SeaDataNet

PAN-EUROPEAN INFRASTRUCTURE
FOR OCEAN & MARINE DATA
MANAGEMENT

WP2.4 Monitoring

Angelos Lykiardopoulos, Stavroula Balopoulou, Sissy Iona (HCMR-HNODC)

Menashè Eliezer (OGS)

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A. Overview of the Monitoring System

What is network monitoring?

The term **network monitoring** describes the use of a system that constantly monitors a computer network for slow or failing components and that notifies the network administrator in case of outages.

In the fields of SDN, network monitoring service monitors through Internet the SDN services (web pages, DMs, etc) to confirm that they are accessible and available, notify persons in charge to take action in case of service failure and keep statistics.

Benefits of monitoring

- ✓ Monitoring presence is crucial when implementing widely distributed systems over the Internet.

- ✓ Is also more and more a commitment for some projects funded by the European Commission like Research Infrastructure project (DG-Research) or Global Monitoring for Environment and Security (GMES - DG_Industry).

- ✓ In real time, to be able to alert when incidents are detected and to correct them as soon as possible;

- ✓ In a longer term, to identify critical components within widely distributed systems and to update them to improve their robustness;

- ✓ To provide continuous information about the overall availability of provided services.

- ✓ As statistics, to inform the consortium of the usage of services, portals, websites etc.

- ✓ The WP2 monitoring activities will also give input to the coordination by OGS of the WP7 scientific access services.

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Network Monitoring Plan

SeaDataNet

PAN-EUROPEAN INFRASTRUCTURE FOR OCEAN & MARINE DATA MANAGEMENT

Phase I: Services Inventory & Upgrade Nagios

Phase II: First Monitoring Services (web pages, servers status)

Phase III: Plugins, configuration of Web services, web forms, CAS

Phase IV: Development of Download Manager plugin

Phase V: Design & Development of Monitoring portal

Phase VI: Definition & Development of Global Availability Indicator formula

Phase VII: Messaging System (email) to notify local administrators

Phase VIII: Establishment of second monitoring center

Phase IX: Services usage monitoring

- ✓Testing with Pilot Partners
- ✓Examination of first monitoring data
- ✓Monitoring all partners services

- ✓ SDN CAS authentication
- ✓ Features for reporting monitoring results
- ✓ Version of Download Manager (in cooperation with IFREMER)

MARIS: script to provide HCMR portal with RSM statistics needed for the formula

OGS identical Nagios False Alarm Detection System

Monitoring System

- All phases were completed, successfully.

- Last developments

    – False alarm detection system (crosscheck with OGS nagios system and confirm or reject a critical events),

    – Addition of version of Download Manager at the portal,

    – New feature=>Global Availability Indicator that shows the whole infrastructure's % uptime during a selected period of time.

Monitoring System: Services

The SeaDataNet components that are monitored are divided into two groups of services:

- ✓ The **Core services**, which are centrally-based provided services:
    - ➤ Common Data Index (CDI) portal
    - ➤ European Directory of Marine Organisations (EDMO) portal
    - ➤ European Directory of the initial Ocean-observing Systems (EDIOS) portal
    - ➤ European Directory of Marine Environmental Research Projects (EDMERP) portal
    - ➤ European Directory of Marine Environmental Data Sets (EDMED) portal
    - ➤ Cruise Summary Reports (CSR) portal
    - ➤ SeaDataNet homepage
    - ➤ SDN Central Authentication Service (CAS)
    - ➤ Common Vocabularies Web Services
    - ➤ Request Status Manager (RSM).

- ✓ The **Local services**, which are services that are provided by the partners' infrastructures.
    - ➤ 86 Download Managers supporting SeaDataNet, GeoSeas, UBSS, EMODNet-Chemistry and EMODNet-Bathymetry projects

Monitoring System: Web portal

✓ The Monitoring Portal is an **online web interface** that can be accessed by *members only* either via the http://seadatanetnm.hcmr.gr/portal URL or via the *SeaDataNet website* (http://www.seadatanet.org) under the *Standards & Software* menu and as an icon at the top right of the page, next to extranet icon.

✓ **Members are**: people whose SDN service(s) is(are) monitored by the system (e.g. Download Manager), who are set by their organization as responsible for this(these) service(s) up and running smoothly, have obtained a SeaDataNet user ID.

✓ The portal provides users the capability to:
  ➢ search and access a variety of detailed information about their own servers and services status and logs,
  ➢ view on map all SDN services status of operation (availability),
  ➢ record and show the history of their services operation status (statistic reports),
  ➢ calculate % service uptime (availability indicator),
  ➢ calculate a global availability indicator (% uptime of the whole network)

Monitoring Portal: Important features

✓ **"Latest Critical Events" =>** reports the "hard critical events for the last 7 days" of the user's service(s) showing duration and detailed state information.

✓ **"Alerts Summary" =>** reports the "hard critical events for a selected period of time" of the user's service(s) showing duration and detailed state information.

✓ **"Service Availability Indicator" =>** % uptime of an individual service at a specific period of time.

✓ **"Global Availability Indicator" =>** Data Access Services: refers to the Data Access & Download Service (CDI) and calculates the % total uptime of all its related services (Seadatanet homepage, SDN CAS, Request Status Manager and 86 Download Managers).

✓ **"False Alarm Detection System"** => in case of an event a notification email is sent to local administrators including the status of the monitored service by both monitoring systems (HCMR & OGS).

"Data Access Services" - Global Availability Indicator formula

- The *seadatanet.org, CAS authentication and Request Status Manager* services play a critical role to the overall data availability of the network.

  – If they are not functioning (**OFF**) then the availability is **NULL**.

  – When *seadatanet.org, CAS authentication and Request Status Manager* are actually functioning properly (**ON**) then the Availability is calculated based on the equation below that consists of the following factors:

    s_j *value:* the uptime of each of the above three services

  evaluation coefficient (w_i): estimated delivered CDIs for each local service (Download Manager),

    s_i *value:* uptime of each local service.

$$Availability = \begin{cases} 0, seadatanet.org/CAS\ authentication/Request\ Status\ Manager\ OFF \\ \sum_{j=0}^{3} s_j \sum_{i=0}^{n} w_i s_i, seadatanet.org/CAS\ authentication/Request\ Status\ Manager\ ON \end{cases}$$

Monitoring Network: List of services

Monitoring Network: SeaDataNet Download Managers

State Reports -> Service Availability Index

Monitoring Network

About the portal

Document Library

View all services on map

Current State

Services

Service Groups

State Reports

Service(s) Availability Index

State Breakdowns (Availability)

State History (Trends)

Alerts Reports

Latest Critical Events

Alerts Summary

Alerts Histograms

Add other service(s)

Add your Service

Account

Change your personal info

Sign-out user *sb30fad*!

Calculate Availability Index

This form calculates in real-time the availability of a service in a specific period of time on percentage basis.

Select: All

From: 2014-09-01

To: 2014-09-09

Calculate

Select service & time period and press "Calculate"

Service Availability Index: %UP state of a single service.

Alert Reports -> Latest Critical Events

Monitoring Network

About the portal
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Latest Critical Events

Select to view the latest critical events of your host/service.

Select Type: Service ▼ Next

Select service from the list below:

Select service: All ▼ View Alerts

➢Select type **"Service"** & one or **"All"** service(s) from the list.
➢Press **"View Alerts"**.

Latest critical events report: describes the critical state (**"DOWN state"**) of service(s) for the last 7 days.
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Alert Reports -> Alerts Summary

Monitoring Network

- About the portal
- Document Library
- View all services on map

Current State

- Services
- Service Groups

State Reports

- Service(s) Availability Index
- State Breakdowns (Availability)
- State History (Trends)

Alerts Reports

- Latest Critical Events
- Alerts Summary
- Alerts Histograms

Add other service(s)

- Add your Service

Account

- Change your personal info
- Sign-out user *sb30fad*!

Contact

Alerts Summary

Select to view the summary of alerts of your host/service.

Select Type: Service   Next

Select service from the criteria below:

Select service: All

From: 2014-09-01
To: 2014-09-09

View Alerts

➢Select type **"Service"** and press **"Next"**.
➢Then select one or **"All"** service(s) from the list & time period.
➢Press **"View Alerts"**.
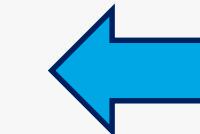
Alerts Summary report: describes the critical state (**"DOWN state"**) of service(s) for a specific period of time.
.
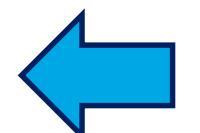
State Reports -> Global Availability Index

Monitoring Network

- About the portal
- Document Library
- View all services on map

Current State

- Services
- Service Groups

State Reports

- Total Availability Index

Calculate Global Availability Indicator

This form calculates in real-time the Global Availability Indicator for the "Data Access Services" on monthly basis for the last 12 months.

Type of Availability Indicator: Data Access Services ▼

From: 09-2014 📅 To: 09-2015 📅
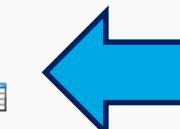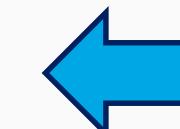
Calculate

➢Select month and year from calendar
➢Press **"Calculate"**

Global Availability Indicator: calculates the % uptime of all Data Access Services (SDN homepage, CAS,RSM and DMs) for a specified monthly period within a year .

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False Alarm Detection System

- ✓ Status-json plugin of Nagios has been installed at OGS monitoring system. This plugin gives the status of each monitred service as shown by OGS system.

- ✓ A script has been developed to send notification emails to local administrators when critical events occur that include status as shown from both monitoring systems HCMR and OGS and it is as follows:

  - ➢ ***** Nagios *****

    Notification Type: PROBLEM

    Service: ICES Download Manager

    Host: ICES Server Address: 89.104.200.100

    State: CRITICAL

    Date/Time: Sun Sept 13 11:49:34 EEST 2015

    Additional Info: No route to host

    ****

    OGS CHECKED THE STATUS OF SERVICE AND CONFIRMS THE ALERT

    Description given by OGS monitoring service for ICES/CRITICAL:

B. Monitoring Report of the last year

What is being monitored until now?

A total of 160 services are currently being monitored:

- ✓ 11 SeaDataNet Services,
- ✓ 2 GeoSeas Services,
- ✓ 46 SeaDataNet Download Managers,
- ✓ 24 GeoSeas Download Managers,
- ✓ 21 UBSS Download Managers,
- ✓ 43 EMODnet Chemistry Download,
- ✓ 13 EMODnet Bathymetry Download Managers.

Monitored Services statistics

In the next slides, statistics are presented about the availability results of the 160 services derived from 7 service groups. The results are presented per service group and refer to a monitoring period of approximately 12 months (from 01-09-2014 to 01-09-2015).

The 7 service groups are:

- ✓ SeaDataNet Services
- ✓ GeoSeas Services
- ✓ SeaDataNet Download Managers (SeaDataNet DMs)
- ✓ GeoSeas Download Managers (GeoSeas DMs)
- ✓ UBSS Download Managers (UBSS DMs)
- ✓ EMODnet Chemistry Download Managers (EMODnet-Chem DMs)
- ✓ EMODnet Bathymetry Download Managers (EMODnet-Bathym DMs)

'SeaDataNet Services' results from 01-09-2014 to 01-09-2015

Service	Starting Date	% Time OK	% Time Critical
Common Vocabularies	27/11/2013 12:36	99.598% (99.598%)	0.402% (0.402%)
cas_service	29/11/2013 13:42	99.618% (99.618%)	0.382% (0.382%)
CSR homepage	29/6/2012 21:00	98.531% (98.531%)	1.469% (1.469%)
CDI homepage 1	29/6/2012 21:00	99.919% (99.919%)	0.081% (0.081%)
CDI homepage 2	29/6/2012 21:00	99.912% (99.912%)	0.088% (0.088%)
EDIOS homepage	29/6/2012 21:00	99.919% (99.919%)	0.081% (0.081%)
EDMERP homepage	29/6/2012 21:00	99.917% (99.917%)	0.083% (0.083%)
EDMO homepage	29/6/2012 21:00	99.900% (99.900%)	0.100% (0.100%)
Request Status Manager	26/02/2015 22:00	100.000% (100.000%)	0.000% (0.000%)
EDMED homepage	29/6/2012 21:00	99.897% (99.897%)	0.103% (0.103%)
SeaDataNet homepage	15/6/2012 21:00	99.805% (99.805%)	0.195% (0.195%)
Average		*99.729% (99.729%)*	*0.271% (0.271%)*

'GeoSeas Services' results from 01-09-2014 to 01-09-2015

Service	Starting Date	% Time OK	% Time Critical
Geoseas Godiva Service	7/3/2013 13:45	99.354% (99.354%)	0.646% (0.646%)
Geoseas Thredds Service	7/3/2013 13:46	99.360% (99.360%)	0.640% (0.640%)
Average		**99.357% (99.357%)**	***0.643% (0.643%)***

'SeaDataNet DMs' results from 01-09-2014 to 01-09-2015
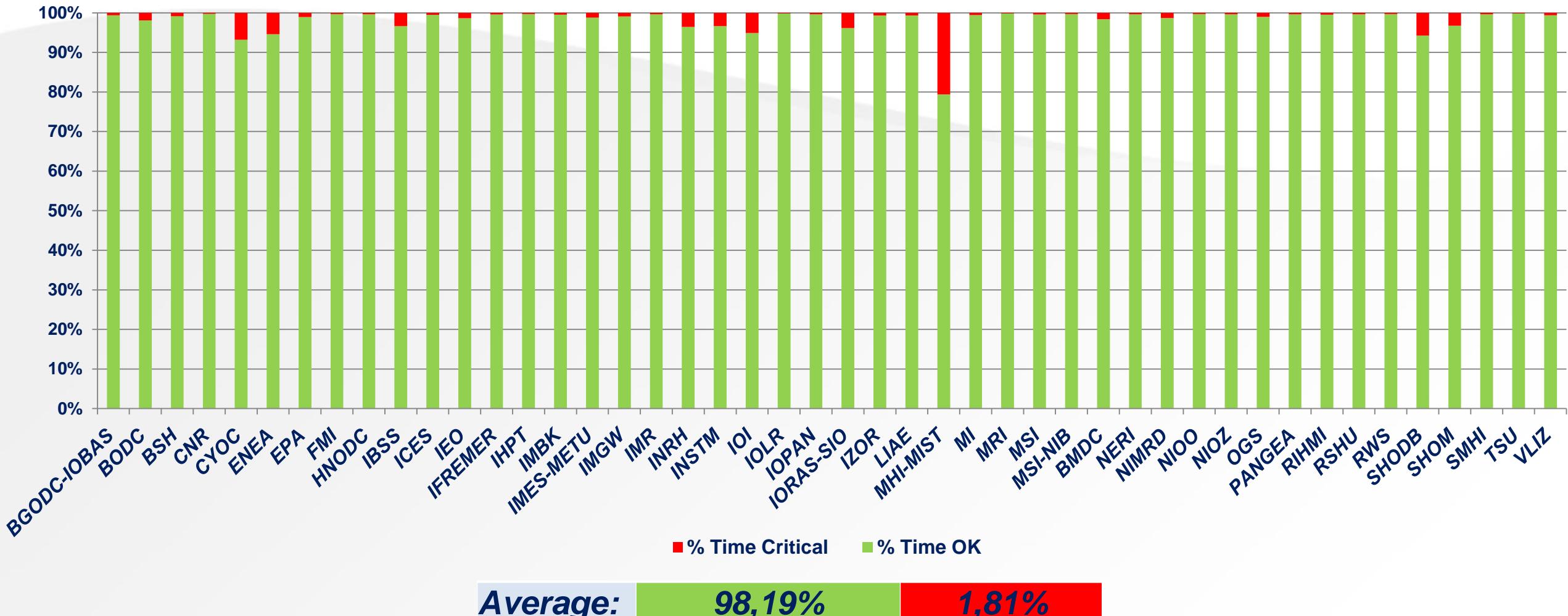
'GeoSeas DMs' results from 01-09-2014 to 01-09-2015
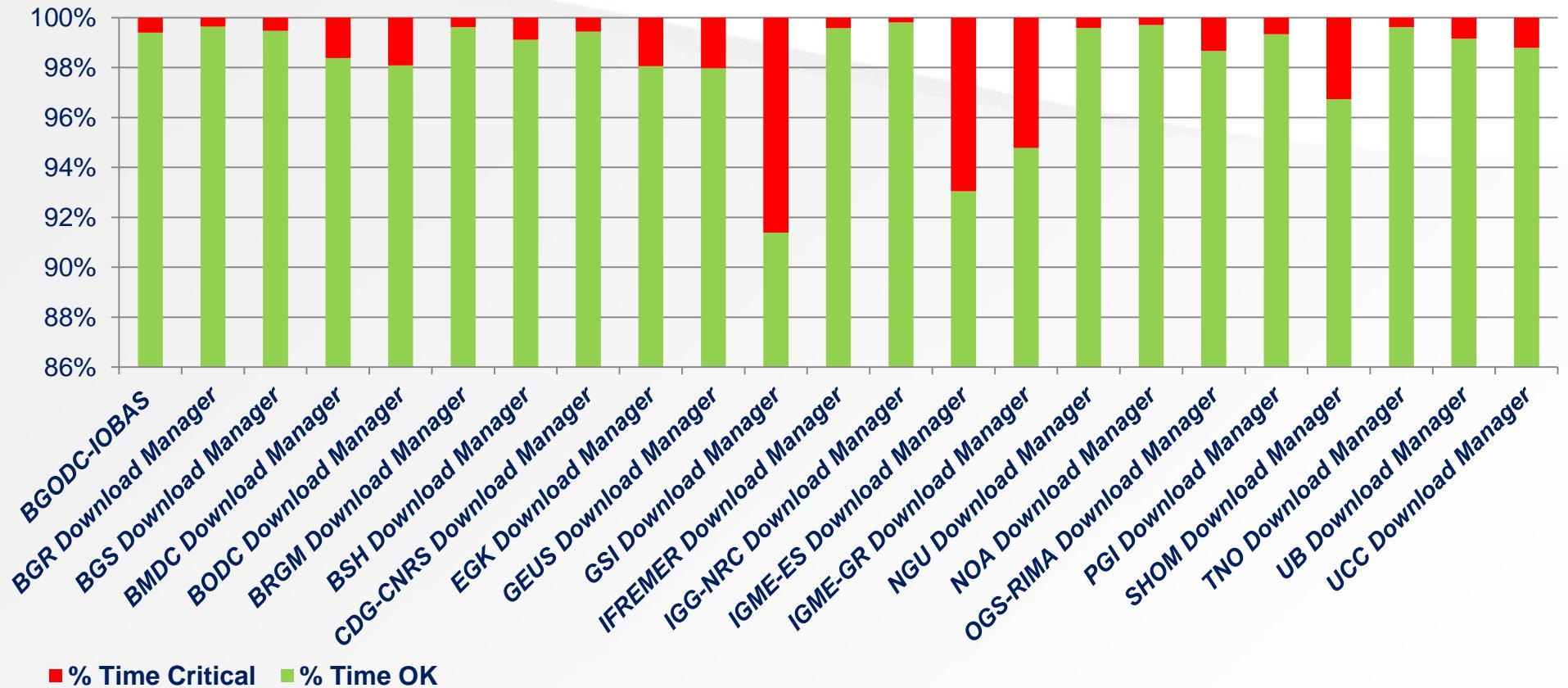
'UBSS DMs' results from 01-09-2014 to 01-09-2015

Average: 93,68% 6,32%
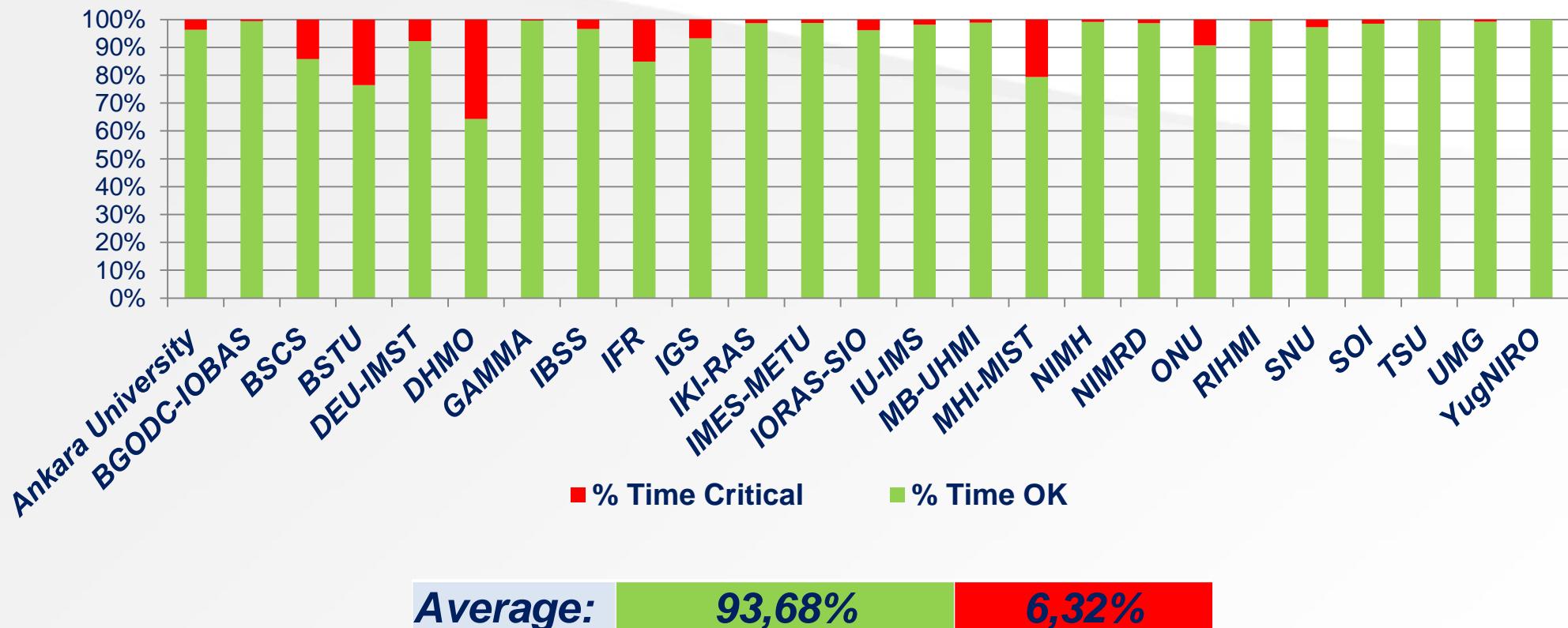
'EMODnet-Chemistry DMs' results from 01-09-2014 to 01-09-2015

Average: 98,51% 1,59%

- % Time Critical
- % Time OK
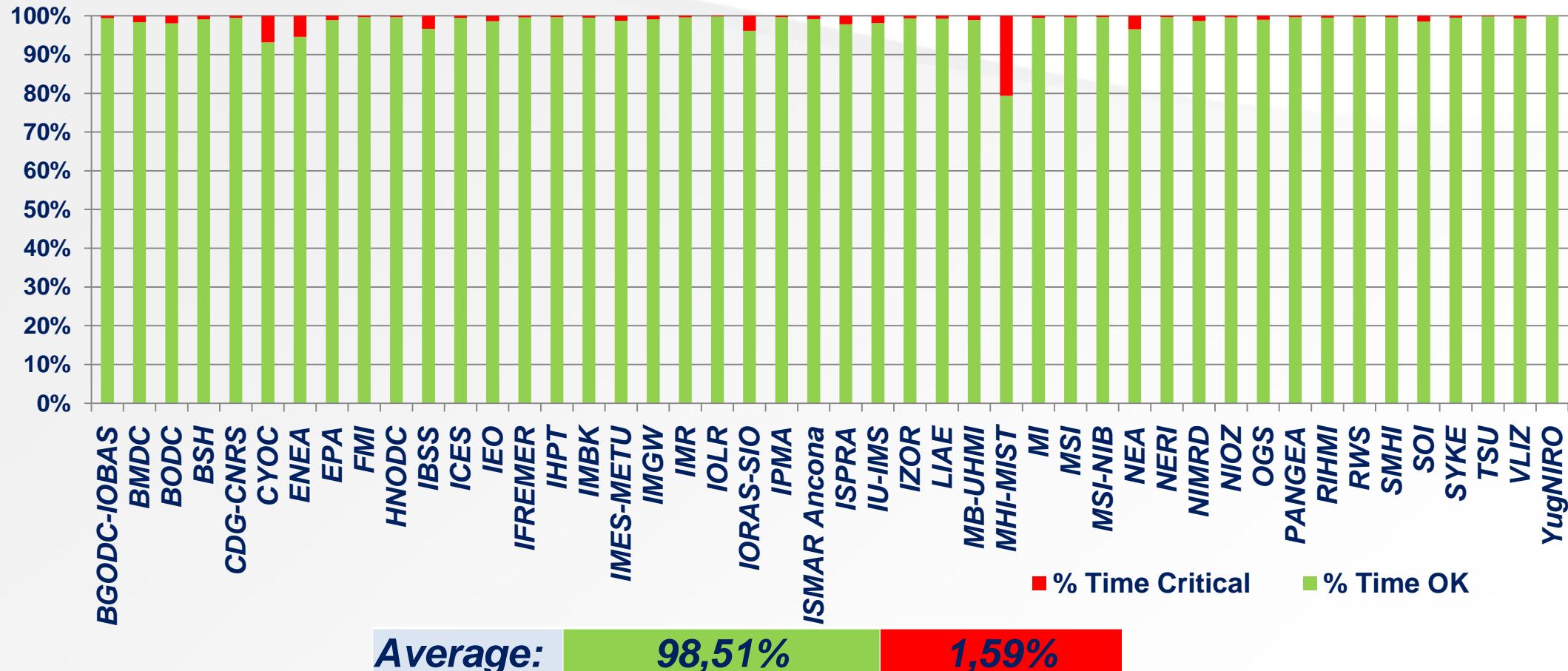
'EMODnet-Bathymetry DMs' results from 01-09-2014 to 01-09-2015
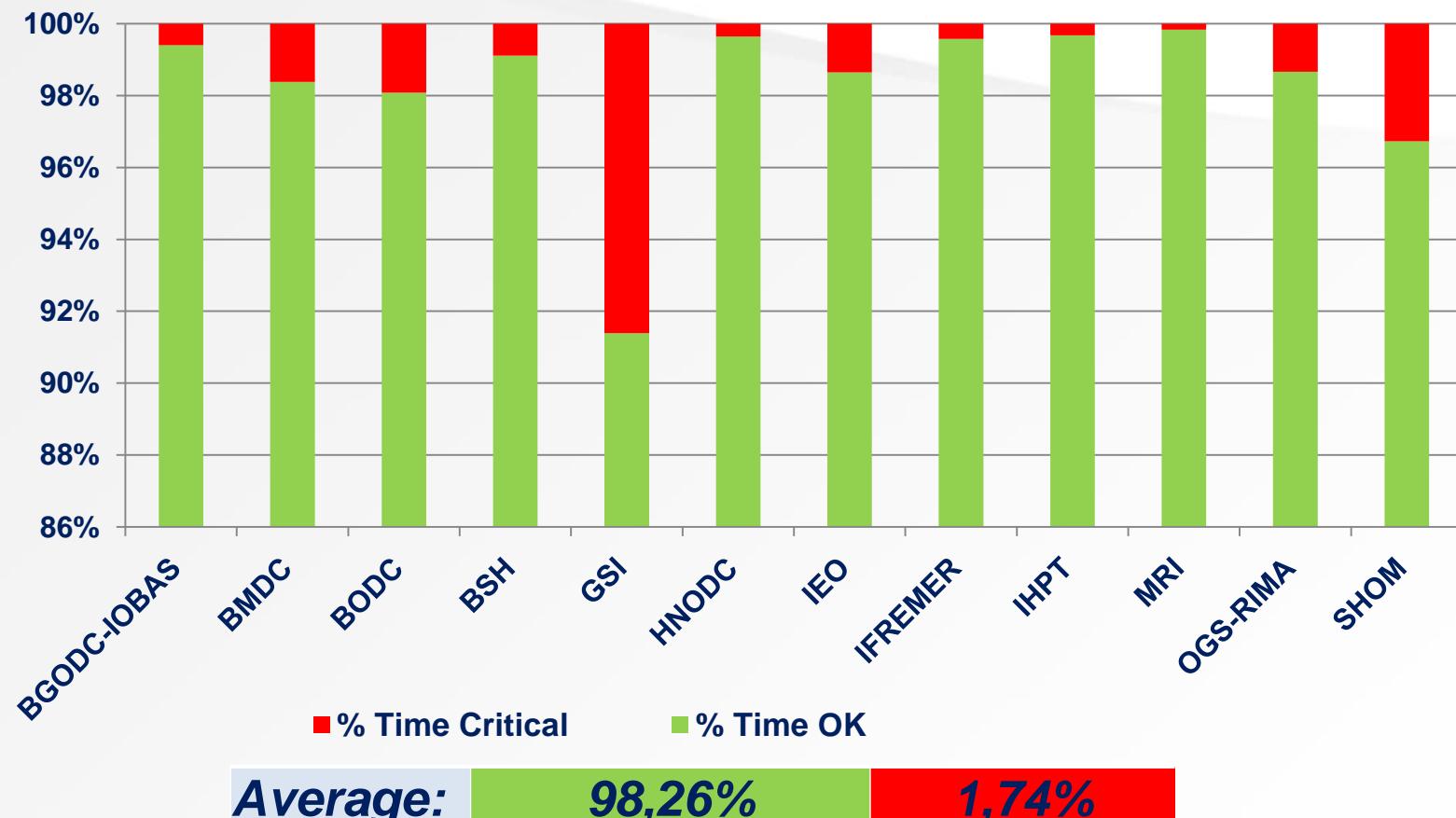
C. RSM Statistics

Operational performance of the infrastructure

- ✓ MARIS robot verifies that the Download Manager's are capable of handling shopping requests made via the CDI portal.
- ✓ Test results are for the period 01-09-2014 -> 14-09-2015.
- ✓ The SDN2 forth year annual metrics report will provide more details.

Robot monitoring of CDI shopping process (01-09-2014 until 14-09-2015)

% successful robot orders for SDN partners

| 01-09-2014 until 14-09-2015	
Average of the percentage of successful requests	95,34%
Maximum of the percentage of successful requests	99,73%
Number of organisation with 100% result	0
Minimum of the percentage of succesful requests	57,87%

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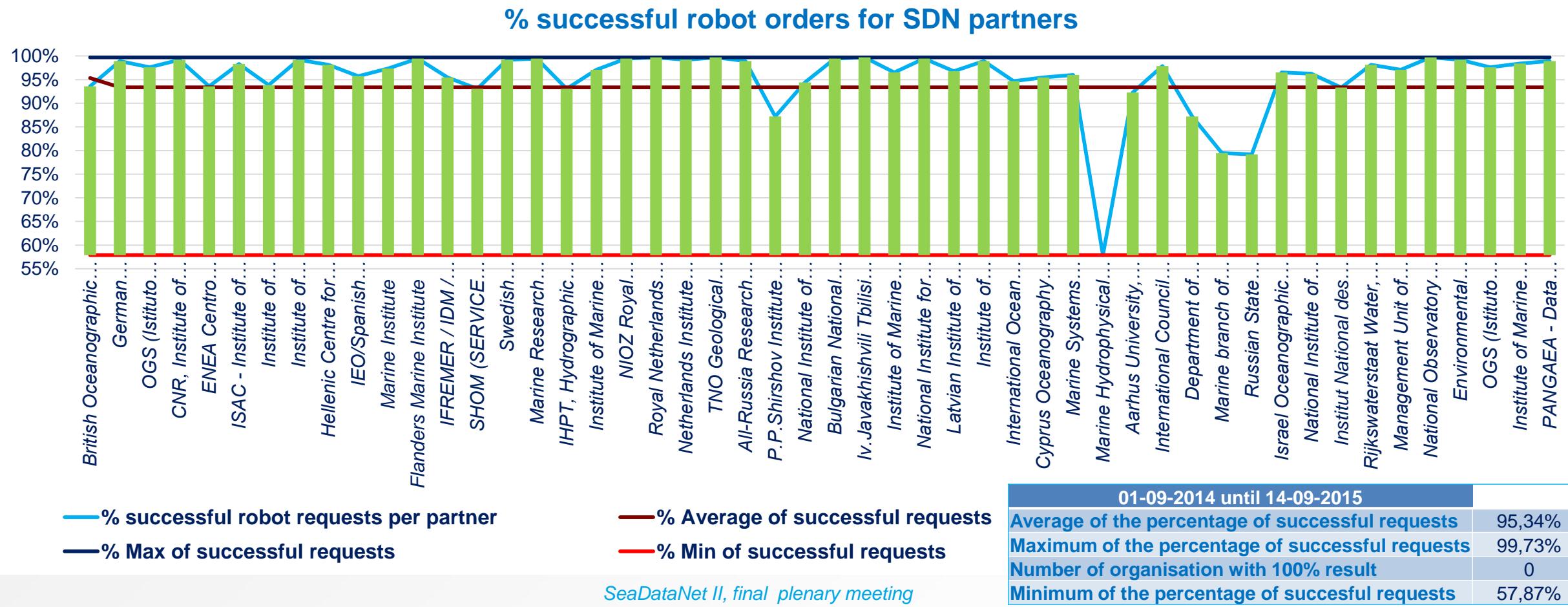
Data requests (01-09-2014 until 14-09-2015)

✓ Results for 1 year: Requests for data files made to countries that have submitted data to the CDI portal.

Requests by country

Bar chart "Requests by country" with logarithmic y-axis (1 to 131072):

Country	Value
Indonesia	159
Iran, Islamic Republic of	7
Ireland	24
Israel	4029
Italy	71521
Japan	85
Korea, Republic of	29641
Latvia	2
Lebanon	1253
Lithuania	8
Malta	21
Montenegro	499
Morocco	7
Netherlands	93137
New Zealand	7
Norway	243
Philippines	22
Poland	52
Portugal	10135
Romania	1606
Russian Federation	123
Saudi Arabia	256
Slovenia	1031
Spain	25176
Sweden	23167
Thailand	7
Tunisia	58
Turkey	27365
Ukraine	103301
United Kingdom	19299
United States	6921

CDI submission (01-09-2014 until 14-09-2015)

Total No of CDIs by partner

THANK YOU!