



D-SA2.3.0: VERCE platform integration: Report on performance indicators and quality measurements

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Executive summary

One of the objectives of the VERCE project is to provide a service-oriented architecture and framework that wraps the data-infrastructure resources and services with a set of distributed data-aware Grid and HPC resources provided by the European e-Infrastructure and community. To this end, the tools, services and application codes, i.e. software components, which are particularly relevant to the seismologists and the Earth Science community, are selected for integration and deployment on the VERCE Platform. These components are then available as services to seismic users.

In order to ensure that these components are effectively and efficiently provided on the VERCE platform, the services information is continuously collected via monitoring and users' feedback. Performance indicators are defined by SA2 in the first six months and are continuously refined by SA1 to align it with the actual available monitoring data and feedbacks. Monitoring data and feedbacks are in turn used to assess the quality of service.

The main aim of this report is to report the current defined key performance indicators (KPIs) and the classification of the quality measurements. The services and tools that will be available to our users that can influence the quality of the VERCE platform are outlined and classified based on their level of importance. The internal tools, Inca and the issue tracking system, used by SA1 to collect the data for the quality measurements are also shared. A summarised view on how each KPI can be collected using the tools is also shared.

In the upcoming reporting periods, a more comprehensive set of data is expected to be collected when the VERCE platform is made available to external beta-users. The KPIs and quality measurements can then be further refined to better assess the quality of the platform.

1. Key performance indicators

An initial list of key performance indicators (KPIs) that could be used to measure the performance and assess the quality of service was defined by SA2 in the first six months of the project. These indicators were defined not to be the final set but as an initial set to assist SA1 in defining the monitoring metrics for the platform. Since it can be expected that not all data required could be collected on all resources, the list is continuously refined by SA1, in cooperation with SA3.

1.1. Refined list of key performance indicators

VERCE platform will provide a number of services and tools for the seismologists and other end users for data management, data processing, job management, visualisation and many other tasks. This section discusses the KPIs defined for these services provided by VERCE platform.

To correspond with the PDCA cycle, the time frame for measurement is set to be six months. The monitoring period will begin after a new VERCE platform release is deployed and will end when a newer VERCE platform release is available for deployment. Deployed services is categorised as external services and internal services. External services are services that are available to VERCE platform users while internal services are services that are used only by VERCE project members.

1.1.1. Availability of Services

Availability of VERCE services can be measured using the metrics defined under this section. This set of KPIs will provide an insight into how stable and reliable the VERCE platform is.

<i>Service Availability</i>	This is a status-based metric that is reported in the percentage of time the service is running during the entire monitoring period. The availability should be measured and logged at intervals depending on the acceptable tolerance for each service.
<i>Number of Service Interruptions</i>	Total number of times the service was interrupted during the entire period of reporting. Interruptions during planned maintenance should be excluded from this evaluation.
<i>Duration of Service Interruptions</i>	This metric is a time based where the duration during the time frame of measurement is the average duration of all interruptions for each service. It should be noted that this is dependent on the window between each service probes. Duration of planned interruptions should be excluded from this calculation.
<i>Availability Monitoring</i>	This is the percentage of VERCE services and infrastructure components that are monitored for availability. This percentage is relative to the total number of services defined in the platform.
<i>Number of reported service failures</i>	This is the total number of service failures reported by the users.

1.1.2. Tools/Service/Software releases

The KPIs will give an insight into the quality of software components chosen to be included as a part of VERCE platform release and also the efficiency of the evaluation and deployment procedures. The unit of

measurement should be the total number instead of a percentage. The "percentage" may be misleading especially due to the relatively small number of components that are evaluated and deployed in each PDCA cycle.

<i>Number of components evaluated</i>	Number of components that were proposed for inclusion in the VERCE platform release.
<i>Number of components accepted</i>	Number of components that successfully satisfied the evaluation requirements.
<i>Completed evaluations within the scheduled timeframe</i>	Number of components that completed the evaluation procedures within the PDCA cycle based on the pre-defined schedule.
<i>Completed deployments within the scheduled timeframe</i>	Number of components that completed the deployment procedures within the PDCA cycle based on the pre-defined schedule.

1.1.3. Security

In order to evaluate the security of services provided by VERCE platform, security incidents not only related to software components developed in-house, but also related to components approved and deployed by VERCE.

<i>Number of major security incidents</i>	This is the total number of major security incidents filed in the issue tracking system on components deployed by VERCE. All major security incidents are submitted on the issue tracking system for tracking purposes. Major security incidents are incidents that require an immediate suspension of operation of a deployed component across all resources to prevent a compromise in security.
<i>Number of security patches</i>	The total number of security patches reported on deployed components during the period of evaluation.

1.1.4. Quality of Support

Quality of support provided by VERCE project will be evaluated based on support for any reported incidents.

<i>Number of incidents</i>	Total number of incidents reported in VERCE issue tracking system. This includes issues requesting for support and change.
<i>Average initial response time</i>	This is the average of time taken by VERCE support team to acknowledge or address the issues.
<i>Incident resolution time</i>	The average of time taken to resolve each issue during the reporting period.

1.2. Monitored services and tools and required quality of service

Monitored services and tools are defined into two categories, external and internal. Services and tools that are used internally for operational purposes do not need to be monitored for quality measurements. Services and tools that will be used by VERCE platform users will be monitored. External services are further divided into three level of importance, High, Medium and Low. Front-end services, e.g. the science gateway and the issue tracking system and widely used services are defined as of “High” importance. “Medium” importance services are services that are required for fulfilling the defined seismic workflow but when unavailable can cause either a delay or performance degradation. Services that provide optional functionalities are defined as of “Low” importance. In the following table, external services offered by the VERCE platform and their importance levels are shared.

Services/Tools	Version	Importance	Deployed at
Dispel Gateway	1.0	High	DEP-ULIV-01
			DEP-UEDIN-01
gLite Cream	1.14.0	Medium	GRI-SCAI-01
			GRI-IPGP-03
gLite WMS	3.4	Medium	GRI-SCAI-01
			GRI-IPGP-03
GMT	4.5.9	Low	HPC-LRZ-01
			GRI-LRZ-02
			GRI-SCAI-01
GRAM	5	Medium	HPC-LRZ-01
			GRI-LRZ-02
GridFTP	6.14	High	HPC-LRZ-01
			GRI-LRZ-02
			HPC-CINECA-02
			HPC-CINECA-03
			GRI-SCAI-01
			GRI-IPGP-03
GSISSH	SSH2.0 OpenSSH 6.0p	Low	HPC-LRZ-01
			GRI-LRZ-02
			GRI-SCAI-01
Matplotlib	1.0.5	Low	HPC-LRZ-01
			GRI-LRZ-02
			HPC-CINECA-02
			GRI-SCAI-01

			GRI-IPGP-03
Metis	4.0.3 or 5.0.2	Low	HPC-LRZ-01 GRI-LRZ-02 HPC-CINECA-02 HPC-CINECA-03 GRI-SCAI-01
ObsPy	0.8.3	High	HPC-LRZ-01 GRI-LRZ-02 HPC-CINECA-02 GRI-SCAI-01 GRI-IPGP-03 DEP-UEDIN-01
OGSA-DAI	4.2	High	DEP-ULIV-01 DEP-UEDIN-01
Python Basemap	1.0.5	Low	HPC-LRZ-01 GRI-LRZ-02 HPC-CINECA-02 GRI-SCAI-01 GRI-IPGP-03
Science Gateway	-	High	KNMI
SeisSol	1.0	Medium	HPC-LRZ-01 GRI-LRZ-02 GRI-SCAI-01
Specfem3D	2.0.1 Revision 21477	Medium	HPC-LRZ-01 GRI-LRZ-02 GRI-SCAI-01
Issue tracking system	-	High	IPGP
Unicore	6	Medium	HPC-LRZ-01 GRI-LRZ-02 HPC-CINECA-02 GRI-SCAI-01

Table 1. External services and their associated level of importance

For services that are of a “High” level of importance, the most stringent level of quality is expected since any loss in availability and reliability will have the greatest impact to the platform reported users. The proposed associated quality measurements classification based on the level of importance is shared in Table 2. All external services offered by VERCE should have at least a “Good” level of quality for it to be considered acceptable. Services with “Poor” level of quality will be re-evaluated and improvements will be requested. http://www.lrz.de/services/compute/grid_res/globus/gsissh-term/applet/jws.jnlp

Importance	Excellent	Very Good	Good	Poor
High	95-100%	85-95%	75-85%	Below 75%
Medium	90-100%	80-90%	70-80%	Below 70%
Low	Above 80%	70%-80%	60-70%	Below 60%

Table 2. Quality measurements classification

1.3. Data collection

The quality measurements can be calculated mainly from the data collected by SA1 from Inca and the issue tracking system.

1.3.1. Inca

SA1 operates a monitoring system, Inca. Inca is able to monitor the deployed services and tools on different VERCE resources. Inca is particularly useful in collecting data for the availability of services. For more information about Inca, please refer to section 3.4 of D-SA1.3.

1.3.2. Issue tracking system

SA1 operates a Redmine based issue tracking system for both internal and external users. This system allows users to submit issues found on the VERCE platform. The required data for checking the quality measurements, in particular those related to quality of support, can be derived from the issues submitted by users. For more information about the issue tracking system, please refer to section 3 of D-SA1.2.1 deliverable.

1.3.3. Source of data for each KPI

The data required for quality measurements is collected by SA1 from Inca and the issue tracking system. This data will then be given to SA2 to assess the quality of the platform against the defined KPIs. More detail about how each KPI can be measured is described in this sub-section.

Availability of Service

The data required to calculate the quality metrics for availability of service can be retrieved from Inca monitoring service. Each external service is tested hourly to check if it is available. As such, information on “Service Availability”, “Number of Service Interruptions” and “Duration of Service Interruptions” can be extracted from the collected monitoring data. To differentiate unexpected service interruptions from planned maintenances, additional data from the issue tracking system have to be collected.

“Availability Monitoring” information can also be retrieved from Inca by checking if the required external services are available with the correct version on each resource. “Number of reported service interruptions” will be collected from our issue tracking system.

	Inca	Issue tracking system
<i>Service Availability</i>	X	X
<i>Number of Service Interruptions</i>	X	X
<i>Duration of Service Interruptions</i>	X	X
<i>Availability Monitoring</i>	X	
<i>Number of reported service failures</i>		X

Tools/Services/Software Releases

“Number of components evaluated”, “Number of components accepted” and “Completed evaluations within scheduled timeframe” can be provided by SA2. The final indicator, “Completed deployments within scheduled timeframe” can be collected from the issue tracking system since SA1 has a process of keeping track of the deployment procedures of each accepted components via the internal issue tracking system.

	SA2	Issue tracking system
<i>Number of components evaluated</i>	X	
<i>Number of components accepted</i>	X	
<i>Completed evaluations within the scheduled timeframe.</i>	X	
<i>Completed deployments within the scheduled timeframe.</i>		X

Security

The security measurements can be collected from the issue tracking system. All major security incidents and security patches request will be recorded as an incident on the issue tracking system.

	Issue tracking system
<i>Number of major security incidents</i>	X
<i>Number of security patches</i>	X

Quality of Service

The quality of service indicators can be measured from the issue tracking system. The initial response time to an issue and the incident response time will be recorded by the issue tracking system.

	Issue tracking system
<i>Number of incidents</i>	X
<i>Average initial response time</i>	X
<i>Incident resolution time</i>	X

2. Conclusion and Future Plan

The refined key performance indicators are shared in this report. The tools for collecting the data for the quality measurements are identified. The external services offered by VERCE to users are classified into three level of importance, high, medium and low. For each level of importance, the quality measurements are further classified into excellent, very good, good and poor. All external VERCE should have at least a “Good” level of quality to be considered as acceptable. Services and tools with “Poor” level of quality will be re-evaluated and improvements will be requested.

Data will be continuously collected by SA1 for assessment by SA2 to check the quality of the platform based on the identified KPIs. Currently, the full data required to provide a comprehensive view of the platform is not yet available since the platform is not yet opened to external users. In the upcoming reporting period, the platform is expected to serve our first group of beta-users. During this period, more data can be collected from Inca and the issue tracking system. Surveys will be proposed to gather feedback, i.e. “customer experience”, from the users to have a more comprehensive picture of the quality of the VERCE platform. The KPIs and quality classifications can then be further refined, if required, to ensure that they accurately assess the quality of the VERCE platform.