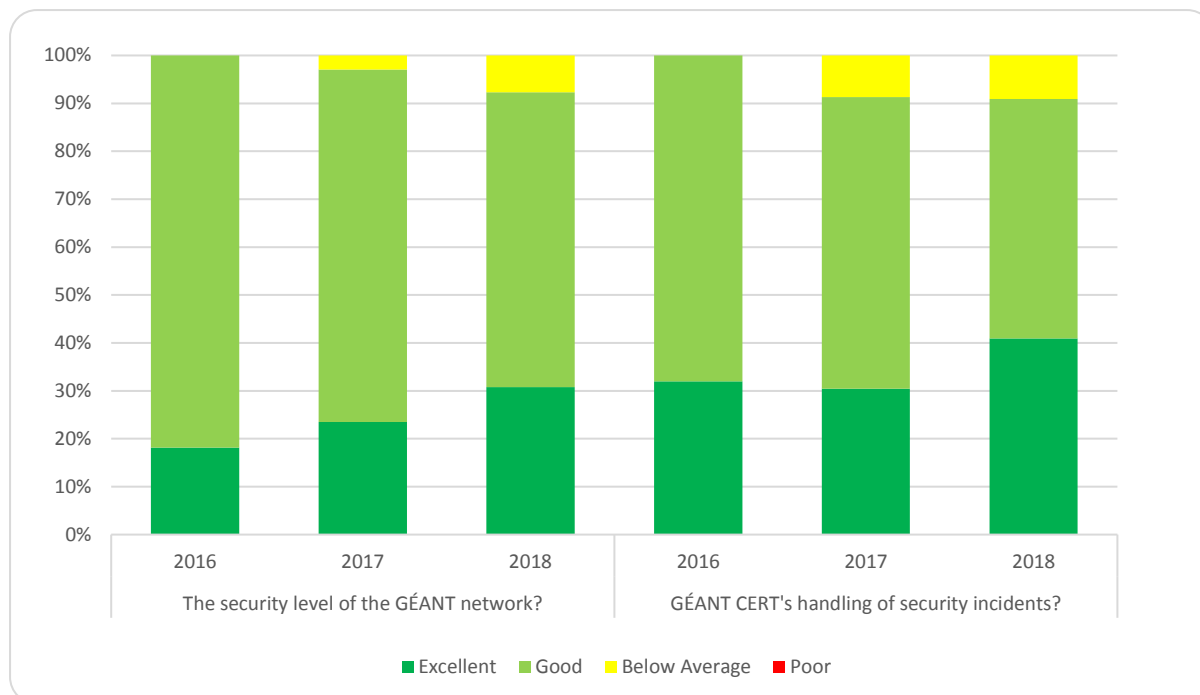
5.3.2.2 Analysis

When this question was asked for the first time in 2017, only 14 respondents answered it. In 2018, 32 respondents answered. This sign of deeper engagement with the respondents is positive in its own right, independent of the fact that all respondents indicated satisfaction in this area, which is an improvement on last year’s rating, when each aspect received 1 “Below average” rating. (One response equates to 10% in Figure 5.2 as the 4 “No opinion” responses have been excluded from the graph.)

5.4 Network Security

5.4.1 Results

How would you rate:



2016: n=33; 2017: n=56; 2018: n=63 (n = number of respondents who answered the question)

Figure 5.3: 2016, 2017 and 2018 results for rating network security

5.4.2 Analysis

Network security remains an important issue. Overall satisfaction with network security posted a growing number of “Excellent” ratings (31% in 2018 vs. 24% in 2017 and 18% in 2016), which can likely be attributed to significant efforts in GN4-2 to strengthen and support network security.

In the 2018 survey, three respondents felt that the security of the GÉANT network was “Below average”, compared to one in 2017, and for the second year in a row, two respondents rated the GÉANT Computer Emergency Response Team’s (CERT’s) handling of security incidents as “Below average” (vs. 20 who rated it either “Excellent” or “Good”). This will be followed up in the improvement activities.

In the individual responses, some of the respondents stated that more focus on security is needed, but the comments also pointed to the GN4-3 Security white paper and their confidence that it outlines the correct direction and measures to address areas of concern.

5.4.3 NSHaRP Usage



Users were asked if they use the GÉANT NSHaRP service [[NSHaRP](#)] to thwart DDoS threats. NSHaRP provides a mechanism to quickly and effectively inform affected users and to manage the mitigation process. It allows CERTs to tailor how and for what type of incidents they want their notifications to be triggered. The system serves as an extension to NREN CERTs, if they do not have either the human or the technical resources available to monitor security incidents affecting users.

5.4.3.1 Results

14 NRENs reported that they subscribed to this service, vs. 12 in 2017.

5.4.3.2 Analysis

This slight uptake is positive but not significant. In the individual comments, one respondent mentioned that it would be much better if users could change policies on their own. As with last year, many commented that they were not aware of the service. Some indicated that they did not know it was still in production. Others invited GÉANT to make a presentation. The comments indicate a need for better communication and promotion of the service to the user community.

5.4.4 Firewall-on-Demand (FoD) Usage

Firewall on Demand (FoD) [[Firewall-on-Demand](#)] is a system that allows authorised users, via a web portal, to quickly create and disseminate firewall filters based on traffic flows to or from their designated address space. This system allows NRENs to filter and block malicious traffic flows from within the GÉANT backbone, giving NRENs power and control over network security.

5.4.4.1 Results

17 NRENs reported that they subscribed to use this service, versus 15 in 2017.

5.4.4.2 Analysis

As with NSHaRP, the slight uptake is positive but not significant.

When asked to “please let us know what GÉANT would need to change/improve for your NREN to subscribe”, several respondents reported that they plan to subscribe to the service or were testing it. Several reported, as above, that they lacked clear information on the service and would like to see more accessible information, as was reported in 2017. This indicates a need for better communication and promotion of the service with local NREN security teams.

6 Satisfaction with the GÉANT Service Portfolio

6.1 Overview

The objective of this section of the survey was to get a high-level overview of how the service portfolio is perceived and valued, and at the same time to drill down deeper in five service categories to obtain information on usage, perceived quality and satisfaction level for specific services within each of those categories. The categories, specific services and questions asked are summarised in Table 6.1 below.

As the service portfolio has changed since the 2016 survey was conducted, several services included in 2016 were removed in 2017 and 2018 as they have been discontinued.

The following sub-sections present, for each service category:

- Summary of the services included.
- Comparison data with 2016 where available, and 2017.
- Notes and comments recorded.

In the data analysis, the primary parameter checked is NREN usage (presented in absolute terms), in order to gauge increase or decline in uptake compared to the previous period. Where usage is steady or high, the assessment of the importance and quality of the service is presented as a percentage of the total responses received for that question option. In cases where usage is minimal, analysis of the quality is presented in absolute terms.

Service Category	Specific Services	Question
1. Software-Defined Networking	–	Planned deployment – Y/N
2. Network-Based Services	GÉANT IP GÉANT World Service GÉANT Peering GÉANT Lambda GÉANT Plus GÉANT Open L3-VPN MD-VPN	Deployed – Y/N Level of importance Satisfaction rating

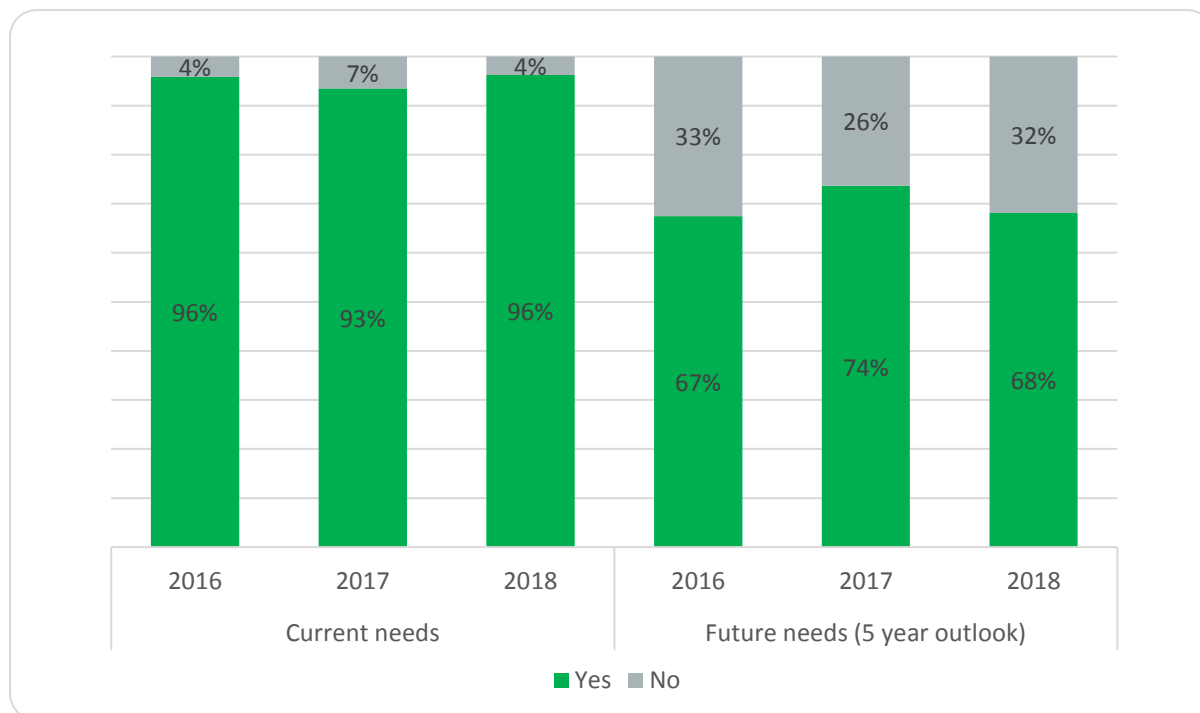
Service Category	Specific Services	Question
	GÉANT Testbed Service perfSONAR	
3. Trust, Identity & Security Services	eduGAIN eduroam eduPKI TCS FaaS	Deployed – Y/N Level of importance Satisfaction rating
4. Cloud Services	GÉANT Cloud Catalogue	Deployed – Y/N Level of importance Satisfaction rating
5. Real-time Communications Services	eduOER NRENum.net	Deployed – Y/N Level of importance Satisfaction rating

Table 6.1: Five service categories, specific services and questions asked

6.2 Overall Service Portfolio

6.2.1 Results

Does GÉANT’s service portfolio meet your NREN’s current and future needs?



2016: n=48; 2017: n=46; 2018: n=53 (n = number of respondents who answered the question)

Figure 6.1: 2016, 2017 and 2018 results for overall service portfolio

6.2.2 Analysis

The number of respondents who felt GÉANT’s service portfolio meets their current needs increased from 93% in 2017 to 96% in 2018, while 68% (vs. 74% in 2017) felt that it will meet their future needs. Of the 47 respondents who answered this part of the question, many commented that a five-year outlook was too distant and that they could not respond; this was also true in 2017. Nevertheless, the reduction in the percentage of those who felt the service portfolio will meet their future needs will be investigated.

With regard to meeting future needs, others said that GÉANT, and in turn NRENs, need to be more flexible and create service extensions to meet demand from users for more commodity IT services, such as personal storage, file sharing, backup, network monitoring and email. Similar comments were raised in 2017.

The question, “Which services would you like GÉANT to offer in the future?” produced the following suggestions (this is the complete list):

- A 24x7 help desk to support institutions wishing to collaborate outside their home country.

- Quantum Key Exchange (QKE).
- Extend cloud (now IaaS) to SaaS/PaaS service. Also virtual learning environment (VLE) frameworks, VLE student performance analytics.
- Joint solutions for AAI for access to various applications such as Microsoft Office 365.
- Production AAI infrastructure/services developed/suggested in the AARC project, in close collaboration with EGI, ESFRI projects (ELIXIR AAI, Life Science AAI).
- Services outlined in the Security white paper.
- More cloud service management and procurement assistance.
- Orchestrated and automated end-to-end NRENs' users' VPN services through usage of the MD-VPN service.
- Pan-European (optical) connectivity based on open line systems; additional GÉANT Open sites, especially further south. Access to GÉANT Global Connectivity at GÉANT Open is essential. T&I services are in general the most important pillar of the GÉANT services.
- SDN and NFV orchestrator based on OpenFlow for implementation in NRENs.
- Videoconferencing service on demand for NRENs' users.
- Intrusion detection tools or a DDoS scrubber service could also be important for NREN environment.
- IdP as a Service, integration with eIDAS, two-factor authentication.
- Basic services like file backup, network monitoring, file sharing, VC, anti-spam, DR, etc.
- Short term/guaranteed capacity (and low jitter) interconnects within Europe and with partner networks like Internet2 (SDN operated if possible).
- Multimedia: new services like Traversal Using Relay Network Address Translation (TURN) distributed infrastructure and web-based real-time communications (WebRTC) service.

6.3 Network-Based Services

Connectivity and network management services support the NRENs in delivering world-class network facilities to the research and education community.

6.3.1 Usage

6.3.1.1 Results

Table 6.2 below shows the number of NRENs using network-based services – based on survey responses – compared to responses in 2016 and 2017.

SERVICE	Number of NRENs Using the Service			
	2016	2017	2018	Change compared to 2017
GÉANT IP	27	31	31	0
GÉANT World Service	19	20	20	0
GÉANT Peering	21	21	21	0
GÉANT Lambda	4	9	10	1
GÉANT Plus	11	12	14	2
GÉANT Open	0	2	3	1
L3-VPN	12	8	11	3
MD-VPN	12	11	17	6
GÉANT Testbed Service	7	7	9	2
perFSONAR	13	16	18	2

Table 6.2: 2016, 2017 and 2018 results for number of NRENs using network-based services

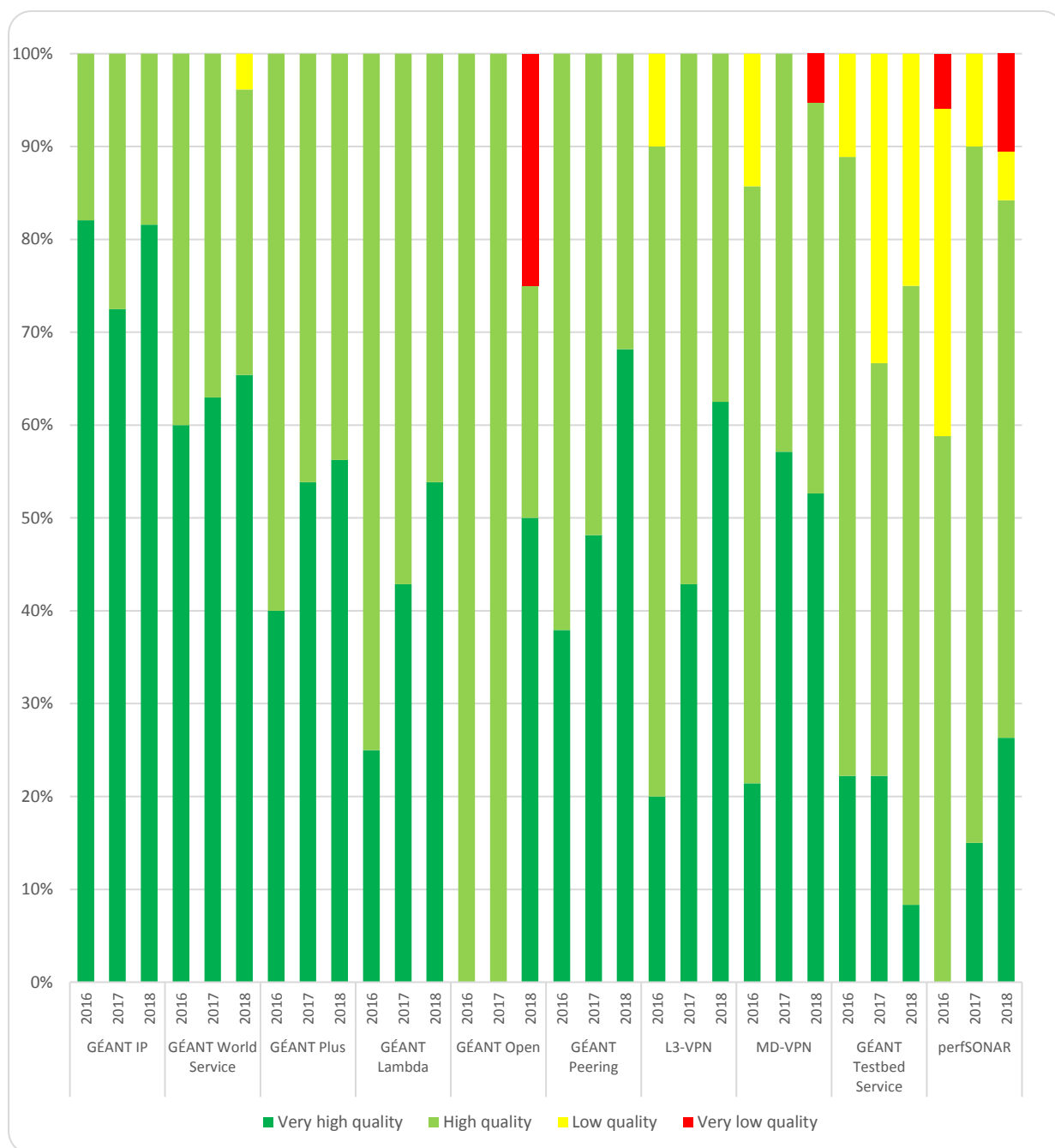
6.3.1.2 Analysis

There was no decrease in the number of NRENs using network-based services, and a slight increase in uptake of several, most notably MD-VPN, with an increase of 6.

6.3.2 Quality

6.3.2.1 Results

The respondents' assessment of the quality of these network-based services is summarised in Figure 6.2 below. In the related table, "n" represents the total number of respondents who answered the quality assessment section of the question for each service. It is important to note that the percentages for each option are based on the number of responses received for that service. In calculating the percentages, responses of "No opinion" or "Not applicable" were removed to enable comparison with the previous survey.



n=	GÉANT IP	GÉANT World	GÉANT Peering	GÉANT Plus	GÉANT Lambda	GÉANT Open	L3-VPN	MD-VPN	GÉANT Testbed Service	perfSONAR
2016	39	30	29	15	8	3	10	14	9	17
2017	40	27	27	13	7	1	7	14	9	20
2018	38	26	16	13	4	22	8	19	12	19

(n = number of respondents who answered the quality assessment section of the question for each service)

Figure 6.2: 2016, 2017 and 2018 results for quality of network-based services

6.3.2.2 Analysis

In general, these network-based services were considered to be “Very high quality” or “High quality”. Noteworthy is that the level of “Very high quality” ratings was at its highest since 2016 (among 80% of GÉANT services), with all network-based services showing an increase in this level except MD-VPN and Testbed Services. There were no major changes.

Of note is the “Very low quality” ratings for some services. For GÉANT Open, there was a larger number of respondents in 2018 (4 vs. 1 in 2017), with one giving a “Very low quality” rating. This will be further investigated, as will the “Low quality” (1 respondent) and “Very low quality” (2) ratings for perfSONAR and the “Very low quality” rating (1 respondent) for MD-VPN. The “Low quality” ratings of the Testbed as a Service offering continued (3 respondents, which amounted to 33% in 2017, 25% in 2018), and in all likelihood is due to its still being in the early development phases.

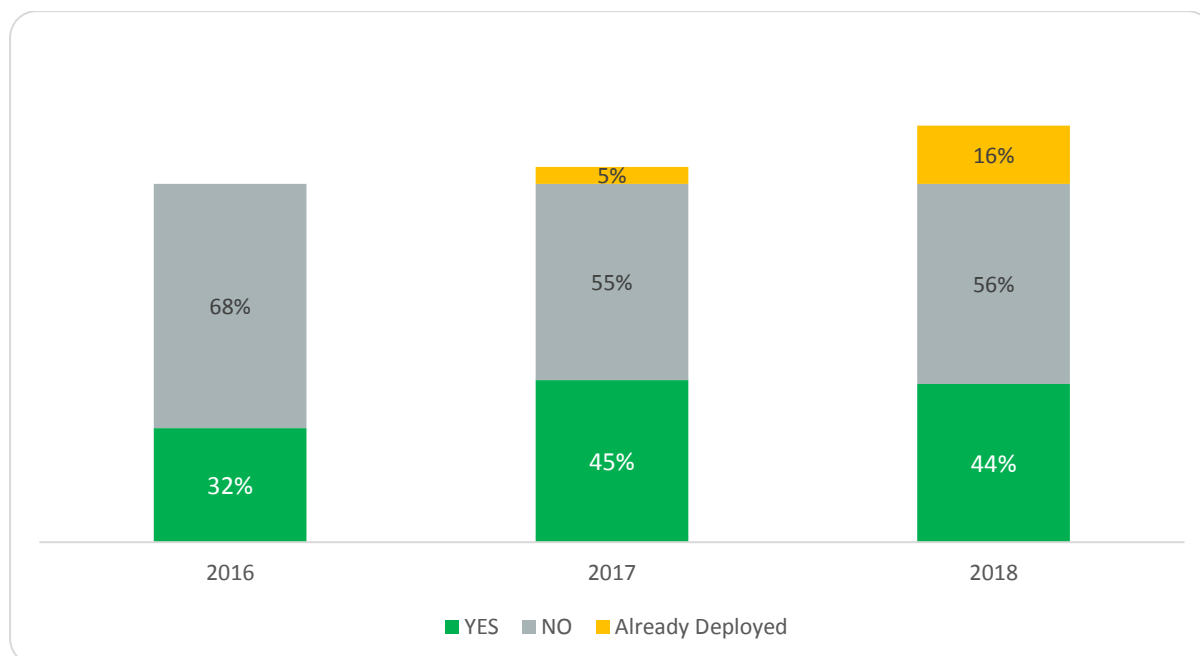
In the individual comments, the perceived lack of a clear roadmap was noted and a general uncertainty expressed as to whether the GÉANT network could be planned better technically and/or more cost-effectively.

6.4 Software-Defined Networking

GÉANT is investigating the integration of software-defined networking (SDN) technology into the GÉANT network, in line with the national efforts of many NRENs in this area. SDN introduces a more flexible way of service provisioning. During GN4-1, GÉANT delivered proofs of concept for SDN-based capabilities in the backbone within lab environments. Significant expertise has been developed in the specification, implementation and testing of SDN-based functionality utilising white boxes, industry-endorsed controller frameworks and purpose-built network applications. GÉANT project teams are developing, designing and implementing pilots of the SDN-based capabilities, carefully engineered within the GÉANT project in order to demonstrate their suitability for integration into the operational environment.

6.4.1 Results

Does your NREN plan to deploy software-defined networking (SDN) in the next 12–18 months?



2016 and 2017: n=44; 2018=50 (n = number of respondents who answered the question)

Figure 6.3: 2016, 2017 and 2018 results for planned deployment of SDN

6.4.2 Analysis

The increased uptake of SDN capabilities amongst NRENs (from 2, or 5%, in 2017 to 7, or 16%, in 2018) is in line with project objectives, as can be seen in the growth of actual pilots and deployments, as well as the increase in planned deployments, as this topic becomes increasingly important. The percentage of respondents who plan to deploy SDN at their NREN in the next 12–18 months remained effectively the same. However, given the higher number of respondents to the question in 2018, this represents an increase of 2 responses on 2017.

6.5 Trust, Identity and Security Services

Trusted digital identities, underpinned with secure technologies, allow students, researchers and institutions to simply and securely access content and services, collaborate, teach, analyse and share data, and access resources. GÉANT provides services that build trust, promote security and support the use of online identities, through a range of activities and international collaborations.

6.5.1 Usage

6.5.1.1 Results

Table 6.3 below shows the number of NRENs deploying trust, identity and security services – based on survey responses.

SERVICE	Number of NRENs Using the Service			
	2016	2017	2018	Change compared to 2017
eduGAIN	24	25	27	2
eduroam	30	31	33	2
eduPKI	7	7	9	2
TCS	17	19	23	4
FaaS	1	4	8	4

Table 6.3: 2016, 2017 and 2018 results for number of NRENs using trust, identity and security services

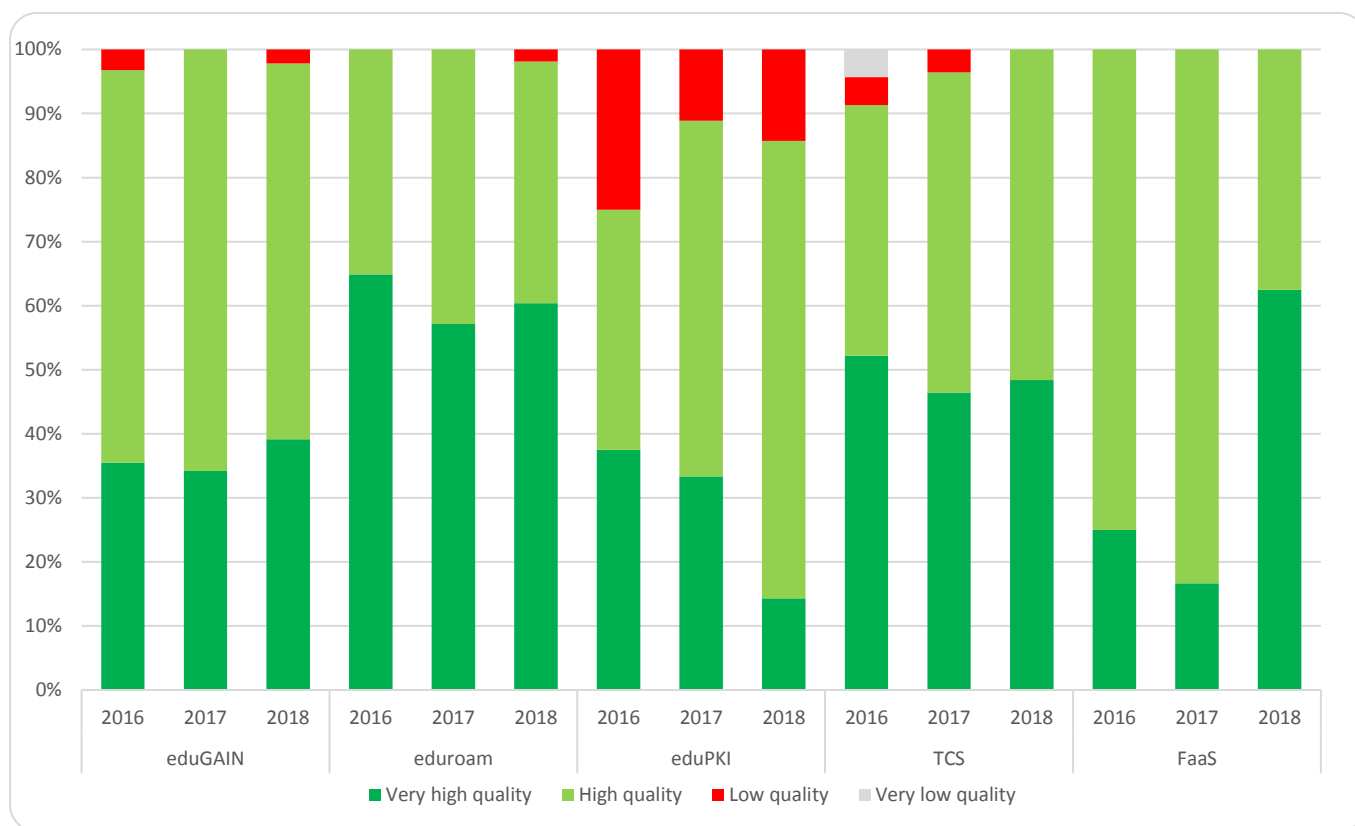
6.5.1.2 Analysis

For the second year running there was no decrease in the number of NRENs using these services. Slight increases in uptake were reported for three of them, with, most notably, 4 additional NRENs deploying the Trusted Certificate Service (TCS) and Federation as a Service (FaaS), the latter representing a doubling of numbers and a continuation of the rapid uptake started in 2017.

6.5.2 Quality

6.5.2.1 Results

The respondents' assessment of the quality of these trust, identity and security services is summarised in Figure 6.4 below. For an explanation of "n" in the related table, and of the percentages, please refer to Section 6.3.2.1.



n=	eduGAIN	eduroam	eduPKI	TCS	FaaS
2016	31	37	8	23	4
2017	38	49	9	28	6
2018	46	53	7	31	8

(n = number of respondents who answered the quality assessment section of the question for each service)

Figure 6.4: 2016, 2017 and 2018 results for quality of trust, identity and security services

6.5.2.2 Analysis

eduroam and eduGAIN are clearly well entrenched in the NREN community, with high usage and high quality-assessment ratings. The Trusted Certificate Service (TCS) is also relatively well entrenched, and registered a higher quality rating than in the previous year. All of the few (8) users who responded to the quality assessment of FaaS reported high ratings. The reason for “Low quality” ratings for eduGAIN (1 respondent out of 46), eduroam (1 respondent out of 53) and eduPKI (1 respondent out of 7) will be investigated.

In the individual comments, strong demand for better operational support for Authentication and Authorisation Infrastructure (AAI) services was noted, as in 2017. One respondent commented that not enough resources are invested in this area and that GÉANT could, and should, be doing more to make it a key element of its value proposition, for example by developing IdP as a Service, integration with eIDAS, two-factor authentication and OIDC. Another respondent recommended more cooperation with international groups working in this area. Comments also included that AAI should

evolve to address non-web-based applications and increase the adoption in terms of organisations and services.

6.6 Cloud Catalogue

The Cloud Catalogue [[Cloud Catalogue](#)] experienced significant attention and uptake in 2018, though is still a relatively new initiative for GÉANT. It lists a diverse range of service providers and cloud services, structured to help NRENs clarify the capabilities of providers, to assist and streamline procurement processes. Significant work continues to strengthen the foundation to support national rollouts.

As in 2017, the activity has made substantial progress over the last year. The Infrastructure as a Service (IaaS) framework of agreements with vendors from across Europe has gained a lot of traction and interest. Workshops and national events are enabling NRENs to develop detailed tactical plans for adoption and national rollouts. NRENs have appointed designated Cloud Managers, and attendance at seminars, workshops and weekly briefings remains strong. In addition, communications efforts continue to be an area of focus, notably the dedicated cloud website, newsletters, and practical guides and marketing materials for institutions.

6.6.1 Usage

6.6.1.1 Results

Table 6.4 below shows the number of NRENs using the Cloud Catalogue – based on survey responses – compared to responses in 2016 and 2017.

SERVICE	Number of NRENs Using the Service			
	2016	2017	2018	Change compared to 2017
GÉANT Cloud Catalogue	7	10	15	5

Table 6.4: 2016, 2017 and 2018 results for number of NRENs using the Cloud Catalogue

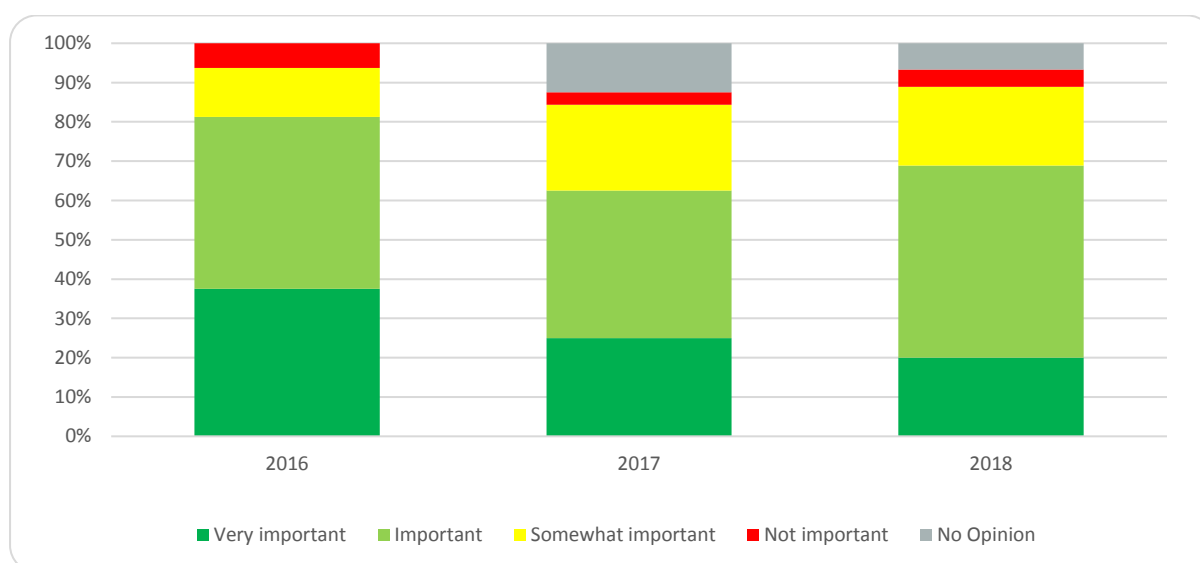
6.6.1.2 Analysis

The number of NRENs using the service has increased by 5. Uptake is expected to increase further as the Catalogue is developed in line with NREN feedback as to their requirements.

6.6.2 Importance

6.6.2.1 Results

The respondents' assessment of the importance of the Cloud Catalogue is summarised in Figure 6.5 below. In the note below the figure, "n" represents the total number of respondents who answered the importance assessment section of the question for the Cloud Service Catalogue. In calculating the percentages, responses of "No opinion" have been included, as they were thought to be of interest for this key emerging area.



2016: n=16; 2017: n=32; 2018: n=45 (n = number of respondents who answered the importance assessment section of the question for this service)

Figure 6.5: 2016, 2017 and 2018 results for importance of the Cloud Catalogue

6.6.2.2 Analysis

While the survey results regarding the importance of this service are in line with the maturity of the offering, the number of individuals responding to the question about its importance increased to 45 (vs. 32 in 2017), with only 3 offering a response of "No opinion" on the importance of the service in 2018. This indicates a growing level of awareness and appreciation for this emerging area.

6.7 Real-time Communications Services

Online communications are crucial to research and education. Real-time communications (RTC) [[Real-time communications](#)] is a rapidly developing area and GÉANT is working to support and foster innovation for the NRENs and their communities.

GÉANT's eduOER service is designed to enable structured searching and reuse of digital multimedia learning and educational materials, known as Open Educational Resources (OER), that are scattered

across Europe in multiple repositories, infrastructures and services. NRENum.net provides a solution for seamless dialling interconnection between multiple technologies, translating standard telephone numbers into IP addresses to facilitate VoIP and videoconferencing.

6.7.1 Usage

6.7.1.1 Results

Table below shows the number of NRENs using RTC services – based on survey responses – compared to responses in 2016 and 2017.

SERVICE	Number of NRENs Using the Service			
	2016	2017	2018	Change compared to 2017
eduOER	2	4	4	0
NRENum.net	7	7	10	3

Table 6.5: 2016, 2017 and 2018 results for number of NRENs using RTC services

6.7.1.2 Analysis

According to the survey responses, the RTC services are not widely deployed and are hardly known across the community. In 2018, 12 respondents (24%) indicated that they were not aware of the eduOER service and 10 (21%) were not aware of the NRENum.net service. These results suggest that efforts to raise awareness about the services are required.

6.7.2 Quality

6.7.2.1 Results

The respondents' assessment of the quality of these RTC services is summarised in Figure 6.6 below.



n=	eduOER	NRENum.net
2016	4	9
2017	8	10
2018	6	9

(n = number of respondents who answered the quality assessment section of the question for each service)

Figure 6.6: 2016, 2017 and 2018 results for quality of RTC services

6.7.2.2 Analysis

In 2018, 5 of the 6 respondents rated the eduOER service as being of “Very high quality” or “High quality”, while only 1 of the 6 respondents rated it as being of “Very low quality”. For NRENum.net, the 9 respondents continued to rate the service as being of “High” quality (8) or “Very high quality” (1), with no “Low” ratings. However, in 2018, the response rate continues to be too low to use as a fair assessment of satisfaction with the quality of the service.

7 Collaboration and Community Activities

7.1 Overview

GÉANT collaborates with members, partners and research, education and innovation communities to drive research and discovery – keeping Europe at the heart of global research and education networking. Two questions were included to gauge NRENs’ level of participation in these initiatives, as well as their view on whether and how they add value or assist them.

The activities and events rated were:

- Task Forces / Special Interest Groups.
- The Networking Conference (TNC).
- Research and Education Federations (REFEDS) meetings.
- Knowledge transfer events.
- Training workshops.
- Digital Infrastructure for Research (DI4R).

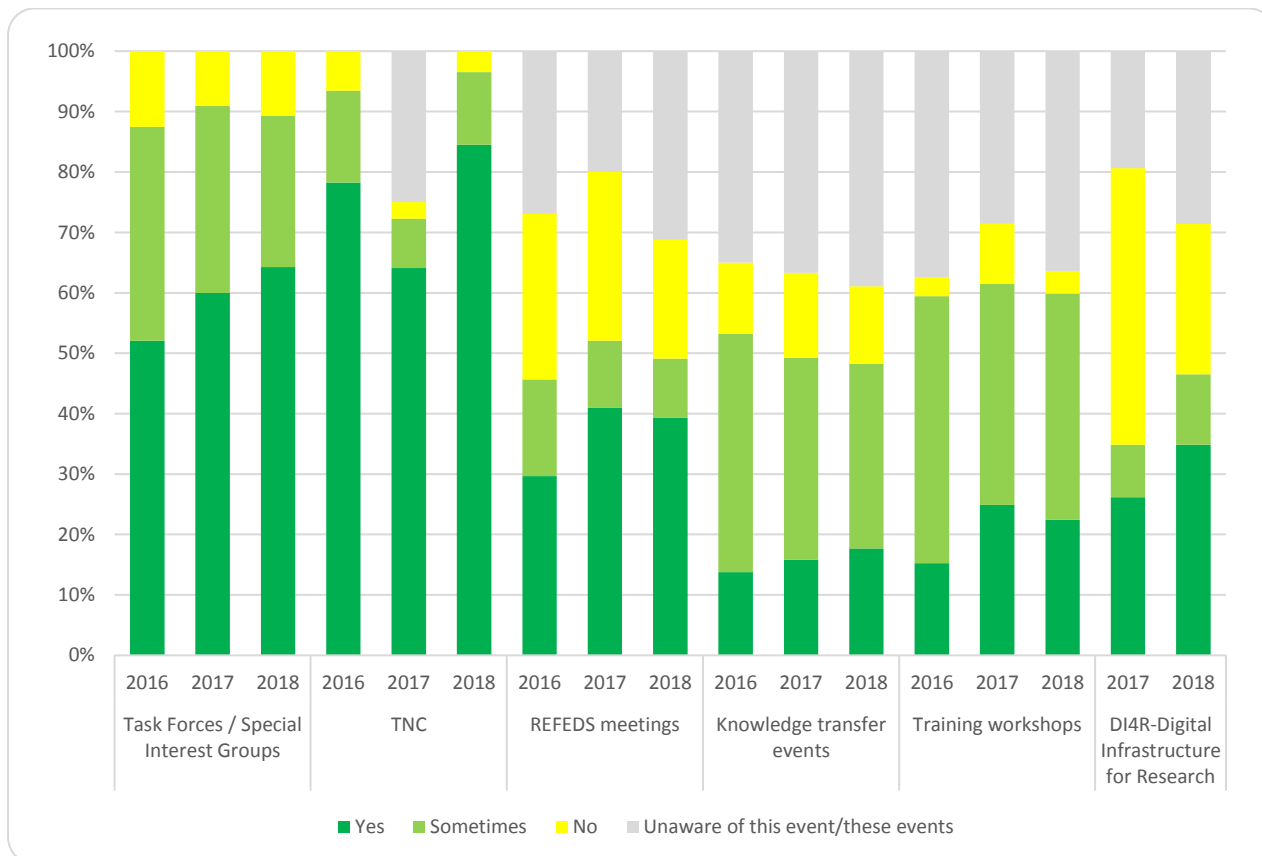


In the data below, “n” represents the total number of respondents who answered the question. It is important to note that the percentages for each event are based on the number of responses received for that event. In calculating the percentages, responses of “No opinion” or “Not applicable” were removed to enable comparison with the previous survey.

7.2 Attendance

7.2.1 Results

Figure 7.1 below shows the number of NRENs attending collaboration and community events.



2016: n=48; 2017: n=56; 2018: n=58 (n = number of respondents who answered the question)

Figure 7.1: 2016, 2017 and 2018 results for attendance at collaboration and community events

7.2.2 Analysis

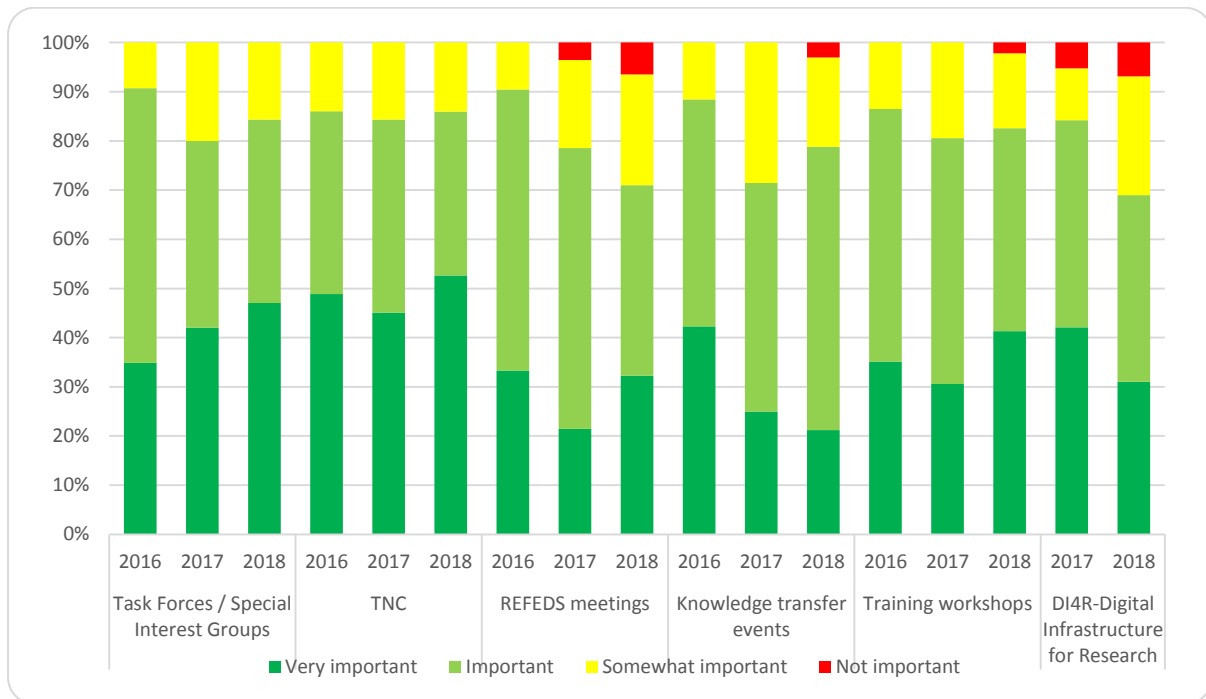
In 2018, 58 community members responded, compared to 56 in 2017 and 48 in 2016.

With the exception of training events, in all cases the percentage of respondents attending events increased in 2018, which is encouraging, especially DI4R. 2017 was the second year in which DI4R was held, and so the increased participation reflects growth of the event and recognition among NRENs of its importance. Attendance at Task Forces/Special Interest Groups and TNC remained high (89% and 96% of respondents respectively). However, the high percentages, and in some cases growing percentages, of respondents who said they did not attend, or who were unaware of the event, indicates that further communications effort is necessary both to raise awareness, and to emphasise the value of the events, in addition to efforts to address any issues relating to perceived importance and quality (discussed below).

7.3 Importance

7.3.1 Results

Figure 7.2 below shows the NRENs’ assessment of the importance of collaboration and community events.



2016: n=48; 2017: n=56; 2018: n=58 (n = number of respondents who answered the question)

Figure 7.2: 2016, 2017 and 2018 results for importance of collaboration and community events

7.3.2 Analysis

Again, 58 community members responded in 2018, compared to 56 and 48 in 2017 and 2016, respectively.

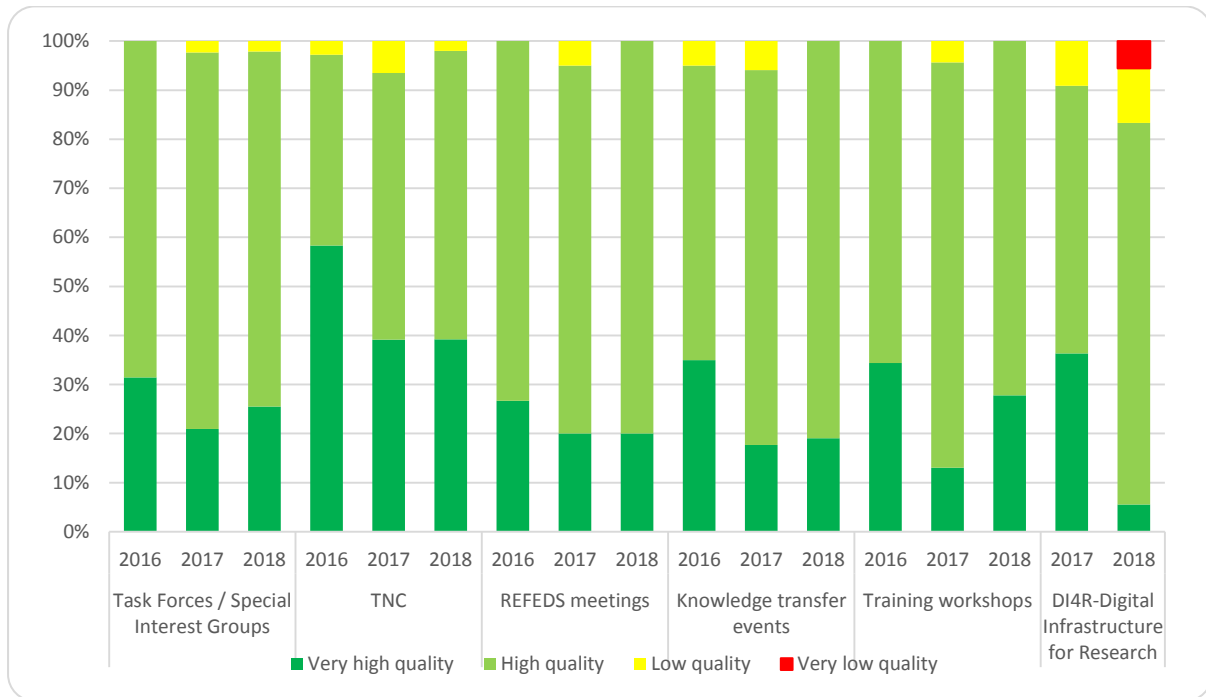
The ratings for the perceived importance of collaboration and community events remained high, though the perceived importance of the two-year-old DIR4 event declined, in line with lower quality ratings (see Section 7.4). The vast majority of respondents assessed each event or type as either “Very important” or “Important”.

One of the individual comments noted a lack of local training events for vital services such as eduGAIN and edu roam.

7.4 Quality

7.4.1 Results

Figure 7.3 below shows the NRENs’ assessment of the quality of collaboration and community events.



2016: n=48; 2017: n=56; 2018: n=58 (n = number of respondents who answered the quality assessment section of the question for each type of event)

Figure 7.3: 2016, 2017 and 2018 results for quality of collaboration and community events

7.4.2 Analysis

As above, in 2018, 58 community members responded, compared to 56 and 48 in 2017 and 2016, respectively.

There was an overall increase in the perceived quality of all types of events, except for the DI4R event. The reasons for the decreased ratings for DI4R will be investigated as part of the improvement activities.

In the individual comments, community members expressed a need to provide better training programmes in the technical and non-technical sphere, as well as online video training such as on-demand webinars or MOOCs for NRENs’ users’ IT staff. There is also a call for more joint knowledge sharing – especially for NREN-to-NREN knowledge transfer and joint events to support emerging NRENs.

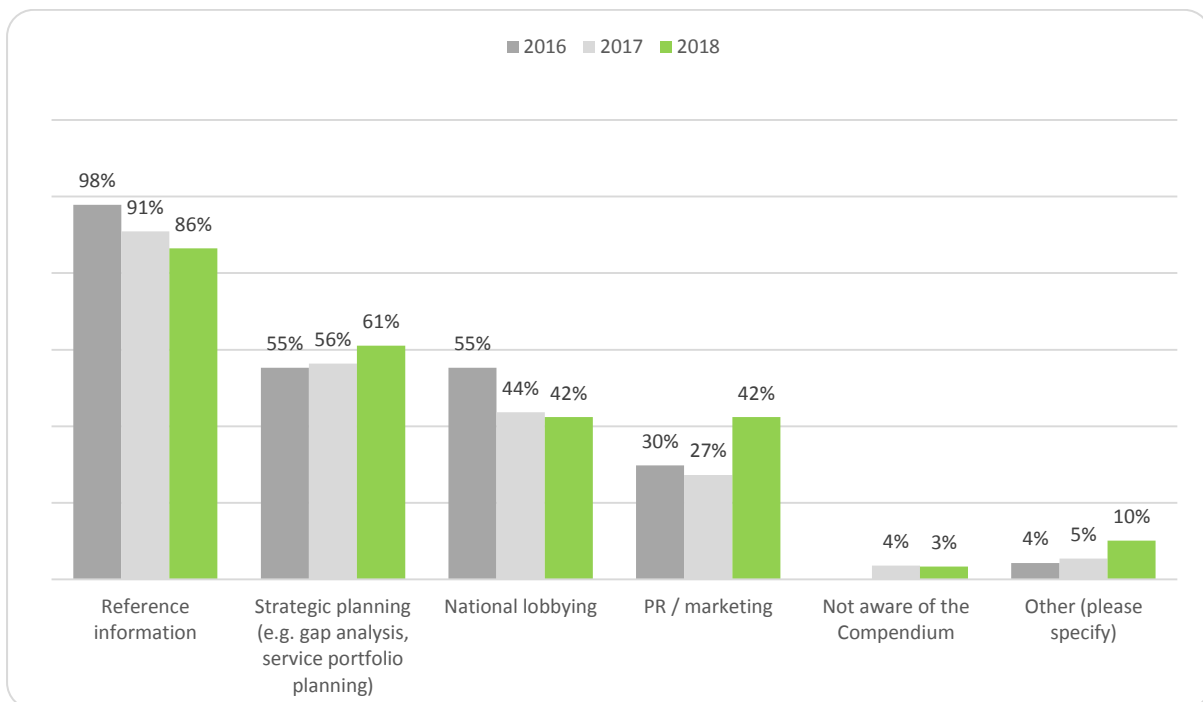
8 GÉANT Compendium

8.1 Overview

As the GÉANT Compendium has become an institution within the community, questions focused on how it is used.

8.2 Results

Figure 8.1 below shows the NRENs' responses for how they use the GÉANT Compendium.



2016: n=47; 2017: n=55; 2018: n=59 (n = number of respondents who answered the question)

Figure 8.1: 2016, 2017 and 2018 results for uses of the Compendium

8.3 Analysis

In 2018, 59 respondents answered this question, compared to 55 and 47 in 2017 and 2016, respectively. Their answers remained relatively unchanged, with slightly fewer using the Compendium as a reference tool and more as a strategic planning and marketing/PR tool (increases of 5% and 15% respectively).

One member noted using it as a benchmarking tool, another for internal referencing within the NREN, and another as an occasional tool to explain the concept of European NRENs to global partners. However, most respondents who selected “Other” uses did not specify what those uses were.

9 User Input on Improvement

9.1 Overview

To conclude the survey, respondents were asked to enter free-text responses to this question:

“And finally, if you haven’t had a chance to tell us earlier in the survey . . . Which one improvement could we make over the coming year that would help us better serve your NREN?”

Fifteen of the 71 respondents chose to answer this question. The responses, of course, were as varied as the population. Some salient points to take into consideration included the following areas:

- GÉANT services.
- GÉANT collaboration.
- Communications and training.

Each of these is discussed below.

9.1.2 GÉANT Services

One respondent called for a stricter policy regarding who can receive GÉANT services, limiting it to NREN-connected institutions in order to stimulate NRENs’ user organisations without supporting commercial providers. Another respondent recommended that more services be provided centrally, such as NSHaRP and FoD, and that the cost of international links be reduced. In some comments, the respondent referred to their input to the GÉANT white papers for services currently in progress, indicating the value of inviting their input on the next iteration of the project.

9.1.3 GÉANT Collaboration

One respondent noted that it is essential for the GÉANT “collaboration” to become more adept at developing strategy and setting long-term objectives. Another comment recommended ensuring that GN4-3 is better aligned with NREN and EC strategies.

The importance of having a dedicated single point of contact was noted, and automated message queues were suggested, to streamline responsiveness. This point requires further investigation.

Another community member suggested it would be helpful to organise meetings – or a support mailing list, forum or group, using a knowledge-based collaboration tool – of NREN staff that

administer GÉANT and EU-funded projects. These could act as a forum for users to ask questions on GÉANT project administration issues, such as reporting, finances and procedures.

9.1.4 Communications and Training

Community members noted the need for more and better training programmes for technical and non-technical staff, including online, on-demand courses and webinars, and for localised language support for materials, for example, about GÉANT and its services, to pass on to the community. One respondent also suggested helping NRENs to organise local user needs and opinion surveys.

10 Conclusions and Next Steps

Satisfaction remains stable at a high level across organisation, project, network operations and services, and, in general, there were only small deviations from the last survey.

The response rate of both the 2018 and 2017 NREN Satisfaction Survey validates the decision to make it as inclusive as possible. Open-ended responses (such as “Other”) for roles in the organisation must be eliminated where possible.

Specific highlights include:

- Organisation: Confidence remains strong in GÉANT’s ability to serve its members.
- Project: A high level of satisfaction was expressed for the management of the GN4-2 project.
- Services: Overall, network-based services were considered to be very high quality, and a significant improvement in both deployment and perceived quality of perfSONAR is apparent.
- Service Portfolio: The GÉANT service portfolio is meeting current and future needs.
- Collaboration Activities: The perceived importance of collaboration and community-wide events remains high.

Areas where work is needed in order to increase satisfaction include:

- Project: More transparency in the areas of project finances, staff allocation, cost and usage of services.
- Service Portfolio: Raise awareness of the service availability and status, and make services more easily accessible.
- Service Portfolio: Increase efforts in T&I, Security, & Privacy.
- Collaboration Activities: Address ongoing demand by the community for more training.

The results of this survey are being shared with the entire community, including:

- Service and Technology Forum.
- General Assembly.
- Project Management Team and Activity Leaders.
- Subject matter experts.
- GÉANT staff.

They will also feed into the wider intelligence-gathering activities of NA3.

While the results show that constituents are in general satisfied, GÉANT community needs and views must be constantly monitored and taken into account, and relationships nurtured. Accordingly, based on the results and stakeholder feedback, improvement activities are being initiated by the appropriate GÉANT organisation and project personnel, particularly in the areas identified above, with the aim of maintaining, or if possible exceeding 2018 results in 2019.

Appendix A Survey Response Details

This appendix gives the details behind the graphs in sections 3 to 8. It shows the number of responses received for each option within a question, including, where appropriate, “No opinion” or “Not applicable”. For convenience, it also restates the total number of respondents who answered the question (“n”).

The figures in the headings relate to the section number in which the related graph appears.

A.1 GÉANT Organisation

3.2.1. How satisfied are you with these GÉANT activities?

Activity	Year	Very satisfied	Satisfied	Dissatisfied	Very dissatisfied	N/A	Total (Excl N/A)
Managing the GÉANT (GN4-2) project and finances	2016	11	28	4	0		43
	2017	12	45	1	0	3	58
	2018	24	33	4	0	4	61
Operating the GÉANT network and providing network services	2016	24	23	0	0		47
	2017	22	34	0	0	4	56
	2018	29	29	2	0	5	60
Managing regional projects (e.g. AfricaConnect, EaPConnect)	2016	13	23	4	0		40
	2017	10	27	1	0	20	38
	2018	17	26	5	0	16	48
Organising community knowledge sharing events and training (e.g. TNC, REFEDS)	2016	24	22	1	0		47
	2017	18	34	2	0	5	54
	2018	21	38	1	1	4	61
Providing Middleware / AAI services	2016	10	30	3	2		45
	2017	10	41	2	0	7	53
	2018	12	45	2	0	6	59
Running Task Forces and Special Interest Groups	2016	16	29	0	0		45
	2017	8	40	4	0	5	52
	2018	15	40	6	1	3	62

2016: n=48; 2017: n=62; 2018: n=67

Table A.1: 2016, 2017 and 2018 results for satisfaction with GÉANT activities

3.3.1. I am confident in GÉANT’s ability to serve its members in the best possible way.

	Response count		
	2016	2017	2018
Strongly agree	20	14	24
Agree	26	46	38
Disagree	3	0	2
Strongly disagree	0	0	0
No opinion	8	1	2

2016: n=49; 2017: n=61; 2018: n=67

Table A.2: 2016, 2017 and 2018 results for confidence in GÉANT’s ability to serve its members

3.4.1. How would you rate the following primary GÉANT functions:

Function	Year	Excellent	Good	Below average	Poor	No opinion	Total (Excl No opinion)
The value for money represented by GÉANT?	2016	11	33	2	1		47
	2017	7	37	1	1	12	46
	2018	15	35	2	2	9	54
GÉANT's performance promoting the interests of R&E networking to the European Commission?	2016	18	29	2	0		49
	2017	19	30	5	0	5	54
	2018	26	24	6	0	5	56
GÉANT's performance promoting the interests of GÉANT NREs internationally/with global regional partners?	2016	13	31	4	1		49
	2017	10	37	4	0	8	51
	2018	17	39	1	1	5	58
The effectiveness of General Assembly meetings as the main membership decision making forum?	2016	5	27	6	2		40
	2017	6	15	11	2	24	34
	2018	10	22	7	4	19	43
Your experience with GÉANT's invoicing and billing process?	2016	15	17	3	0		35
	2017	9	22	1	0	26	32
	2018	17	23	2	0	20	42
GÉANT's performance in keeping you informed of our services and activities?	2016	12	33	1	0		46
	2017	11	36	8	1	3	56
	2018	19	37	8	0	0	64

2016: n=49; 2017: n=59; 2018: n=64

Table A.3: 2016, 2017 and 2018 results for rating six primary GÉANT functions

3.5.1. Do you use the following communication tools?

Communication Tool	Year	Yes	No	Total
geant.org website	2016	47	2	49
	2017	59	1	60
	2018	63	0	63
Connect magazine	2016	42	7	49
	2017	52	6	58
	2018	57	5	62
PeaR Community News	2016	25	22	47
	2017	31	25	56
	2018	42	19	61
GÉANT Project Office News	2016	42	6	48
	2017	45	13	58
	2018	54	9	63
GÉANT Facebook page	2016	9	39	48
	2017	10	48	58
	2018	19	43	62
GÉANT Twitter page	2016	6	43	49
	2017	17	40	57
	2018	24	38	62
GÉANT LinkedIn page	2016	9	39	48
	2017	7	50	57
	2018	14	48	62

2016: n=49; 2017: n=60; 2018: n=63

Table A.4: 2016, 2017 and 2018 results for use of communication tools

How often do you use it?

Communication Tool	Year	Frequently	Sometimes	Rarely	Never	Total
geant.org website	2016	24	18	5	1	48
	2017	19	31	9	0	59
	2018	28	21	14	0	63
Connect magazine	2016	5	23	15	1	44
	2017	15	23	13	1	52
	2018	23	25	10	1	59
PeaR Community News	2016	17	7	3	6	33
	2017	19	9	5	11	44
	2018	21	17	4	11	53
GÉANT Project Office News	2016	27	12	3	1	43
	2017	34	9	2	6	51
	2018	44	8	2	3	57
GÉANT Facebook page	2016	1	1	6	13	21
	2017	2	2	5	27	36
	2018	2	8	11	22	43
GÉANT Twitter page	2016	2	2	3	13	20
	2017	1	7	6	21	35
	2018	3	12	10	21	46
GÉANT LinkedIn page	2016	0	2	7	13	22
	2017	0	3	5	25	33
	2018	0	4	12	29	45

2016: n=49; 2017: n=60; 2018: n=63

Table A.5: 2016, 2017 and 2018 results for how often communication tools are used

How useful do you find it?

Communication Tool	Year	Very useful	Somewhat useful	Not very useful	Not at all useful	No opinion	Total (Excl No opinion)
geant.org website	2016	23	18	4	2		47
	2017	16	32	7	1	2	56
	2018	26	28	8	1	0	63
Connect magazine	2016	17	21	2	3		43
	2017	19	24	6	0	0	49
	2018	19	34	3	2	0	58
PeaR Community News	2016	13	12	1	5		31
	2017	9	18	2	1	12	30
	2018	16	24	3	0	9	43
GÉANT Project Office News	2016	24	17	1	0		42
	2017	32	12	1	0	4	45
	2018	39	13	1	0	4	53
GÉANT Facebook page	2016	2	5	2	7		16
	2017	1	6	1	2	23	10
	2018	2	11	6	0	23	19
GÉANT Twitter page	2016	1	6	1	6		14
	2017	1	9	2	1	19	13
	2018	2	16	4	0	23	22
GÉANT LinkedIn page	2016	0	6	2	8		16
	2017	1	2	3	0	24	6
	2018	1	7	4	2	30	14

2016: n=49; 2017: n=60; 2018: n=63

Table A.6: 2016, 2017 and 2018 results for usefulness of communication tools

3.6.1 How satisfied were you with the following relating to your last interaction with GÉANT staff:

Aspect of Interaction	Year	Very satisfied	Satisfied	Dissatisfied	Very dissatisfied	N/A	Total (Excl N/A)
Your last interaction with GÉANT staff?	2016	34	14	0	0		48
	2017	36	20	0	0	1	56
	2018	52	13	0	0	0	65
The ease of getting in touch with the right person at GÉANT?	2016	34	14	0	0		48
	2017	27	28	0	0	2	55
	2018	43	21	1	0	0	65
The responsiveness of GÉANT staff to your questions / concerns?	2016	28	18	1	0		47
	2017	30	25	1	0	1	56
	2018	41	22	2	0	0	65
The level of knowledge of our staff?	2016	30	18	0	0		48
	2017	29	23	1	0	4	53
	2018	38	26	0	1	0	65

2016: n=49; 2017: n=57; 2018: n=65

Table A.7: 2016, 2017 and 2018 results for satisfaction with GÉANT staff

A.2 GN4-2 Project

4.2 How would you rate the following relating to the GN4-2 project?

Aspect of the GN4-2 Project	Year	Excellent	Good	Below average	Poor	No opinion	Total (Excl No opinion)
The overall project management?	2016	16	24	1	1		42
	2017	14	34	2	0	8	50
	2018	25	24	1	0	14	50
The level of transparency of activity within the project?	2016	6	31	4	2		43
	2017	7	28	11	1	11	47
	2018	12	30	8	3	11	53
Project administration (e.g. meetings, documents, reporting)?	2016	10	30	3	0		43
	2017	11	31	3	0	12	45
	2018	18	29	4	0	12	51
Project communication (e.g. news, bulletins, information on activities)?	2016	19	21	2	1		43
	2017	14	32	3	1	8	50
	2018	23	30	0	2	9	55
Coordination of pan-European user groups / projects on behalf of NREs (e.g. EUMETSAT, LHCONe)?	2016	5	24	3	0		32
	2017	3	18	4	1	31	26
	2018	7	22	4	0	29	33
The GÉANT Partner Relations team as a single point of contact for NREN liaison and support?	2016	23	16	1	0		40
	2017	20	19	2	0	18	41
	2018	26	21	3	1	13	51

2016: n=45; 2017: n=59; 2018: n=64

Table A.8: 2016, 2017 and 2018 results for satisfaction with the management of the GN4-2 project

A.3 Satisfaction with the GÉANT Network and Operations

5.2.1 How would you rate the following relating to the GÉANT network:

Aspect of the GÉANT Network	Year	Excellent	Good	Below average	Poor	No opinion	Total (Excl No opinion)
The overall performance and reliability of the GÉANT network?	2016	35	12	0	0		47
	2017	33	21	0	0	5	54
	2018	44	11	0	0	9	55
The operation and management of the GÉANT network?	2016	30	15	1	0		46
	2017	28	24	0	0	7	52
	2018	32	22	1	0	9	55
GÉANT connectivity with global R+E networks (e.g. Internet2, TEIN)?	2016	29	15	1	0		45
	2017	22	24	0	0	13	46
	2018	33	14	0	0	16	47
The GÉANT Service and Technology Forum for APMs to receive and share information?	2016	16	20	3	0		39
	2017	13	21	1	0	24	35
	2018	20	18	2	0	24	40
The ability of the GÉANT Operations Centre to respond to technical issues?	2016	17	20	3	0		40
	2017	18	20	0	0	20	38
	2018	21	21	0	0	22	42

2016: n=47; 2017: n=59; 2018: n=64

Table A.9: 2016, 2017 and 2018 results for rating the GÉANT network

5.3.2 New or Upgraded Service Rollouts

Aspect of Rollout	Year	Excellent	Good	Below Average	Poor	No opinion	Total (Excl No opinion)
The ability of GÉANT Operations to deliver the services/upgrades within your desired timeframe	2017	4	5	1	0	4	10
	2018	13	14	0	0	5	27
The ability of GÉANT Operations to deliver the services/upgrades to your expected standard	2017	5	4	1	0	3	10
	2018	15	11	0	0	6	26
The frequency, accuracy and helpfulness of communication and updates during the service provision	2017	5	4	1	0	3	10
	2018	16	11	0	0	5	27

2017: n=14; 2018: n=32

Table A.10: 2017 and 2018 results for new or upgraded service rollouts

5.4.1 How would you rate these aspects of network security?

Aspect of Network Security	Year	Excellent	Good	Below Average	Poor	No opinion	Total (Excl No opinion)
The security level of the GÉANT network?	2016	6	27	0	0	0	33
	2017	8	25	1	0	19	34
	2018	12	24	3	0	24	39
GÉANT CERT's handling of security incidents?	2016	8	17	0	0	0	25
	2017	7	14	2	0	33	23
	2018	9	11	2	0	39	22

2016: n=33; 2017: n=56; 2018: n=63

Table A.11: 2016, 2017 and 2018 results for rating network security

A.4 Satisfaction with the GÉANT Service Portfolio

6.2.1 Does GÉANT's service portfolio meet your NREN's current and future needs?

Type of Needs	Year	Yes	No	Total
Current needs	2016	46	2	48
	2017	43	3	46
	2018	51	2	53
Future needs (5 year outlook)	2016	29	14	43
	2017	28	10	38
	2018	32	15	47

2016: n=48; 2017: n=46; 2018: n=53

Table A.12: 2016, 2017 and 2018 results for overall service portfolio

6.3.2.1 How would you rate the quality of these network-based services?

Network-Based Service	Year	Very high quality	High quality	Low quality	Very low quality	No opinion	Total (Excl No opinion)
GÉANT IP	2016	32	7	0	0		39
	2017	29	11	0	0	2	40
	2018	31	7	0	0	3	38
GÉANT World Service	2016	18	12	0	0		30
	2017	17	10	0	0	9	27
	2018	17	8	1	0	10	26
GÉANT Plus	2016	6	9	0	0		15
	2017	7	6	0	0	11	13
	2018	9	7	0	0	15	16
GÉANT Lambda	2016	2	6	0	0		8
	2017	3	4	0	0	16	7
	2018	7	6	0	0	18	13
GÉANT Open	2016	0	3	0	0		3
	2017	0	1	0	0	18	1
	2018	2	1	0	1	26	4
GÉANT Peering	2016	11	18	0	0		29
	2017	13	14	0	0	5	27
	2018	15	7	0	0	13	22
L3-VPN	2016	2	7	1	0		10
	2017	3	4	0	0	14	7
	2018	5	3	0	0	23	8
MD-VPN	2016	3	9	2	0		14
	2017	8	6	0	0	10	14
	2018	10	8	0	1	15	19

Network-Based Service	Year	Very high quality	High quality	Low quality	Very low quality	No opinion	Total (Excl No opinion)
GÉANT Testbed Service	2016	2	6	1	0		9
	2017	2	4	3	0	14	9
	2018	1	8	3	0	21	12
perfSONAR	2016	0	10	6	1		17
	2017	3	15	2	0	9	20
	2018	5	11	1	2	16	19

n=	GÉANT IP	GÉANT World	GÉANT Peering	GÉANT Plus	GÉANT Lambda	GÉANT Open	L3-VPN	MD-VPN	GÉANT Testbed Service	perfSONAR
2016	39	30	29	15	8	3	10	14	9	17
2017	40	27	27	13	7	1	7	14	9	20
2018	38	26	16	13	4	22	8	19	12	19

Table A.13: 2016, 2017 and 2018 results for quality of network-based services

6.4.1 Does your NREN plan to deploy software-defined networking (SDN) in the next 12–18 months?

	Response count		
	2016	2017	2018
YES	14	19	19
NO	30	23	24
Already deployed	-	2	7
Total	44	44	50

2016 and 2017: n=44; 2018=50

Table A.14: 2016, 2017 and 2018 results for planned deployment of SDN

6.5.2.1 How would you rate the quality of these trust, identity and security services?

Service	Year	Very high quality	High quality	Low quality	Very low quality	No opinion	Total (Excl No opinion)
eduGAIN	2016	11	19	1	0		31
	2017	13	25	0	0	5	38
	2018	18	27	1	0	4	46
eduroam	2016	24	13	0	0		37
	2017	28	21	0	0	1	49
	2018	32	20	1	0	1	53
eduPKI	2016	3	3	2	0		8
	2017	3	5	1	0	19	9
	2018	1	5	1	0	27	7
TCS	2016	12	9	1	1		23
	2017	13	14	1	0	5	28
	2018	15	16	0	0	11	31
FaaS	2016	1	3	0	0		4
	2017	1	5	0	0	17	6
	2018	5	3	0	0	26	8

n=	eduGAIN	eduroam	eduPKI	TCS	FaaS
2016	31	37	8	23	4
2017	38	49	9	28	6
2018	46	53	7	31	8

Table A.15: 2016, 2017 and 2018 results for quality of trust, identity and security services

6.6.2.1 How important is the GÉANT Cloud Catalogue for your NREN?

Year	Very important	Important	Somewhat important	Not important	No opinion	Total
2016	6	7	2	1	-	16
2017	8	12	7	1	4	32
2018	9	22	9	2	3	45

2016: n=16; 2017: n=32; 2018: n=45

Table A.16: 2016, 2017 and 2018 results for importance of the Cloud Catalogue

6.7.2.1 How would you rate the quality of these RTC services?

Service	Year	Very high quality	High quality	Low quality	Very low quality	No opinion	Total (Excl no opinion)
eduOER	2016	1	3	0	0	-	4
	2017	2	4	2	0	13	8
	2018	1	4	0	1	26	6
NRENum.net	2016	4	5	0	0	-	9
	2017	5	5	0	0	11	10
	2018	1	8	0	0	22	9

n=	eduOER	NRENum.net
2016	4	9
2017	8	10
2018	6	9

Table A.17: 2016, 2017 and 2018 results for quality of RTC services

A.5 Collaboration and Community Activities

7.2.1 Does your NREN attend these collaboration and community events?

Event	Year	Yes	Sometimes	No	Unaware of this event/these events	Total
Task Forces / Special Interest Groups	2016	25	17	6	0	48
	2017	33	17	5	0	55
	2018	36	14	6	0	56
TNC	2016	36	7	3	0	46
	2017	47	6	2	1	55
	2018	49	7	2	0	58
REFEDS meetings	2016	13	7	12	7	32
	2017	22	6	15	5	43
	2018	24	6	12	10	42
Knowledge transfer events	2016	7	20	6	7	33
	2017	9	19	8	11	36
	2018	11	19	8	14	38
Training workshops	2016	10	29	2	3	41
	2017	15	22	6	4	43
	2018	18	30	3	4	51
DI4R-Digital Infrastructure for Research	2017	12	4	21	6	37
	2018	21	7	15	10	43

2016: n=48; 2017: n=56; 2018: n=58

Table A.18: 2016, 2017 and 2018 results for attendance at collaboration and community events

7.3.1 How important are these collaboration and community events to your NREN?

Event	Year	Very important	Important	Somewhat important	Not important	No opinion	Total (Excl No opinion)
Task Forces / Special Interest Groups	2016	15	24	4	0		43
	2017	21	19	10	0	2	50
	2018	24	19	8	0	2	51
TNC	2016	21	16	6	0		43
	2017	23	20	8	0	1	51
	2018	30	19	8	0	1	57
REFEDS meetings	2016	7	12	2	0		21
	2017	6	16	5	1	11	28
	2018	10	12	7	2	12	31
Knowledge transfer events	2016	11	12	3	0		26
	2017	7	13	8	0	11	28
	2018	7	19	6	1	7	33
Training workshops	2016	13	19	5	0		37
	2017	11	18	7	0	5	36
	2018	19	19	7	1	4	46
DI4R-Digital Infrastructure for Research	2017	8	8	2	1	9	19
	2018	9	11	7	2	15	29

2016: n=48; 2017: n=56; 2018: n=58

Table A.19: 2016, 2017 and 2018 results for importance of collaboration and community events

7.4.1 How would you rate the quality of these collaboration and community events?

Event	Year	Very high quality	High quality	Low quality	Very low quality	No opinion	Total (Excl No opinion)
Task Forces / Special Interest Groups	2016	11	24	0	0		35
	2017	9	33	1	0	4	43
	2018	12	34	1	0	4	47
TNC	2016	21	14	1	0		36
	2017	18	25	3	0	2	46
	2018	20	30	1	0	5	51
REFEDS meetings	2016	4	11	0	0		15
	2017	4	15	1	0	14	20
	2018	4	16	0	0	19	20
Knowledge transfer events	2016	7	12	1	0		20
	2017	3	13	1	0	16	17
	2018	4	17	0	0	18	21
Training workshops	2016	11	21	0	0		32
	2017	3	19	1	0	13	23
	2018	10	26	0	0	11	36
DI4R-Digital Infrastructure for Research	2017	4	6	1	0	13	11
	2018	1	14	2	1	24	18

2016: n=48; 2017: n=56; 2018: n=58

Table A.20: 2016, 2017 and 2018 results for quality of collaboration and community events

A.6 GÉANT Compendium

8.2 What does your NREN use the GÉANT Compendium for?

	Response count		
	2016	2017	2018
Reference information	46	50	51
Strategic planning (e.g. gap analysis, service portfolio planning)	26	31	36
National lobbying	26	24	25
PR / marketing	14	15	25
Not aware of the Compendium	0	2	2
Other (please specify)	2	3	6

2016: n=47; 2017: n=55; 2018: n=59

Table A.21: 2016, 2017 and 2018 results for uses of the Compendium

References

- [Cloud Catalogue]** <https://clouds.geant.org/>
- [Firewall-on-Demand]** https://www.geant.org/Networks/Network_Operations/Pages/Firewall-on-Demand.aspx
- [GÉANT website]** <http://www.geant.org/>
- [NSHaRP]** http://www.geant.org/Networks/Network_Operations/Network_Security
- [Real-time communications]** https://www.geant.org/Services/Real-time_communications
- [SurveyMonkey]** <http://www.surveymonkey.com/>

Glossary

AAI	Authentication and Authorisation Infrastructure
APM	Access Port Manager
CEO	Chief Executive Officer
CERT	Computer Emergency Response Team
DDoS	Distributed Denial of Service
DI4R	Digital Infrastructure for Research
DR	Disaster Recovery
EC	European Commission
eIDAS	electronic IDentification, Authentication and trust Services
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
FaaS	Federation as a Service
FoD	Firewall on Demand
GA	General Assembly
IaaS	Infrastructure as a Service
IdP	Identity Provider
L3	Layer 3
LHCONE	Large Hadron Collider Open Network Environment
MD-VPN	Multi-Domain Virtual Private Network
MOOC	Massive Open Online Course
N/A	Not Applicable
NA	Networking Activity
NA3 T1	NA3 Task 1 European and Global NREN Account Management
NA3	Networking Activity 3 Partner, User and Stakeholder Relations
NAT	Network Address Translation
NFV	Network Function Virtualisation
N/O	No Opinion
NREN	National Research and Education Network
NSHaRP	Network Security Handling and Response Process
OER	Open Educational Resources
OIDC	OpenID Connect
PaaS	Platform as a Service
PeaR	The news service by and for the research and education networking community
QKE	Quantum Key Exchange
R&E	Research and Education
REFEDS	Research and Education Federations
RTC	Real-time Communications
SaaS	Software as a Service
SDN	Software-Defined Networking

SIG	Special Interest Group
TCS	Trusted Certificate Service
TNC	The Networking Conference
TURN	Traversal Using Relay NAT
VLE	Virtual Learning Environment
VoIP	Voice over IP
VPN	Virtual Private Network
WebRTC	Web-Based Real-Time Communications