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## N4U

NeuGRID for you:

expansion of NeuGRID services and outreach to new user communities

**Combination of Collaborative Project and Coordination and Support Action**

**Objective INFRA-2011-1.2.1 – e-Science environments**

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# **1. Introduction**

## **1.1 Purpose of the Document**

*D4.2 SSC Portfolio Update Report* describes the results achieved in the specification and in the deployment of SSC protocols, structure, and portfolio. The main results are the definition and implementation of a operational structure and protocols of the N4U SSC, which has been developed in the first year and updated in the second years, as well as the production of a growing set of services into the N4U SSC.

## **1.2 Document Organisation**

The deliverable has 4 chapters. The first describes purpose, structure, and review process of the document. In the second, the neuGRID Specific Support Centre (SSC) strategy, structure and tools available for users to get support are described. Along with the portfolio of support services, the monitoring systems of the performance level of the SSC and statistics of the use of the infrastructure are also addressed. The third chapter describes the support activities carried out in Year 2. The fourth chapter presents conclusions.

## 2. N4U SSC

### 2.1 N4U SSC Strategy

As stated in deliverable D1.2, N4U Vision, the main goal of N4U is to provide neuroscientists and clinicians worldwide the innovative online neuGRID functional environment where they can efficiently upload/use/share relevant algorithms for brain features extraction/computational power/large image datasets, and access support and training.

In N4U strategy, the **Specific Support Centre (SSC)** plays a key role, since it is the body in charge of structuring the services provided by the neuGRID functional environment. Through the SSC, N4U intends to obtain a robust but adaptable structure that fits the needs of end-users and which can be legally launched post-project

The SSC legal structure, that will deliver neuGRID services, after the end of N4U is being designed by the Business Model Working Group (BMWG) in WP 2 (Task 2.3 Exploitation). According to recent plans, the SSC is made of 4 major bodies: (i) Administrative & Technical Support (Help Desk), as its name implies in charge of administrative and technical assistance to stakeholders and users; (ii) Sales & Marketing in charge of promoting the products and associated services to target customers; (iii) Services & Applications Providers, feeding the portfolio; and (iv) Decision Making Level, gearing the SSC and managing the global portfolio. During the project, the SSC will focus on the activities related to user support since the other bodies are not needed until the project is over, as associated aspects are being taken care of by respective project work packages.

## 2.2 NeuGRID Portfolio of services

Being the main interface between users and the neuGRID environment, the SSC acts as a facilitator for users, but also as an enabler for the system innovation, and long term sustainability. The SSC integrates the overall project portfolio into a single set of coherent assistance services.

In N4U, “User Support” means providing information and assistance for users to access, use, operate, customise neuGRID services and resources . In order to define what services the SSC should provide, the users to target must be identified.

By expanding the portfolio of services previously available in neuGRID, which addressed only neuroscientists working in the field of Alzheimer’s disease, N4U has expanded the coverage of the e-Infrastructure and thus offers a differentiated set of services to different user categories. Therefore, the SSC are prepared to serve the following four types of users (*See Table 1*)

*Table 1. Categorisation of users of neuGRID– clients of the SSC .*

User category	User characteristics	NeuGRID offering
<b>Clinicians</b>	Neurologists and physicians assessing patients with supposed Alzheimer’s disease (AD).	neuGRID offer the chance to include in their diagnosis quantitative measurements, such as the hippocampal volume and brain hypometabolism.
<b>Researchers</b>	Researchers working in the field of brain diseases (neurodegenerative, white matter, and psychiatric diseases) who create advanced experiments in computational neuroimaging.	neuGRID provide technological resources and profiling tools to develop more accurate and sensitive biomarkers.
<b>Algo developers</b>	Companies of algorithm developers needing a benchmarking environment to develop new algorithms and workflows to extract imaging biomarkers for neurodegenerative, white matter, and psychiatric diseases.	neuGRID is a harmonized environment where new complex, heterogeneous tools can be developed, tested and then widely distributed to researchers working in the diverse field of neuroimaging.
<b>Pharma</b>	Pharma have large image datasets collected in clinical trials, but they do not own the infrastructure enabling computational intensive data analysis	By offering powerful computational resources and a wide range of tools, neuGRID can allow pharma companies to run analysis on their big datasets easier and faster.

NeuGRID users range from individual clinicians or researchers to large internationally funded research projects or big Pharma. Because these users have very different goals, expectations and requirements regarding neuGRID usage, the services provided by the SSC are flexible and adaptable for various needs.

Table 2. Portfolio of neuGRID User Support services

Service	Description of service
<b>Infrastructure Portfolio</b>	<p>neuGRID infrastructure is composed of 3 major Tiers of computing resources:</p> <ul style="list-style-type: none"> <li>✓ Tier 1: It is the core of the infrastructure. It is made up of different computing nodes, providing Grid resources and a set of integrated services.</li> <li>✓ Tier 2: It connects other large international initiatives (e.g.: LONI, CBRAIN) to neuGRID augmenting its scientific capacity.</li> <li>✓ Tier 3: It relies on private cloud computing resources.</li> </ul>
<b>Scientific portfolio</b>	<p>N4U offers a range off applications, through ExpressLane, a neuGRID interface custom designed for running medical research applications under high performance computing on large numbers of scans. At the same time, neuGRID is offering its users the access to different datasets.</p>
<b>Infrastructure Experience</b>	<p>In the N4U website, an area has been added where the actual usage of neuGRID resources and services is described: in the section “neuGRID Achievements” results of the “Data Challenges” performed to test the infrastructure are reported described. Whereas, in the section “User Achievements”, users can publish ‘news’ about their analyses on the platform.</p>
<b>Training</b>  <b>User Documentation</b>	<p>N4U offers both assisted and non-assisted training to users.</p> <p>One of the main task of the SSC is to make sure that the documentation available to users is complete and matches their experiences when they use the infrastructure or operate any infrastructure component.</p>
<b>Helpdesk</b>	<p>The SSC operates a helpdesk where users can report day-to-day problems of the infrastructure, and where they can request support services.</p>

Operating and providing a portfolio of customisable services integrates the benefits of unified support mechanisms and the benefits of flexibility. Users and communities require different level of usage of the infrastructure and a Value proposition has been defined in the Exploitation Plan to allow them to choose those services from the portfolio that will best meet their needs.

Figure 1. The 3 levels of usage model identified for neuGRID value proposition

<p><b>Level I usage model:</b></p> <ul style="list-style-type: none"> <li>- (hybrid) Cloud computing environment with secure and trustworthy access:             <ul style="list-style-type: none"> <li>. Extended computational and storage resources                 <ul style="list-style-type: none"> <li>. Deployment and access to on-premises private dedicated resources for fast response time analysis,</li> <li>. Access to online private dedicated resources for fast response time analysis,</li> <li>. Access to online public shared resources for longer-term and demanding data challenges</li> </ul> </li> <li>. Long-term data archiving,                 <ul style="list-style-type: none"> <li>. Persistent identification of registered datasets</li> <li>. Servicing of archived data onto European networks</li> </ul> </li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>- Restricted image datasets and metadata repository (RBAC)             <ul style="list-style-type: none"> <li>. Publication of image datasets, social media tagging, for later sharing or access,</li> <li>. Sharing of image datasets for download, visualization or analysis,</li> <li>. Access of image datasets for download, visualization or analysis</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>- Running unrestricted image processing applications on unrestricted large datasets             <ul style="list-style-type: none"> <li>. Execution of custom-tailored algorithms for testing purposes</li> <li>. Execution of workflow experiments for validation purposes</li> </ul> </li> </ul>
<p><b>Level II usage model:</b></p> <ul style="list-style-type: none"> <li>- Facilitated access to restricted image datasets and metadata,</li> </ul>
<ul style="list-style-type: none"> <li>- Facilitated access to restricted applications for image processing</li> </ul>
<ul style="list-style-type: none"> <li>- Facilitated access to workflow authoring and provenance information</li> </ul>
<p><b>Level III usage model:</b></p> <ul style="list-style-type: none"> <li>- QC of post-processed images</li> </ul>
<ul style="list-style-type: none"> <li>- Benchmarking environment for newly developed algorithms/workflows</li> </ul>
<ul style="list-style-type: none"> <li>- Computer-aided diagnosis based on MR and PET images - Training courses</li> </ul>

According to N4U exploitation strategy, in the figure below, Clinicians and Single Researchers will access the infrastructure for free, using Basic Accounts. In doing so, they will utilize neuGRID applications and data onto public Grid resources, with the associated quality of service (and limitations). Single Researchers needing more dedicated resources will be provided with Premium Accounts and be charged on a real-cost basis. They will be given 25% of neuGRID's in-house resources together with available public ones. Similarly, but having greater scale requirements, public-funded Projects' consortia will be provided with access to 75% of N4U DACS resources thanks to Premium Accounts, again charged on a real-cost basis. On the Industry side, Algorithm Developers and Pharmaceutical Companies will be provided with access to N4U custom-tailored Cloud DACS resources, thanks to Pro Accounts, charged on market price and according to metered utilization.

Figure 2. NeuGRID targets and related level of usage, type of support and price identified in the Business Model

TARGETS			LEVEL OF USAGE	TYPE OF SUPPORT	PRICE
CLINICIANS		BASIC ACCOUNT	III LEVEL	BASIC TECHNICAL SUPPORT (unlimited)	0
RESEARCHERS	SINGLE RESEARCHERS	BASIC ACCOUNT	I LEVEL	BASIC TECHNICAL SUPPORT (unlimited)	0
		PREMIUM ACCOUNT	II LEVEL	BASIC TECHNICAL SUPPORT (unlimited) ADVANCED TECHNICAL (1-4 weeks) & BASIC SCIENTIFIC (2-3 weeks) SUPPORT	ANNUAL FEE
	PROJECTS	PREMIUM ACCOUNT	III LEVEL	BASIC TECHNICAL SUPPORT (unlimited) ADVANCED TECHNICAL (1-3 weeks) & BASIC SCIENTIFIC (2-7 weeks) SUPPORT	PAY ACCORDING TO REAL COSTS
COMPANIES	ALGO DEVELOPERS	PRO ACCOUNT	III LEVEL	BASIC TECHNICAL SUPPORT (unlimited) ADVANCED TECHNICAL SUPPORT (1-3 weeks)	DEFINED ACCORDING TO MARKET PRICES
	PHARMA	PRO ACCOUNT	III LEVEL	AD HOC ADVANCED TECHNICAL & SCIENTIFIC SUPPORT	DEFINED ACCORDING TO MARKET PRICES

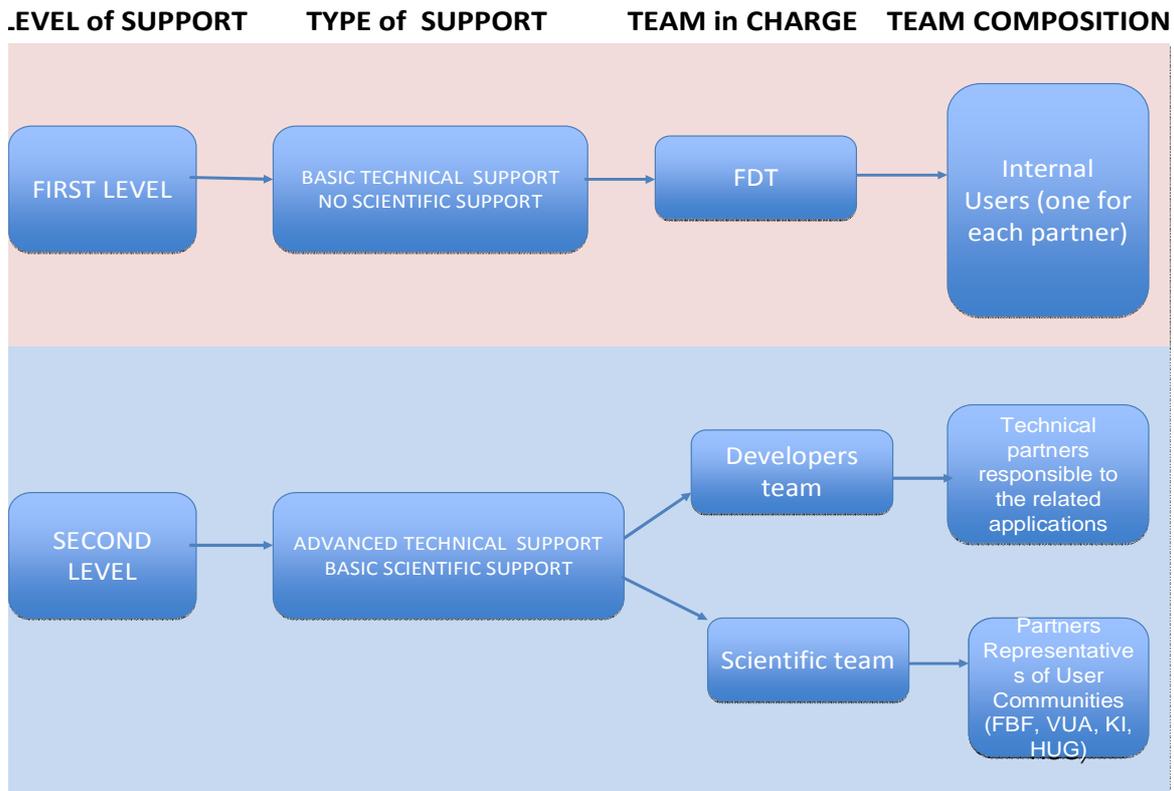
## 2.2 NeuGRID user support

As shown in the figure above, the type of support to users is strictly linked to the user type and the level of usage of the infrastructure.

This is why the different level of supports have been mapped onto the 3 levels of neuGRID value proposition (Figure 1)

The first level of user support consists only of basic technical support, the second level of support comprises advanced technical support, and basic scientific support and the third level consists of advanced technical and scientific support. Since the third level is associated to the “pro Account” which will be created post-project, it will be no put in place during N4U.

Figure 3. NeuGRID two level of user support



### 2.2.2 SSC Structure

NeuGRID Specific Support Center will take care of supporting users through the following activities:

- Set up and management of a centralized user help desk.
- Creation and constant update user documentation
- Monitoring of the status of the infrastructure (through a dashboard)

An important factor is that the SSC must be modular in order to grow if the demand grows too: as the usage of the neuGRID online environment grows in terms of numbers of users and resources available, the need for support will grow proportionally.

The structure is divided into 2 levels to be consistent with the 2 level of support identified during the project lifetime. A third level of support will be introduced as soon as the SSC becomes an economically and financially sustainable legal entity.

- The first level, **the Front Desk Team**, is made up of a set of internal neuGRID users (one per partner). Their task is to handle all the enquiries and escalate the most complicated ones to the second level.
- The second level, has two substructures: **the Developer team**, in charge of advanced technical support and **the Scientific team**, responsible for scientific support. The former consists of specific application experts, who will engage the prioritized enquiries

for a better resolution, since these type of queries require an in-depth knowledge, the latter is made up of advanced users, who have the same profile and research interests of the users who ask for support.

The reason for providing a multi-level support system instead of a general support group is to provide the best possible service in the most efficient manner.

The responsibility of the two levels is shared nearly among all partners, for various reasons. First of all, this complies with N4U “European approach”. Secondly, this allows the project to take advantage of each partner specific competencies and resources: for example the 2 teams of the second level include different partners: technical experts belong to the developer team, whereas Partners representatives of User Communities to the Scientific Team. At the same time, each partner is now in contact with users, having a “first hand” knowledge of the infrastructure usage and what needs to be improved.

The operational aspect related to the management and resolution of user issues is handled through the Issue Tracker (see Section 2.2.3.2) , which is used for registering both user requests (information queries as well as problem reports) and the problems internally diagnosed by the staff members. The Issue Tracker is based on Redmine, a flexible project management web application written using Ruby on Rails framework, customized to be adapted to the N4U needs. The transactions posted through the web interface are automatically notified by e-mail to the requestor and/or the ticket owner and the watchers (Reporters).

#### **2.2.2.1 Front Desk Team**

The Front Desk Team (FDT) is managed by people having basic knowledge of the platform. This means that they have the same needs and requirements of the users asking for support, but, at the same time, have the knowledge to analyze user requests and either solve them or redirect them appropriately.

To handle user requests:, the FDT can

- ❖ Redirect users to documentation and material already available where users can find solutions for their problems.
- ❖ Answer to users questions, when possible
- ❖ Redirect users requests to Level 2 if they cannot solve the problem.

Since the beginning of the project, the activities of providing support and advice on how to use the infrastructure have been carried out by the Chair and the Co-Chair of the User Board (representatives of P5 KI and CO1 FBF), since they have direct contact with users and understand their needs, but, at the same time, took part to the infrastructure development.

Anyway, a defined procedure is being put in place in order for the FDT to be managed by internal users, one per partner, in a round-robin fashion (appointing the “Operator of the month”, which is the partner responsible for the FDT activities for the related period)

#### **2.2.2.2 Developer Team**

The Developer team gets involved in case of task-specific issues which can not be solved by the FDT. Each issue is assigned to the responsible partner, according to the issue category and the partner expertise. Here is an initial list.

- Authentication/login support: MaatG (P2)

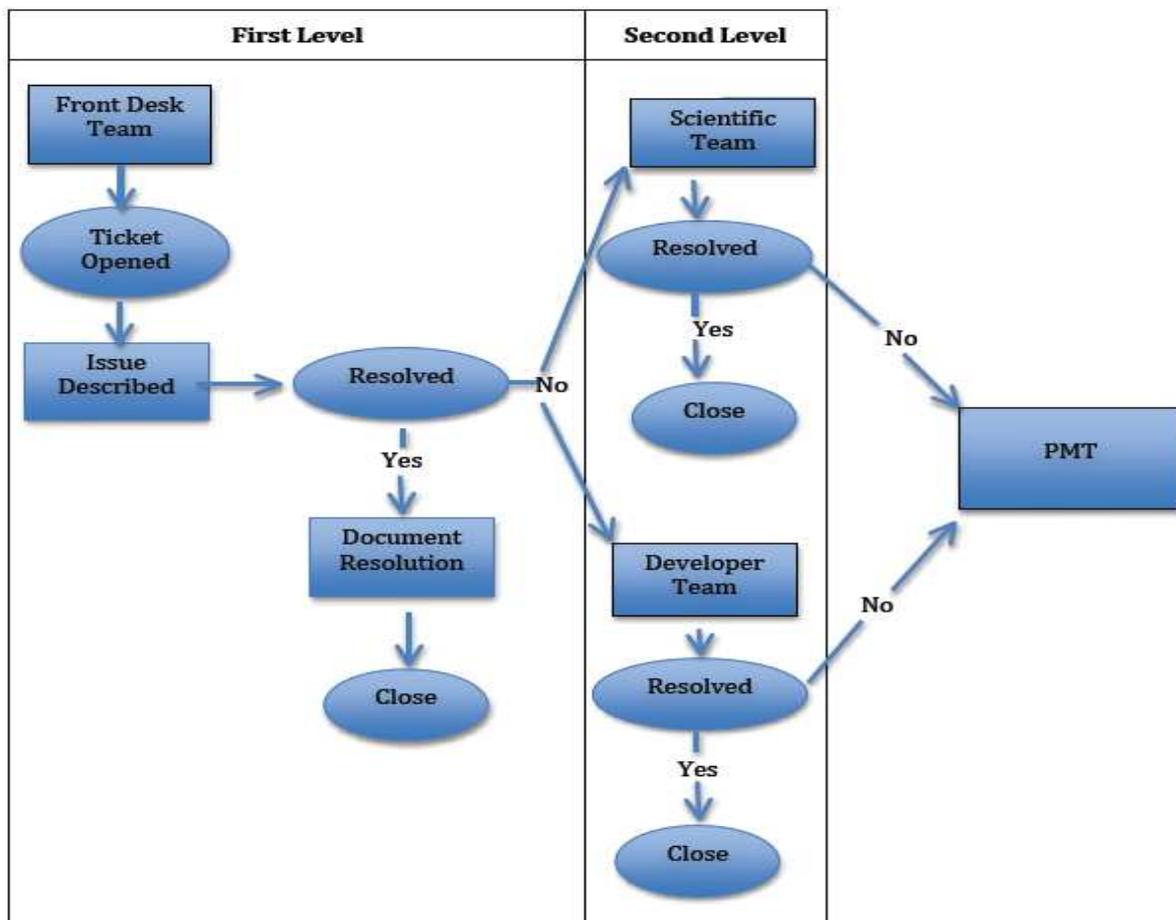
- Information Service : UWE (P3)
- Datasets: CEA (P7)
- Desktop Fusion: MaatG (P2)
- ExpressLane: VUA (P4)
- Grid Browser: MaatG (P2)
- Grid infrastructure support: MaatG (P2)
- Image processing: VUA (P4)
- Portal usage support: MaatG (P2)
- Specific Application Support: Partners in charge

As soon as other tools and services are available on the infrastructure, the related task of providing support will be assigned to the partner responsible.

### 2.2.2.3 Scientific Team

Some institutions participating to the N4U consortium (FBF, VUA, KI, HUG) represent leading institutions in the neuroscience community. This means that, from a scientific point of view, they can be a “peer advanced support group” for users, since they have the same needs and research interests of the users, but can link these needs with the services available on neuGRID.

Figure 4. NeuGRID user support process overview



The figure above summarizes N4U user support system: the 2 levels of support and the teams in charge. If an issue can not be solved even by the second level, during the project, the body in charge of taking the related decisions is the Project Management Team.

### 2.2.3 User support tools

N4U has a multichannel support approach. This means that users are provided with different options to reach support.

Currently the tools available are:

- the Knowledge Base which contains all the knowledge available in the N4U Science Gateway.
- the Online help desk

The first one can be defined as “self-support” tool, whereas the latter implies at least the Front-Desk Team intervention.

For general enquires, a dedicate email address [contact-1@neugrid4you.eu](mailto:contact-1@neugrid4you.eu) has been created. However, we promote the use of the Online helpdesk, as it allows users to have direct access to all the history and previous exchanges concerning a problem. All the emails are taken in charge by the FDT that will start the appropriate procedure (direct reply to the user, issue submission, and so on).

#### 2.2.3.1 KNOWLEDGE-BASE

The N4U Knowledge-Base contains all the knowledge available in neuGRID Science Gateway. It is spread across several tools which can be grouped in three categories:

- Document library. offline official documentation maintained by the neuGRID4you partners
- Wiki. Tools for dynamic documentation that can be created and maintained by N4U partners or users, who will need to be logged in to update these documents, so that any change might be tracked;

**DOCUMENT LIBRARY.** The document library includes all static documentation provided and maintained by N4U partners.

Currently, it includes:

- NeuGrid posters. Presented in different User sessions
- The first issue of N4U newsletter;
- Training demos devoted to different services according to user expertise.
  1. Visualize CIVET cortical thickness data through the Neugrid visualization tool (Basic user).
  2. Download ADNI images from the storage element and compute partial volume maps (CSF,GM and WM) on the N4U computing elements (Intermediate user).
  3. Download ADNI images from the storage element and segment the hippocampus regions automatically (Intermediate user).
- ExpressLane Manual: This guide aims to show how to run an application through the API

ExpressLane. ExpressLane is a simple method allowing the submission of jobs in the N4U grid infrastructure. The benefit for the users is to submit quickly and easily many analyses

- GLITE commands: it is a list of commands users need to know in order to be able to use the GLITE tool, which provides a framework for building grid applications tapping into the power of distributed computing and storage resources across the Internet.
- N4U Science Gateway Manual (Version 3.0): version 2.0 of the manual has been rearranged according to the new release of the Science Gateway and according to the new tools deployed (Freesurfer, Adaboost, and SPM). On the current version, users will find information about all the tools available in the Science Gateway. This manual is available into the Science Gateway only for registered users.
- Dataset Policies, reporting for each dataset the type of access (Open, Restricted or Facilitated) and the instruction for users.

**WIKI.** The wiki is a tool for dynamic documentation that can be created and maintained by both N4U partners or neuGRID users, who will need to be logged in to update these documents, so that any change might be tracked and kept to enable error corrections. The wiki pages have a hierarchical organisation and are interlinked so that users can click back and forth from one concept to another. N4U partners have provided a set of basic contents related to:

- Data registration, management and QC (anonymization, upload, grid browsing)
- Data access querying and browsing
- Workflow development, execution and management (running applications with ExpressLane, running applications with LONI)
- Validation of results and workflows using provenance
- Sharing workflows histories and results
- Visualization of the results
- Tutorials

Recently some pages have been modified by the User Board Chair, in order to be better suited to user needs:

- File management: Browse, Upload, Download,
- Workflow development, execution and management : VIP
- Visualizing imaging data

Within the wiki, FAQ is also hosted, explaining users how to get help and linking all the available support facilities. Currently, FAQ section includes contents related to how to be helped through the Online Help Desk and suggestions about how to use this facility.

### ***2.2.3.2 ONLINE HELP DESK***

The Online Help Desk is based on Redmine project management tool. It is completely separated from the neuGRID Liferay web portal and has a simple local authentication system. This solution avoids potential login problems occurring with the more complex system used to access the neuGRID portal.

The support tools consist of an issue tracker and a forum. The former is targeted to advanced users, and the latter to novice users. Before being able to post on the forum or create/comment issues, users have to request for an account using the register link.

**ISSUE TRACKER.** The issue tracker is a database containing issues associated with neuGRID Science Gateway allowing to track events and discussions taking place during the lifecycle of an issue while making it accessible to all concerned parties. Issues can be searched to find the existing ones about any possible subject. neuGRID users act as reporters (they report issues); the Front Desk Team makes sure that issues are submitted correctly and, when needed, submits issues directly from requests arrived through other systems (i.e. emails).

To submit an issue, users need to be registered to the Help Desk so that they can be identified as reporters. Through this system, users submit bugs or problems they encounter when using neuGRID, as well as requests of support or tool evolution. The tracker allows reporters to choose among: bug, evolution, support.

- a user encounters a bug or a problem when using the neuGRID platform; (BUG Issues)
- a user requests support to use the neuGRID platform; (SUPPORT Issues)
- a user asks for a new feature or improvement. (EVOLUTION Issues)

All the new issues are always assigned to the FDT (Level 1) team. An automatic email is sent to the members of this team when an issue is created or modified. If the FDT is not able to answer a specific issue, it assigns the issue to Level 2.

The status of issues conveys their resolution state, which can be: new, ongoing, resolved, closed, or rejected. It is constantly updated according to the development of each discussion.

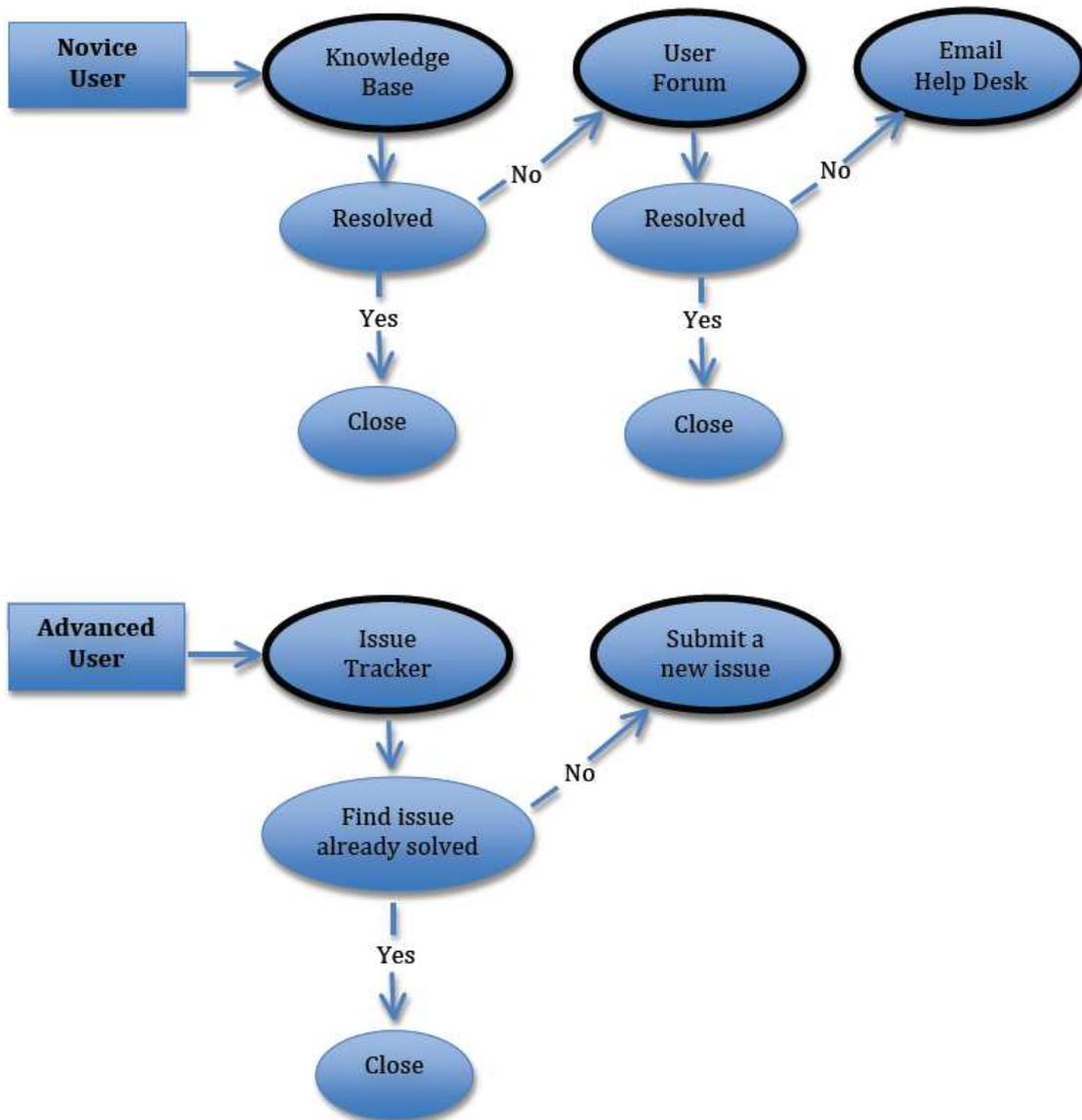
The issue tracker should be used under several circumstances to contact the N4U support team.

Before using the issue tracker, one should first do a query among the issues to see if it has already been reported and possibly completed with a solution. If needed, a user can comment on an existing issue.

**FORUM.** A Forum is managed by administrators who may be helped by a number of moderators, if necessary. Moderators may be divided in subgroups and each of these subgroups may be in charge of a specific category. The Forum allows users to easily find and reuse contents thanks to its structure: according to its use, it can include a number of sections, each of which has several topics; within topic, new discussions are started as threads, and can be replied to by as many people as necessary. Questions posted recurrently will be included into the Knowledge-Base. In addition, having a strong self-support and mutual aid element, a forum allows to foster social interactions among users and to develop a sense of community. It is a tool that should be used by users willing to help themselves.

neuGRID Forum should be used to ask questions to more experienced users or to the support team without creating a new issue in the Help Desk. It allows users to search existing messages and, if needed, post new threads for requesting some help from the community. As it is managed by the support team, if needed, they will redirect users to the appropriate solution or help them creating an issue in case of a new problem. The Forum is the recommended first step before reporting a new issue.

Figure 5. Workflow of NeuGRID support tools according to the user expertise.



Users, especially beginners, are always advised to take a look at the neuGRID4you Knowledge-base. If they don't find any answers to their requests they can post their problems on the neuGRID4you forum. If the issue is not yet resolved, users can send an email to the FDT.

Advanced users can directly use the Issues tracker , searching for existing issues. If they do not find what they are looking for, they can submit a new issue.

## 2.3 Services for Monitoring

### 2.3.1 Dashboard

The dashboard is made of two parts:

- a nagios-based DCI infrastructure monitoring the health of neuGRID infrastructure. This low-level component has already been deployed;
- a high-level user interface allowing the extraction of key measurements. Available solutions are being evaluated and selected.

The dashboard allows users to quickly have a concise overview of the neuGRID platform availability and reliability, helping users and administrators to quickly see if neuGRID is up and running.

### 2.3.2 SSC performance metrics

A set of KPIs has been established in order to monitor the efficacy of neuGRID SSC activities and to plan future developments towards the following outcomes:

- For the internal organisation: efficient and effective use of staff
- For the Service: structured feedback from users in order to make neuGRID more reliable, friendly and customizable
- For the User management: Augmented offer of value

*Table 3. The table shows a list of Key Performance Indicator to measure SSC performance level*

KPI N°	KPIs	STATUS at M12	STATUS at M24	TARGET for M42
1	Number of issues submitted per month	10	7	Less than 20
2	Time to take charge of an issue (average days from issue creation to its status update)	10 days	8 days	4 days
3	Time to solution (average days from issue awareness to solution)	15 days	10 days	5 days
4	Knowledge reuse rate	8% (identified duplicates of requests)	12%	More than 10%
5	Percentage of high priority- urgent issues	6%	6%	Less than 5%
6	Percentage of unresolved issue	4%	4%	Less than 3%
7	Percentage of issue types	66% Bugs (platform errors) 38% Supports (user inadequacy) 2% Evolution (request for improvements)	66% Bugs (platform errors) 22% Supports (user inadequacy) 11% Evolution (request for improvements)	Less than 60% Bugs Less than 20% Support 20% Evolution
8	Number of User achievements published	N/A	4	20

By the end of the project the aim is to shorten of 2/3 the time needed for an issue to be taken in charge of and to be solved. However, it must be noted that the figures of KPIs N° 2 and 3 at month 12 are overestimated due to few extreme values. Nevertheless, an improvement can already be seen from the status at M12 and M24 . The Consortium has evaluated a set of strategies and decided not to increase the personnel effort straightaway, considering that the reported issues per each user decrease as

- the platform errors will decrease and will be solved faster

- the knowledge publicly available will grow

In fact, if we analyze the types of issues submitted until M12 and M24, we can see that the percentage of “Bugs” issues has stayed the same, even if the infrastructure has extended, the number of “Support” Issue has decreased., whereas the “Evolution” issues have increased. This means that neuGRID technical developments and training/user documentation activities have been improved , and users are more likely to submit issues to give suggestions for new applications and tools instead of reporting problems

### 3. Second year’s neuGRID User Support Report

During this second year, the User Support has been improved regularly. it was not immediately available to new users. Nevertheless, the Online Help Desk was put in place really quickly and was promptly adopted by new users. At the time of writing, a total of 170 issues have already been reported in the Issue Tracker and most of them have been quickly closed (152). 6 threads have been created into the Forum for a total of 28 messages

#### Tracker

Figure 3: Helpdesk issues summary

	aperte	chiuse	Totale
Bug	19	140	159
Evolution	6	19	25
Support	10	46	56

#### Categoria

	aperte	chiuse	Totale
Authentication/login support	1	30	31
Data Atlas	1	-	1
Desktop Fusion	3	5	8
ExpressLane dev	-	6	6
Grid browser	2	9	11
Grid infrastructure support	9	47	56
Others	7	22	29
Portal usage support	2	4	6
Specific application support	2	35	37
Terminal	1	4	5
User Certificate Management	1	1	2
Virtual Inaging Plateform	-	-	-

Also, it is important to notice that the number of reported issues is decreasing whereas the number of user increases. This is due to the fact that a lot of work has been done in the Knowledge Base , making easier for users to turn to Self Support, etc. and of course, the system is more and more stable and bugs less frequent.

## 4. Conclusions

This document aimed to describe all the features and the functioning of the Specific Support Center. The Consortium decided to set up a robust, but adaptable and modular structure, able to satisfy users with different needs and expertise of the infrastructure. For the time being, the SSC is the baseline for user support, whereas after the project, it will represent the core of the legal structure that will be launched.

User support is not a monolithic activity that can be defined a priori. This is why, in this deliverable, the different levels of support have been customized according to the user targets, as defined and described in all the other project documents (D 1.2 N4U Vision; D2.4. D2.6 Exploitation plan release 1 and 2)

In fact, the SSC will be solid enough to become a financially sustainable legal structure delivering neuGRID services, only if it proves to be flexible and able to match user needs with neuGRID services,