

# IdP-in-the-Cloud

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# Why?

We needed to find a way to help research institutions, interested to use federated resources, that haven't possibilities (in terms of people, hardware, knowledge, ...) to install and maintain their own Identity Provider.

Our target were Doctors, Librarians, ... People with little or no experience about SAML or Shibboleth.

We had to focus on providing a fully managed IdP service, to ease identity management by our customers; Emphasis on:

- Hiding the complexity of installation and configuration of SAML Shibboleth IdP for IdP managers
- Ease to manage by customers
- Matching required federation standards in terms of security, reliability, compliance with required policies

# What?

The answer has been found in Ansible.

Ansible does what we have already tried to do with Puppet, but in a much simpler way.

The Ansible Toolkit allowed us to:

1. Create/Delete Virtual Machines on our OpenStack Cloud (**ansible-openstack**)
2. Instance an entire Shibboleth Identity Provider(IdP) (**ansible-shibboleth**)
3. Instance the monitoring system for the IdPs (**ansible-monitoring**)

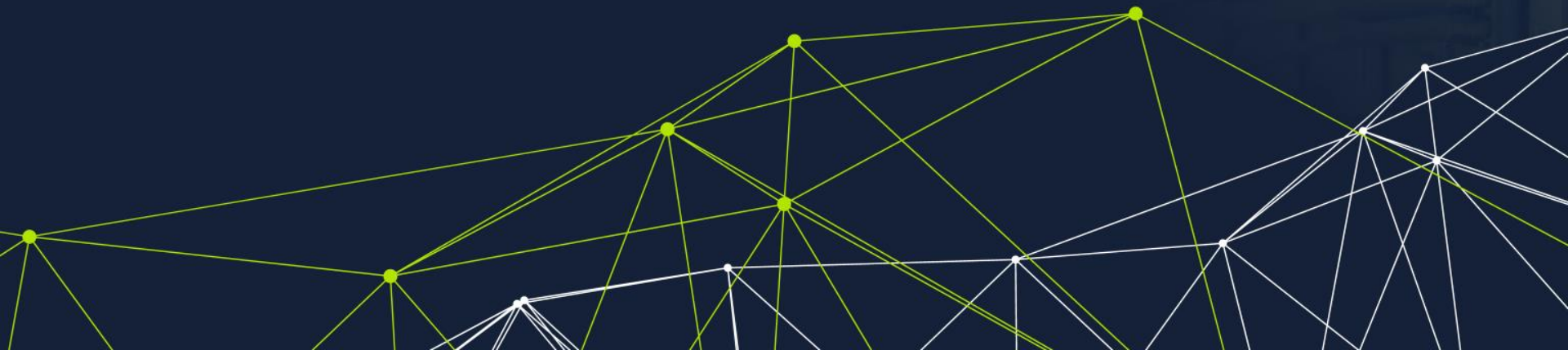
# How?

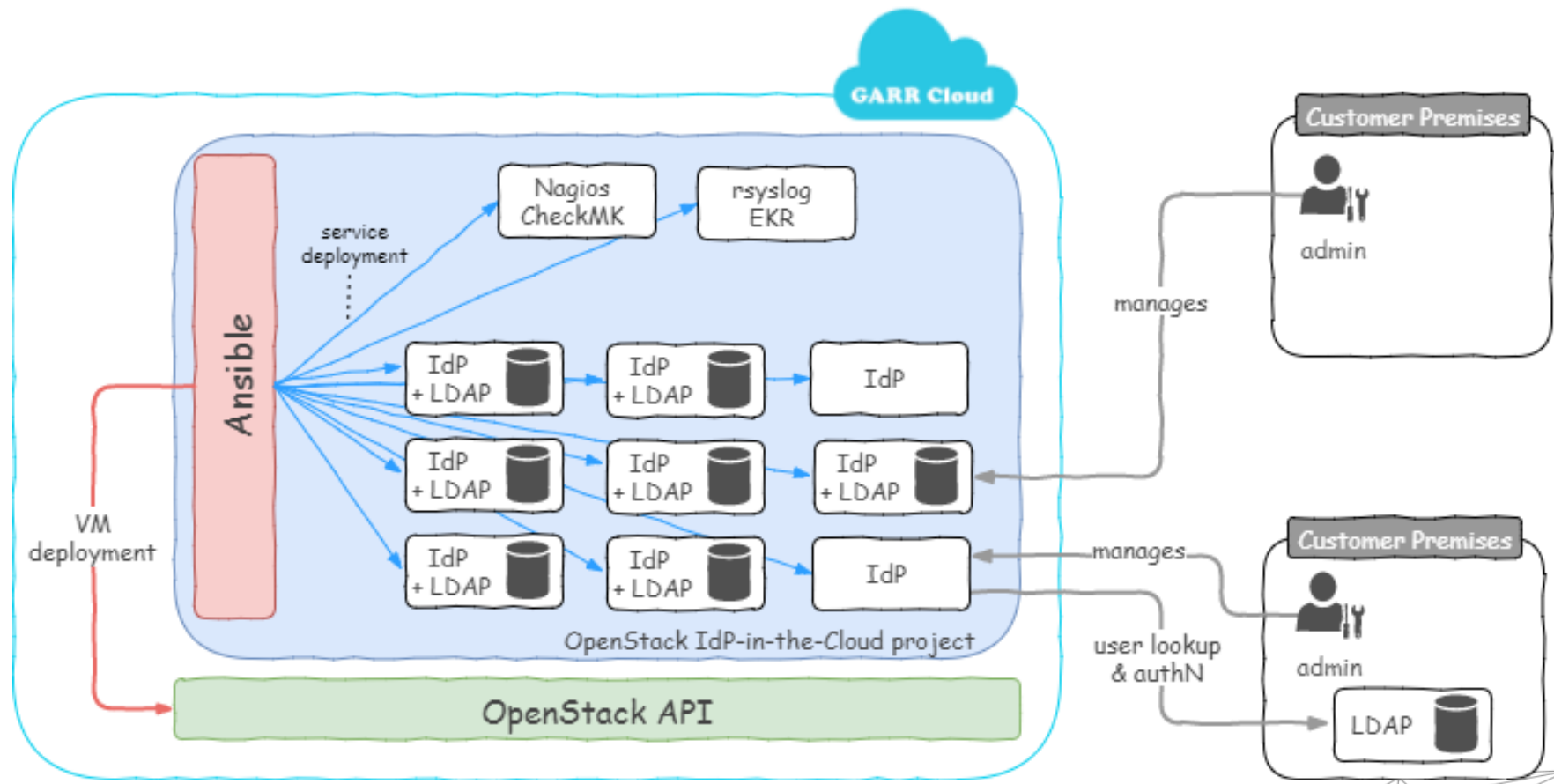
Requirements:

1. **GARR Ansible repositories**
2. **A Public IP** (to be able to reach the IdP on the web)
3. **An OpenStack Cloud** (to create the IdP virtual machine)
4. **A Certification Authority** (to create HTTPS credentials for the IdP)
5. **A public SSH key** (to transfer LDAP and DB backups to a dedicated server simply)
6. **A GIT Private Server** (to store IdP metadata credentials, logos, HTTPS certificate/key)

# IdP-in-the-Cloud

Step-by-Step





# STEP 1 – The Ansible Master

First of all we need to **build up our Ansible Master** machine to be able to run the ansible recipes and create new IdPs.

Our Ansible Master is configured to communicate with our OpenStack Cloud through its API and the [python-openstackclient](#).

OpenStack is needed to create the dedicated VMs for IdPs and all of them have the same SSH “authorized\_keys” to provide a quickly access on each of them .

**Shared SSH keys:** In addition to the Ansible access keys, we deployed on all VMs a shared set of keys to ensure secure communication among internal services on a private, internal LAN

# STEP 1 – The Ansible Master

On the Ansible Master we put the Ansible Toolkit formed by:

1. ansible-openstack: <https://github.com/ConsortiumGARR/ansible-openstack>  
Needed to create/delete Virtual Machines on our OpenStack Cloud environment
2. ansible-monitoring: <https://github.com/ConsortiumGARR/ansible-monitoring>  
Needed to create monitoring environment for Campus IdPs
3. ansible-shibboleth: <https://github.com/ConsortiumGARR/ansible-shibboleth>  
Needed to create and configure Campus IdPs

(and a private GIT repo to store IdP metadata credentials, logos, HTTPS certificate/key)

The Ansible Toolkit recipes are tested with **Ansible v2.4.0.0**



## STEP 2 – Public IP and DNS

We need to reserve some Public IPs of the VMs used by our IdP-in-the-Cloud service and assign them a name on our DNS:

1. **elasticsearch1.aai.garr.it**
2. **elasticsearch2.aai.garr.it**
3. **kibana.aai.garr.it** (where we visualized IdP logs elaborated by elasticsearch[1 & 2])
4. **checkmk.aai.garr.it** (where we monitor the IdP status)
5. **logs.aai.garr.it** (where we store IdP's log files)
6. **data-backups.aai.garr.it** (where we store LDAP & DB backup files)
7. **git.garr.it** (where we store HTTPS credentials, IdP Metadata Credentials and Logos)
8. **idp-[1...N].irccs.garr.it** (our IdPs)

## STEP 3 – Create IdP-in-the-Cloud environment

Once obtained a DNS name of our IdP-in-the-Cloud environment, we can instance them with **ansible-openstack** recipes and by:

1. Create/Modify the configuration files: [all.yml](#) & [openstack-client.yml](#)
2. Create the Inventory INI file ([production.ini](#))
3. Run Ansible

# STEP 3 – Ansible-Openstack result

## Instances

Instance Name =

Filter

Launch Instance

Delete Instances

More Actions ▾

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
<input type="checkbox"/>	ansible-master.aai.garr.it	-	192.168.80.38 Floating IPs: 90.147.166.117	m1.small	idpcloud	Active	nova	None	Running	5 months	Create Snapshot ▾
<input type="checkbox"/>	logs.aai.garr.it	-	192.168.80.8 Floating IPs: 90.147.167.172	Not available	idpcloud	Active	nova	None	Running	4 months, 2 weeks	Create Snapshot ▾
<input type="checkbox"/>	data-backups.aai.garr.it	-	192.168.80.9 Floating IPs: 90.147.166.36	Not available	idpcloud	Active	nova	None	Running	4 months, 2 weeks	Create Snapshot ▾
<input type="checkbox"/>	checkmk.aai.garr.it	-	192.168.80.7 Floating IPs: 90.147.166.123	m1.medium	idpcloud	Active	nova	None	Running	4 months, 2 weeks	Create Snapshot ▾
<input type="checkbox"/>	elasticsearch1.aai.garr.it	-	192.168.80.4 Floating IPs: 90.147.166.201	Not available	idpcloud	Active	nova	None	Running	4 months, 2 weeks	Create Snapshot ▾
<input type="checkbox"/>	elasticsearch2.aai.garr.it	-	192.168.80.5 Floating IPs: 90.147.167.12	Not available	idpcloud	Active	nova	None	Running	4 months, 2 weeks	Create Snapshot ▾
<input type="checkbox"/>	kibana.aai.garr.it	-	192.168.80.6 Floating IPs: 90.147.167.215	Not available	idpcloud	Active	nova	None	Running	4 months, 2 weeks	Create Snapshot ▾

## STEP 3 – Prepare Monitoring Environment

Once obtained the environment VMs of our IdP-in-the-Cloud, we can configure them with **ansible-monitoring** recipes and by:

1. Creating the **FQDN.yml** monitoring tools configuration file by copying & editing the following templates:
  - a. [FQDN.yml-checkmk-template](#) (Reserved for Check\_MK monitoring servers)
  - b. [FQDN.yml-elasticsearch-template](#) (Reserved for ElasticSearch servers)
  - c. [FQDN.yml-kibana-template](#) (Reserved for Kibana servers)
  - d. [FQDN.yml-data-backups-template](#) (Reserved for Data Backups servers)
  - e. [FQDN.yml-rsyslog-template](#) (Reserved for Rsyslog servers)
2. Creating the Inventory INI file ([production.ini](#))
3. Running Ansible

# STEP 4 – Ansible-Monitoring result

Check MK

All services

73 rows malavolti (admin) 12:23

Tactical Overview

Hosts: 3 Problems: 0 Unhandled: 0

Services: 73 Problems: 0 Unhandled: 0

Events: 0 Problems: 0 Unhandled: 0

Quicksearch

Views

Overview

Host & Services Problems

Main Overview

Network Topology

Hosts

All hosts

All hosts (Mini)

All hosts (tiled)

Favorite hosts

Host search

Host Groups

Host Groups (Grid)

Host Groups (Summary)

Services

All services

Favorite services

Recently changed services

Serv. by host groups

Service search

Unmonitored services

Service Groups

Service Groups (Grid)

Service Groups (Summary)

Services by group

Metrics

Search Time Graphs

Search performance data

Business Intelligence

Problems

Alert Statistics

Host problems

Pending Services

Pending service discovery

Service problems

State services

Event Console

Events

Recent Event History

Inventory

CPU Related Inventory of all Hosts

Search Backplanes

Search Firms

Search Modules

Search Network interfaces

Search Oracle dataguard statistics

Search Oracle instances

Search Oracle recovery areas

Search Oracle tablespaces

Local site idpcloud, ansible-slave-1.irccs.garr.it

State	Service	Icons	Status detail	Age	Checked	Perf-O-Meter
OK	Check_MK		OK - Agent version 1.4.0p9, execution time 0.7 sec	2017-06-20 14:20:03	19.6 s	707 ms
OK	Check_MK Discovery		OK - no unmonitored services found, no vanished services found	2017-06-01 12:35:48	36 m	
OK	Check HTTPS		OK - Certificate 'ansible-slave-1.irccs.garr.it' will expire on Sun Nov 29 07:48:08 2026 +0000.	2017-06-20 14:15:37	45.6 s	
OK	Check IDP MD		HTTP OK: HTTP/1.1 200 OK - 14093 bytes in 0.046 second response time	2017-06-20 14:17:29	11.6 s	46.3 ms
OK	check_aacdi		OK - SUCCESS - IdP has retrieved metadata of Test SP and is sending attributes to it	2017-09-12 07:12:22	18.6 s	
OK	check_mysql		OK - SUCCESS - IdP has all needed databases	2017-04-13 20:22:33	18.6 s	
OK	CPU load		OK - 15 min load 0.05 at 2 Cores (0.03 per Core)	2017-04-13 20:22:33	18.6 s	0.0400
OK	CPU utilization		OK - user: 0.7%, system: 0.4%, wait: 0.1%, steal: 0.0%, guest: 0.0%, total: 1.1%	2017-04-13 20:22:33	18.6 s	1.13%
OK	Disk IO SUMMARY		OK - Utilization: 0.1%, Read: 0.00 B/s, Write: 8.53 kB/s, Average Wait: 0.66 ms, Average Read Wait: 0.00 ms, Average Write Wait: 0.66 ms, Latency: 0.66 ms, Average Queue Length: 0.00	2017-04-13 20:22:33	18.6 s	0 B/s / 8.53 kB/s
OK	Filesystem /		OK - 15.6% used (3.06 of 19.65 GB), trend: +8.20 MB / 24 hours	2017-04-13 20:22:33	18.6 s	15.6%
OK	Interface 2		OK - [eth0] (up) speed unknown, in: 425.38 B/s, out: 1.10 kB/s	2017-04-13 20:22:33	18.6 s	425.4B/s / 1.1kB/s
OK	Kernel Context Switches		OK - 144/s	2017-04-13 20:22:40	18.6 s	144.47/s
OK	Kernel Major Page Faults		OK - 0/s	2017-04-13 20:22:40	18.6 s	0.00/s
OK	Kernel Process Creations		OK - 2/s	2017-04-13 20:22:40	18.6 s	1.55/s
OK	Memory		OK - RAM used: 889.41 MB of 3.87 GB (22.4%),	2017-04-13 20:22:33	18.6 s	889.41 MB
OK	Mount options of /		OK - Mount options exactly as expected	2017-04-13 20:22:33	18.6 s	
OK	NTP Time		OK - sys.peer - stratum 1, offset -2.12 ms, jitter 0.94 ms, last reached 968 secs ago (synchronized on 193.204.114.233)	2017-08-29 15:31:22	18.6 s	-2.12 ms
OK	Number of threads		OK - 148 threads	2017-04-13 20:22:33	18.6 s	148
OK	SSH		SSH OK - OpenSSH_6.7p1 Debian-5+deb8u3 (protocol 2.0)	2017-06-22 14:19:46	36.7 s	
OK	TCP Connections		OK - ESTABLISHED: 5, SYN_RECV: 1, CLOSE_WAIT: 7, TIME_WAIT: 1, FIN_WAIT2: 3, LISTEN: 7	2017-04-13 20:22:33	18.7 s	
OK	Uptime		OK - Up since Tue Jun 20 13:54:58 2017 (85d 20:17:23)	2017-04-13 20:22:33	18.7 s	86 d

Local site idpcloud, ansible-slave-2.irccs.garr.it

State	Service	Icons	Status detail	Age	Checked	Perf-O-Meter
OK	Check_MK		OK - Agent version 1.4.0p9, execution time 1.8 sec	2017-06-23 07:16:29	2.67 s	1.83 s
OK	Check_MK Discovery		OK - no unmonitored services found, no vanished services found	2017-05-31 10:35:48	36 m	
OK	Check HTTPS		OK - Certificate 'ansible-slave-2.irccs.garr.it' will expire on Sun Nov 29 14:37:01 2026 +0000.	2017-06-23 07:12:29	53.7 s	
OK	Check IDM page		HTTP OK: Status line output matched "HTTP/1.1 401 Unauthorized" - 1631 bytes in 0.045 second response time	2017-07-28 14:13:30	10.7 s	44.8 ms
OK	Check IDM-TOOLS		HTTP OK: Status line output matched "HTTP/1.1 401 Unauthorized" - 1639 bytes in 0.044 second response time	2017-07-28 14:19:13	45.7 s	44.4 ms
OK	Check IDP MD		HTTP OK: HTTP/1.1 200 OK - 13943 bytes in 0.050 second response time	2017-09-11 01:21:10	30.7 s	49.8 ms
OK	check_LOCKUSER		HTTP OK: Status line output matched "HTTP/1.1 401 Unauthorized" - 1644 bytes in 0.044 second response time	2017-06-23 07:15:35	47.7 s	43.8 ms
OK	check_aacdi		OK - SUCCESS - IdP has retrieved metadata of Test SP and is sending attributes to it	2017-09-07 07:12:40	698 ms	
OK	check_coco		OK - SUCCESS - IdP has retrieved metadata of Test COCO SP and is sending attributes to it	2017-06-19 16:02:35	700 ms	
OK	check_ldap		OK - SUCCESS - LDAP exists and release attributes	2017-06-19 16:02:35	702 ms	
OK	check_mysql		OK - SUCCESS - IdP has all needed databases	2017-06-19 16:02:35	705 ms	
OK	check_rs		OK - SUCCESS - IdP has retrieved metadata of Test RS SP and is sending attributes to it	2017-08-01 00:59:40	708 ms	

Check HTTPS:

Check SSL Certificate Expiration

Check IDP MD:

Check IDP Metadata (/idp/shibboleth) availability

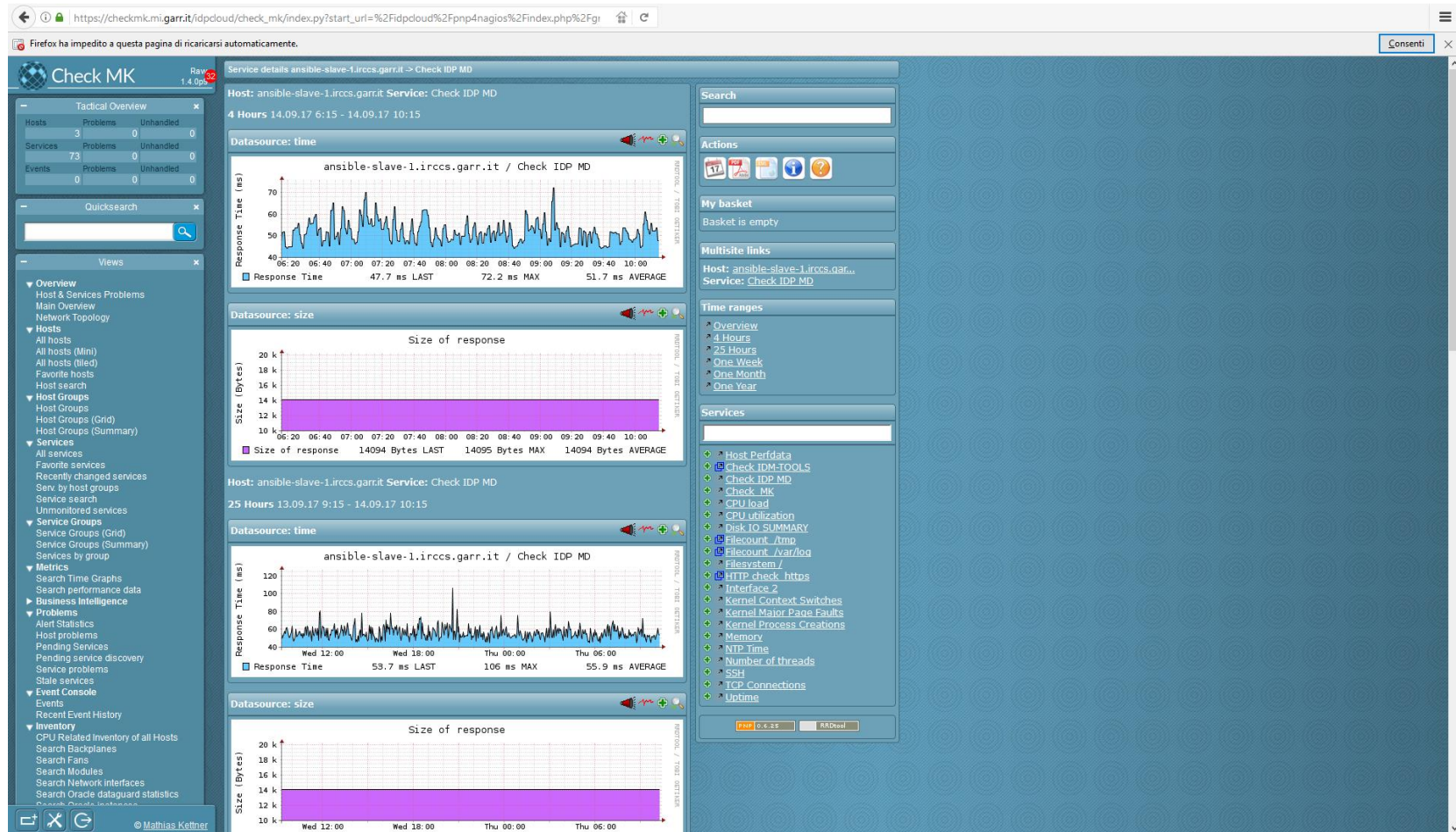
check\_aacdi: Check the capacity of sending attributes from the IdP to a test SP

check\_mysql:

Check that all needed database for the IdP are active

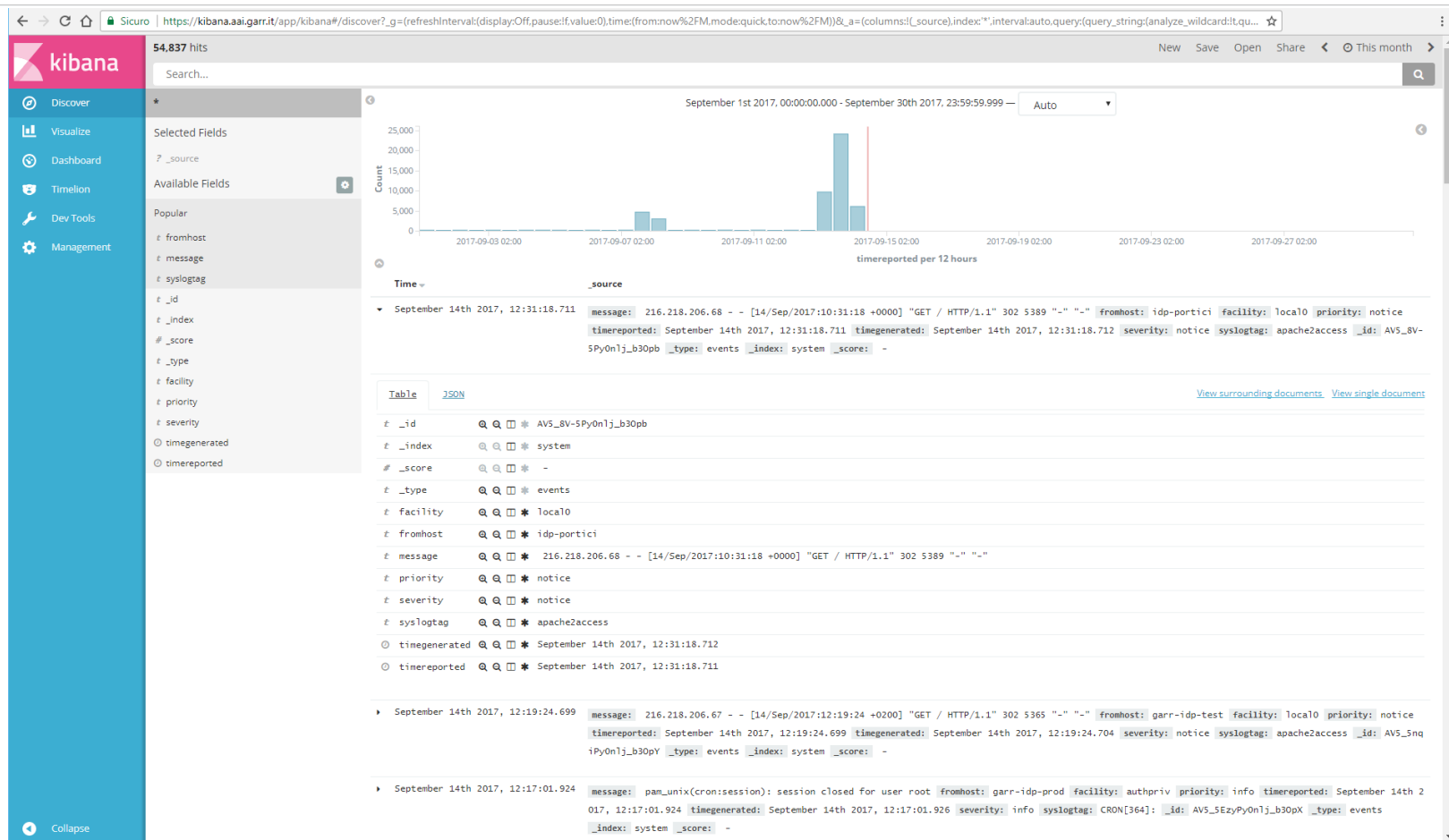
- Check IDM page,
- Check IDM-TOOLS,
- Check LOCKUSER,
- check\_coco,
- check\_rs,
- check\_ldap

# STEP 4 – Ansible-Monitoring result





# STEP 4 – Ansible-Monitoring result



## STEP 4 – Ansible-Monitoring result

```
12. data-backups.aai.garr.it
Re-attach Fullscreen Stay on top Duplicate Hide toolbar
root@data-backups:/data/var/local/backups# tree idp-portici.izs.garr.it/
idp-portici.izs.garr.it/
├── ldap
│   └── 2017-09-14_ldap-users.ldif
└── mysql
    ├── 2017-09-14_shibboleth_db.sql
    └── 2017-09-14_statistics_db.sql

2 directories, 3 files
root@data-backups:/data/var/local/backups#
```



## STEP 5 – Instance new Shibboleth IdP (v3)

We have to:

1. Create a new VM on OpenStack Cloud (ansible-openstack)
2. Install and configure the new Shibboleth IdP (ansible-shibboleth)

## STEP 5 – Instance new Shibboleth IdP v3

To help us with the environment preparation needed to instance of a new IdP, we decided to rely on “[ans-idpcloud-utility](#)” Python script that:

1. Creates CSR and KEY used for HTTPS endpoints.
2. Creates IdP signing, encryption and backchannel credentials.
3. Creates the IdP yaml file (and will append the new IdP to the inventory INI file soon).
4. Appends the IdP ansible-openstack configuration to the *openstackclient.yml*.
5. Appends the new IdP to ansible-openstack inventory INI file.

At the end of we have to run, in this order:

1. ansible-openstack playbook to create the VM of the new IdP.
2. ansible-shibboleth playbook to create and configure the new IdP.

# STEP 6 – Ansible-Shibboleth result

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**Cookie Policy** →

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**Password Management** →

**Information Web Page** →

**Privacy Policy Web Page** →

**Multi Language Support** →

**Links to Federation and Interfederation web page whom the organisation belongs to** →

**Clear User Consent** →

**SP Logo** →

**SP Informations** →

**Footer Background Color and Footer Text are customizable** →

Test Service Provider v2.5.3 hosted by OpenStack Milano  
→ [Resource informations](#)

FOOTER TEXT in english language

Test Service Provider v2.5.3

Username

Password

☐ Don't Remember Login

☐ Clear prior granting of permission for release of your information to this service.

Login

Forgot your password?

Need Help?

Informations

Privacy Policy

eduGAIN

idm garr aai

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THE ITALIAN EDUCATION & RESEARCH NETWORK

# STEP 6 – Ansible-Shibboleth result

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SP Information  
found on its  
metadata

**SP Description**

Test Service Provider v2.5.3 hosted by OpenStack Milano

< [Go back to login page](#)

> **SP Service Name:**

Test SP v2.5.3

> **SP Organization:**

TEST Shib SP v2.5.3

> **SP Contacts:**

Marco Malavolti

> **SP Privacy Policy**

> **SP Information Page**

FOOTER TEXT in english language

# STEP 6 – Ansible-Shibboleth result

Home

Hint

Consortium GARR LDAP Server

new search refresh

Users (2)

## Create Object

Server: Consortium GARR LDAP Server Container: ou=people,dc=garr,dc=it  
Template: Identity Provider: New user creation (custom\_idpAccount)

### Identity Provider: New user creation (Step 1 of 1)

**Name \*** Hint

**Surname \*** Hint

**Name and Surname** Hint

**Username \*** Hint

**Fiscal code \*** Hint

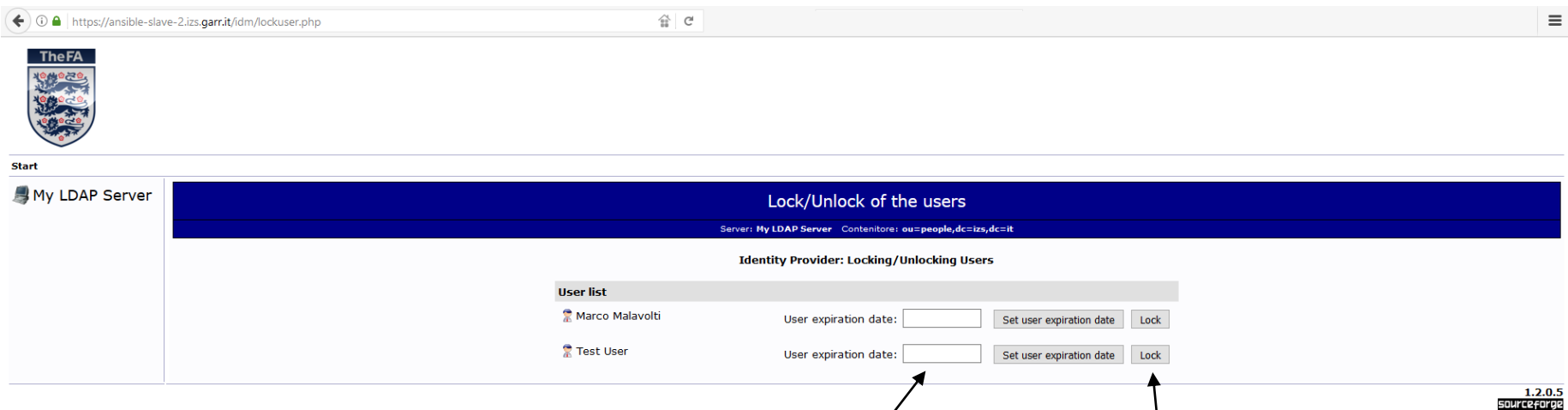
**ORCID** Hint

**eduPersonAffiliation \*** Hint

**eduPersonEntitlement** Hint

Create Object

# STEP 6 – Ansible-Shibboleth result

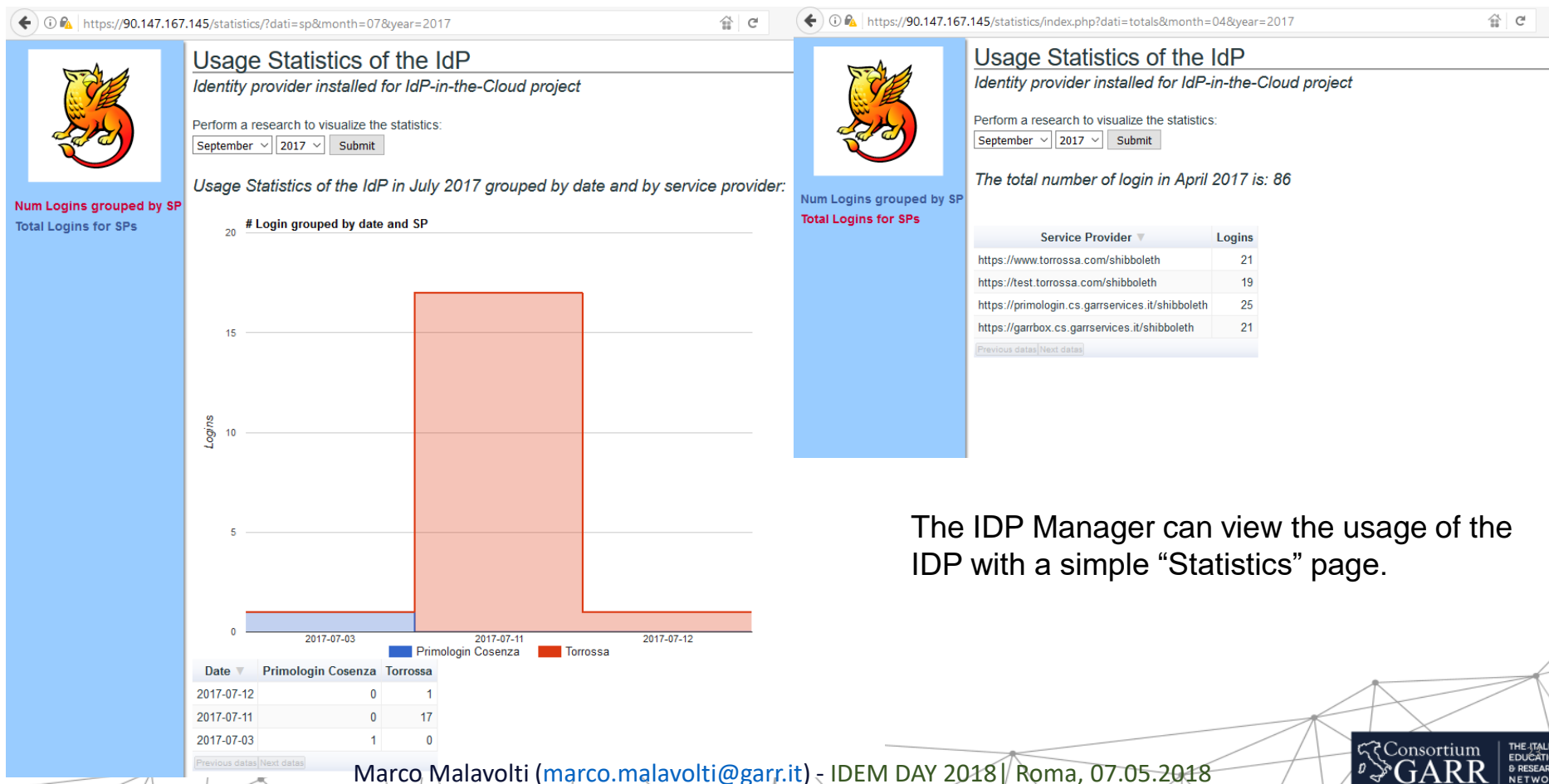


The screenshot shows a web browser window with the URL <https://ansible-slave-2.izs.garr.it/idm/lockuser.php>. The page features a sidebar on the left with a 'TheFA' logo and a 'Start' button. The main content area is titled 'Lock/Unlock of the users' and displays the 'Identity Provider: Locking/Unlocking Users' interface. It includes a 'User list' table with two entries: 'Marco Malavolti' and 'Test User'. Each entry has a 'User expiration date' field, a 'Set user expiration date' button, and a 'Lock' button. Two arrows point from the text below to the 'Set user expiration date' and 'Lock' buttons for the 'Test User' row. The version '1.2.0.5' and 'SOURCEFORGE' are noted in the bottom right corner of the interface.

User list		
Marco Malavolti	User expiration date: <input type="text"/>	<input type="button" value="Set user expiration date"/> <input type="button" value="Lock"/>
Test User	User expiration date: <input type="text"/>	<input type="button" value="Set user expiration date"/> <input type="button" value="Lock"/>

The IdP manager can lock out the users immediately by pressing on “**Lock**” button, or “**Set an expiration date**” in the future.

# STEP 6 – Ansible-Shibboleth result



The IDP Manager can view the usage of the IDP with a simple “Statistics” page.

# STEP 6 – Ansible-Shibboleth result

242 hits New Save Open Share

Uses lucene query syntax

**\* f-ticks**

**Selected Fields**

? **\_source**

**Available Fields**

- t \_id
- t \_index
- # \_score
- t \_type
- t facility
- t fromhost
- t message
- t priority
- t severity
- t syslogtag
- timegenerated
- timereported

**Results:**

- message:** Shibboleth-FTICKS **F-TICKS**/FederationName/1.0#TS=1511771136#RP=https://vconf.garr.it/shibboleth#AP=https://garr-idp-prod.irccs.garr.it/idp/shibboleth#PN=822481fc5088c49091328ec5eb41cee111c14c3a6a2de21c1d226a9d3abf1fe5#RESULT=OK# **fromhost:** garr-idp-prod **facility:** auth **priority:** info **timereported:** November 27th 2017, 09:25:36.000 **timegenerated:** November 27th 2017, 09:25:36.460 **severity:** info **syslogtag:** [qtp353842779-19] **\_id:** AV-87IOIv1WbGuVEkXK **\_type:** events **\_index:** system **\_score:** 19.757
- message:** Shibboleth-FTICKS **F-TICKS**/IDEM GARR AAI/1.0#TS=1512048296#RP=https://testopacizs.cineca.it/shibboleth#AP=https://garr-idp-test.irccs.garr.it/idp/shibboleth#PN=39cd3e1ae67b386fa7839a282b7c8a35c384d6b60bd025822e018c1f0371d57#RESULT=OK# **fromhost:** garr-idp-test **facility:** auth **priority:** info **timereported:** November 30th 2017, 14:24:56.000 **timegenerated:** November 30th 2017, 14:24:56.339 **severity:** info **syslogtag:** [qtp353842779-10] **\_id:** AWANGr3v1WbGuVEuHYa **\_type:** events **\_index:** system **\_score:** 19.757
- message:** Shibboleth-FTICKS **F-TICKS**/FederationName/1.0#TS=1510240229#RP=https://foodl.org/simplesaml/module.php/saml/sp/metadata.php/saml#AP=https://garr-idp-prod.irccs.garr.it/idp/shibboleth#PN=822481fc5088c49091328ec5eb41cee111c14c3a6a2de21c1d226a9d3abf1fe5#RESULT=OK# **fromhost:** garr-idp-prod **facility:** auth **priority:** info **timereported:** November 9th 2017, 17:10:29.000 **timegenerated:** November 9th 2017, 16:10:29.362 **severity:** info **syslogtag:** [qtp353842779-12] **\_id:** AV-hVRg-5N8qjDxxroQ **\_type:** events **\_index:** system **\_score:** 19.757
- message:** Shibboleth-FTICKS **F-TICKS**/FederationName/1.0#TS=1509960900#RP=https://filesender.garr.it/simplesaml/module.php/saml/sp/metadata.php/default-sp#AP=https://garr-idp-prod.irccs.garr.it/idp/shibboleth#PN=822481fc5088c49091328ec5eb41cee111c14c3a6a2de21c1d226a9d3abf1fe5#RESULT=OK# **fromhost:** garr-idp-prod **facility:** auth **priority:** info **timereported:** November 6th 2017, 11:35:00.000 **timegenerated:** November 6th 2017, 10:35:00.022 **severity:** info **syslogtag:** [qtp353842779-11] **\_id:** AV-Qrt3-5N8qjDxxp2QE **\_type:** events **\_index:** system **\_score:** 19.757
- message:** Shibboleth-FTICKS **F-TICKS**/FederationName/1.0#TS=1510057578#RP=https://sp24-test.garr.it/shibboleth#AP=https://garr-idp-prod.irccs.garr.it/idp/shibboleth#PN=822481fc5088c49091328ec5eb41cee111c14c3a6a2de21c1d226a9d3abf1fe5#RESULT=OK# **fromhost:** garr-idp-prod **facility:** auth **priority:** info **timereported:** November 7th 2017, 14:26:18.000 **timegenerated:** November 7th 2017, 13:26:18.418 **severity:** info **syslogtag:** [qtp353842779-12] **\_id:** AV-Wcg-95N8qjDxxqEHT **\_type:** events **\_index:** system **\_score:** 19.757
- message:** Shibboleth-FTICKS **F-TICKS**/FederationName/1.0#TS=1510069706#RP=https://foodl.org/simplesaml/module.php/saml/sp/metadata.php/saml#AP=https://garr-idp-prod.irccs.garr.it/idp/shibboleth#PN=b44036d94e6b5a3cab15eae0a50373a081f7f6a84096edbe12008485dcf255b8#RESULT=OK# **fromhost:** garr-idp-prod **facility:** auth **priority:** info **timereported:** November 7th 2017, 17:48:26.000 **timegenerated:** November 7th 2017, 16:48:26.039 **severity:** info **syslogtag:** [qtp353842779-15] **\_id:** AV-XKyJA5N8qjDxxqJyT **\_type:** events **\_index:** system **\_score:** 19.757



# STEP 6 – Ansible-Shibboleth result



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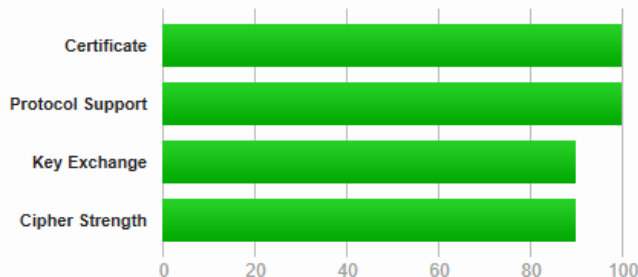
## SSL Report: garr-idp-prod.irccs.garr.it (90.147.166.82)

Assessed on: Tue, 15 May 2018 10:32:33 UTC | [Hide](#) | [Clear cache](#)

[Scan Another »](#)

### Summary

#### Overall Rating



Visit our [documentation page](#) for more information, configuration guides, and books. Known issues are documented [here](#).

HTTP Strict Transport Security (HSTS) with long duration deployed on this server. [MORE INFO »](#)



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