



# MAN-HA

REALIZACJA W MAN-ACH USŁUG KRYTYCZNYCH  
O WYSOKIM POZIOMIE NIEZAWODNOŚCI

## MAN-HA - providing critical services in public cloud environment

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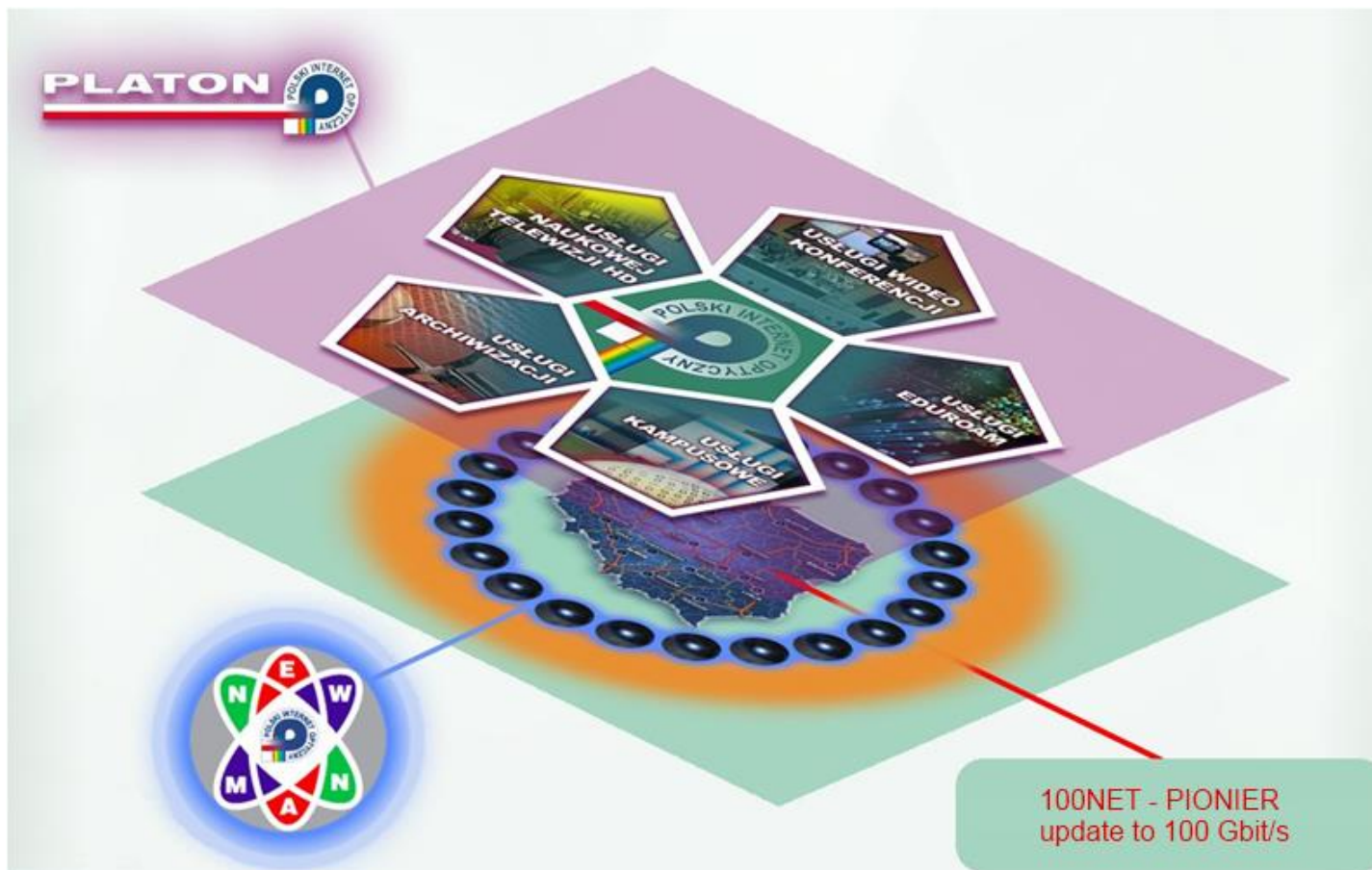
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NARODOWA STRATEGIA SPÓJNOŚCI



UNIA EUROPEJSKA  
EUROPEJSKI FUNDUSZ  
ROZWOJU REGIONALNEGO



# Introduction to Cloud Campus Services



<http://www.platon.pionier.net.pl>

## Introduction to Cloud Campus Services(2)



- Project PLATON U3 – protoplast of public cloud environment launched in **2012**
- Provided by **20 MANs and KDMs**, equipped with local clusters connected by the PIONIER optical network
- In particular, it offers the following services:
  - remote work with interactive applications (graphic applications) in MS Windows environment (eg. Matlab / Simulink graphic tools, Ansys, AutoCad, Photoshop)
  - running virtual machines on-demand (with MS Windows or Linux)



## Introduction to Cloud Campus Services(3)

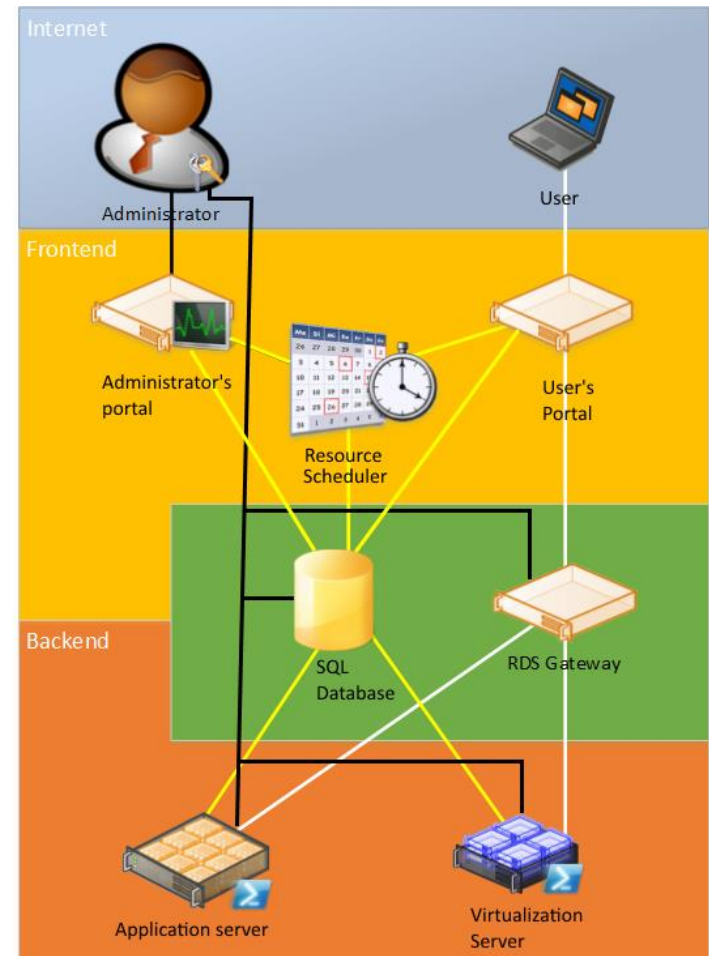
- PLATON U3 in general:
  - 744 (+143 new) nodes
  - 5952 (+3432 new Haswell) cpu cores
  - 17,5 TB (+33TB new) RAM
  - at least 700 TB of data storage
  - 60 TFLOPS (+110 TFLOPS new) of total computational power
  - Internal network: 10 Gbit/s Ethernet



# MAN-HA project in brief:

## Architecture of PLATON U3

- the cloud architecture is divided into:
  - (i) front-end (upper) layer - consists of user's and administrator's portals and resource dispatcher mechanism
  - (ii) back-end middleware – in-house built solution (PowerShell scripts)
  - (iii) core system services – application and virtualization servers
- SQL database as a main broker between layers
- Each center (**MAN**) has their own independent cluster setup



# MAN-HA project in brief:

## Introduction to MAN-HA

- The MAN-HA Cloud Campus Services are carried out by **20** Metropolitan Area Networks and HPC centers (collectively called “MANs”)
- Based on resources mostly provided by nationwide local clusters that were built within the PLATON project, enhanced by new generation servers based on Intel **Haswell** processors



# MAN-HA project in brief:

## Main goals

- More flexible and scalable access to **virtual machines** and specific **applications**, both in MS Windows and Linux systems
- Simplified way of access for multiple platforms and clients, using protocols such as **RDP, SSH, VNC**
- Development of critical services with a high level of reliability
- Better management of resources – local resources of clusters are managed in a centralized way, which gives better usability for end-users
- Central point of access to all MAN-HA resources with high-availability and simplicity of usage
- Support for Federated Authentication – one account for many services within the entire PIONIER network

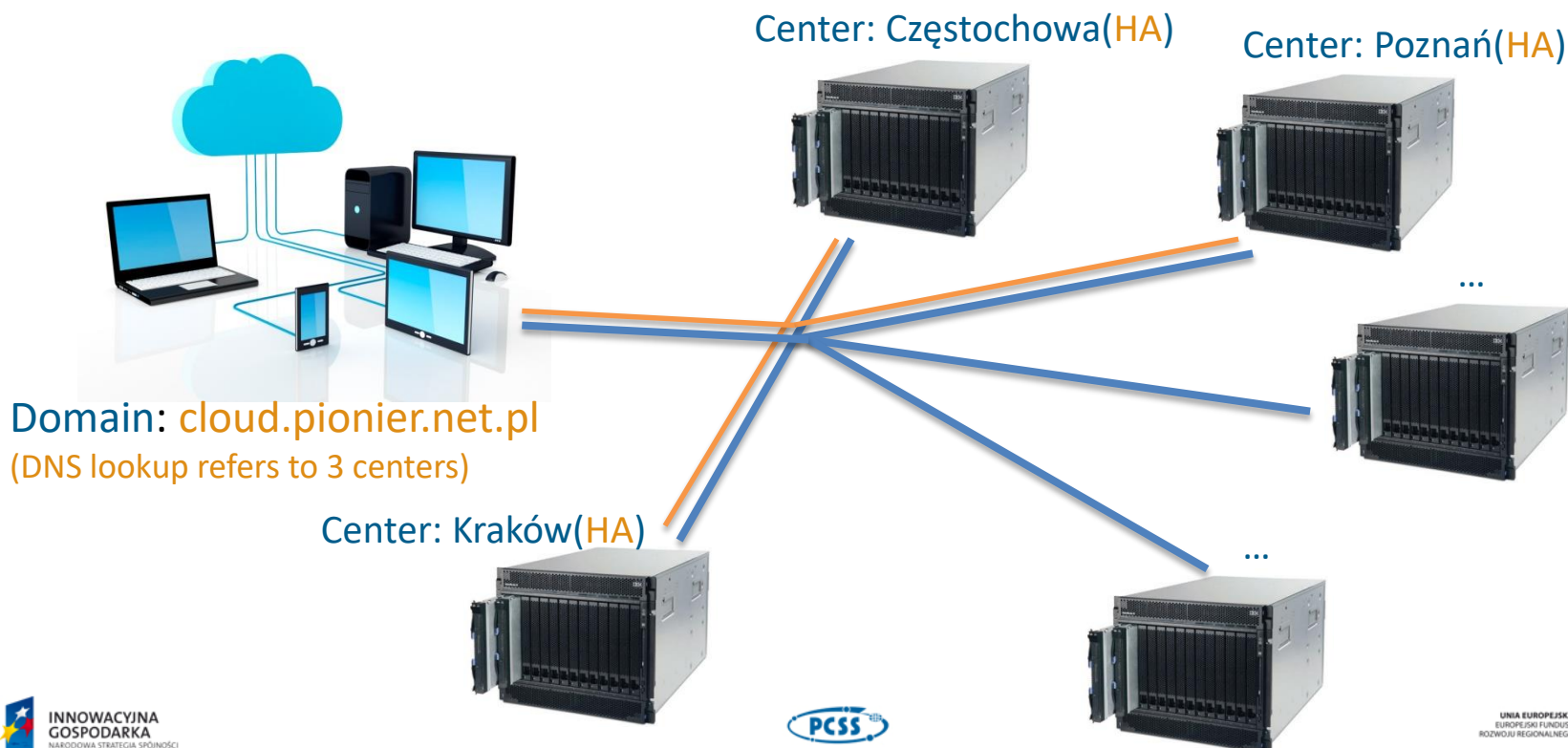




# MAN-HA project in brief:

## Central point of access to MAN-HA resources

- **Central point of access** to MAN-HA resources for all users from all MANs
  - Critical services are distributed by 3 centers: Poznań, Częstochowa, Kraków
  - Single entrance for users, triple enhance of service reliability which is also scalable





# MAN-HA project in brief:

## „Ad-hoc” and scheduled reservations

- Users can reserve their resources not only in **advance** (using calendar), but also in the so-called "**ad-hoc**" mode, which brings their Virtual Machines online as soon as possible

2015-09-30 12:14 - 2015-10-02 12:14

2015-10-20 12:14

2015-10-24 12:14

Ustaw

Anuluj

12 ▾ : 14 ▾

12 ▾ : 14 ▾

Wrzesień ▾

2015 ▾

Pn	Wt	Śr	Cz	Pt	So	Ni
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4
5	6	7	8	9	10	11

Październik ▾

2015 ▾

Pn	Wt	Śr	Cz	Pt	So	Ni
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8



Deploy now

# MAN-HA project in brief:

## How to run virtual machine?

Usługi (Services)















**Step I**  
Choose type of service

# MAN-HA project in brief:

## How to run virtual machine?(2)

### Uruchom aplikację

Aplikacja	Zasoby	Uruchomienie
 Adina 9.1.3	 Adobe Design Premium CS 5.5	 Adobe Premiere Pro CS 5.5
 Ansys 17 Academic Research	 CorelDRAW X5	 Maple 16
 Mathcad 15/Prime 2	 Mathcad 15/Prime 2 [pcss]	 Mathematica 11
 Matlab 2016b Academic	 Matlab 2016b Classrom	 MySQL Tools
<a href="#">Dalej</a>		

**Step II**  
Select application from list

# MAN-HA project in brief:

## How to run virtual machine?(3)

Uruchom aplikację » **Adobe Premiere Pro CS 5.5**

Aplikacja	Zasoby	Uruchomienie
Liczba rdzeni:	<input type="range" value="4"/>	8
Pamięć RAM:	<input type="range" value="32"/>	64 GB
Rozmiar dysku:	<input type="range" value="125"/>	250 GB
Hasło:	<input type="password" value="....."/>	
Powtórz hasło:	<input type="password" value="....."/>	

**Uwaga:** Proszę zapamiętać lub zapisać hasło gdyż nie będzie możliwości jego odzyskania!

Wstecz

Dalej

**Step III**  
Adjust resources to the needs



# MAN-HA project in brief:

## How to run virtual machine?(4)

Uruchom aplikację » **Adobe Premiere Pro CS 5.5**

Aplikacja

Zasoby

Uruchomienie

☐ Od teraz do:

2016-10-17 22:54

☒ W terminie:

2016-10-17 22:04 - 2016-10-18 00:04

2016-10-18 10:00

2016-10-27 22:00

Ustaw

Anuluj

🕒 10 : 00

🕒 22 : 00

Październik ▼

2016 ▼

Pn	Wt	Śr	Cz	Pt	So	Ni
26	27	28	29	30	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Listopad ▼

2016 ▼

Pn	Wt	Śr	Cz	Pt	So	Ni
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4
5	6	7	8	9	10	11

Step IVa

Define reservation time in advance

# MAN-HA project in brief:

## How to run virtual machine?(5)

Uruchom aplikację » **Adobe Premiere Pro CS 5.5**

Aplikacja

Zasoby

Uruchomienie

☒ Od teraz do:

2016-10-17 22:54

☐ W terminie:



21

:

00

Październik

2016

Pn	Wt	Śr	Cz	Pt	So	Ni
26	27	28	29	30	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Ustaw

Anuluj

Uruchom

Step IVb

Make it run immediately!

# MAN-HA project in brief:

## How to run virtual machine?(6)

### Aplikacje

 uruchom aplikację



#### Adobe Premiere Pro CS 5.5

CPU: 8 RAM: 64GB HDD: 250GB

Start: 2016-10-17 22:10

Stop: 2016-10-18 21:00

Status: STARTUJE 

**Final step**


Wait for VM to be ready

# MAN-HA project in brief:


## How to run virtual machine?(7)

### Aplikacje

 uruchom aplikację



**Adobe Premiere Pro CS 5.5**  
 CPU: 8 RAM: 64GB HDD: 250GB  
 Start: 2016-10-17 22:10  
 Stop: 2016-10-18 21:00  
 Status: DZIAŁA



**Extend your reservation time**

**Get RDP connection file**

**It's done**  
Now you can use your VM!

**Show „zero console”**



# MAN-HA project in brief:

## Support for Federated Authentication

- By default, registration and login of users is carried out using the federated authentication mechanism
- This service is supported by the Polish Federation of Identity Management **PIONIER.Id**
- Advantages of applying federated authentication:
  - the service provider does not need to maintain users' accounts
  - users do not need to remember names and passwords of multiple accounts
  - verification of permissions can be delegated to a host institution
  - **Single sign-on**
- The mechanism supporting the federated login service is implemented using **the SimpleSAMLphp** technology
- Additionally, we provide the traditional mechanism of registration and login for users who not belong to the federation

# MAN-HA project in brief:

## Log-in using the federation system

### Logowanie przy pomocy konta uczelnianego

Proszę wybrać dostawcę tożsamości, przez którego chcesz się uwierzytelnić:



Politechnika Częstochowska - Test



Politechnika Rzeszowska

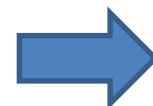


Uniwersytet Mikołaja Kopernika w Toruniu



Uniwersytet Opolski

- Select your IDP Provider for authentication from MAN-HA portal
- After that system will redirect you into proper log-in page of selected provider



# MAN-HA project in brief:

## Log-in using the federation system(2)



NICOLAUS COPERNICUS  
UNIVERSITY  
IN TORUŃ

**CENTRAL AUTHENTICATION SERVICE**

In order to use this service you must be a staff member or a student or an alumn of UMK and you must have an account on one of the university servers.

See [here](#) to find out how to apply for an account.

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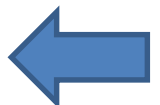
**ENTER YOUR NETWORK ACCOUNT ID AND PASSWORD:**

Username:   
e.g. login@umk.pl, login@his.umk.pl, nralbumu@stud.umk.pl

Password:

» help » list of services » about this page » wersja polska

- Enter username and password to login
- If credentials are correct it will be a redirection to MAN-HA portal
- **And that's all, you are logged in**



# MAN-HA project in brief:

## Database cloud services

Database cloud services in MAN-HA project were implemented as a database cluster of three MySQL nodes (Percona XtraDB Cluster)

Databases are replicated asynchronously between servers located in different locations within the PIONIER network. Users can use databases in each virtual machine





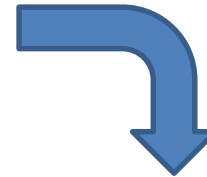
# MAN-HA project in brief:

## Database cloud services (2)

LOGIN\_[NAZWA]

Utwórz

Enter the name of database you wish to create



### Bazy danych

zmień hasło
 zmień adres dostępu
 pokaż zadania
 usuń konto

**ice\_baza1**

Tabele: 0

Zajętość: 0/1024MB

**ice\_db2**

Tabele: 0

Zajętość: 0/1024MB

Now you can use your databases within all VM machines!

# MAN-HA project in brief:

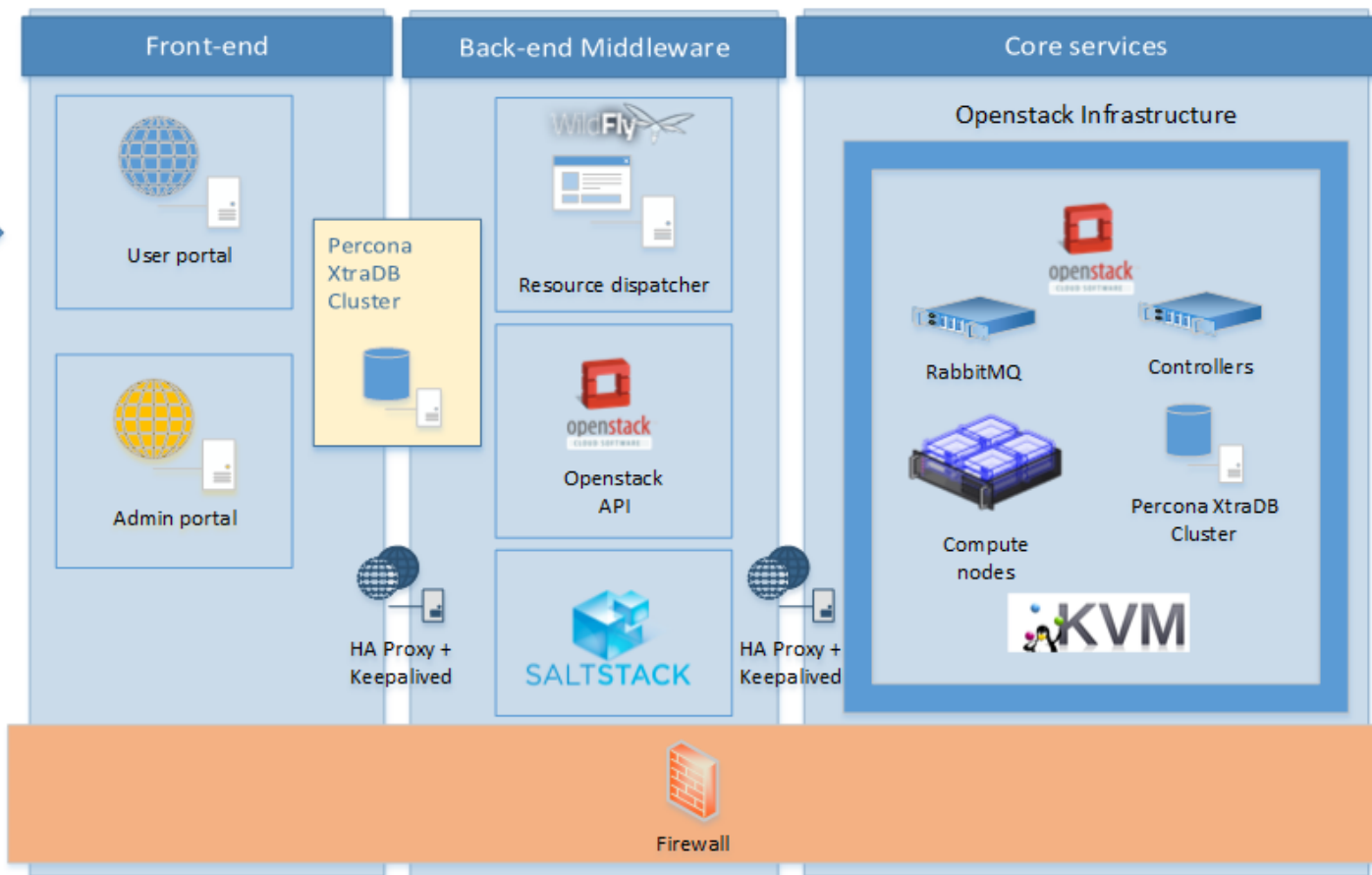
## Integration with public cloud (O365)

- Through the MAN-HA portal, users can apply for an account in O365 infrastructure
- O365 account is created in O365 domain, registered for MAN-HA tenant
- Supported 2 types of user accounts:
  - Normal (typical account)
  - Federated\*



# MAN-HA project in brief:

## MAN-HA architecture – critical services



Setup is hosted by 3 centers in a clustered way:

- PCSS (Poznań)
- PCZ (Częstochowa)
- CYFRONET (Kraków)

Other centers (17) have only part of Back-end Middleware (Openstack API and SaltStack) and Core services including Firewall and HA Proxy + Keepalived

## Conclusions

- The projects MAN-HA and Platon delivered a public cloud environment with IaaS and SaaS services, incl. support for critical services
- The services developed in the MAN-HA project are available for universities and scientific institutions in Poland, as well as for R&D cooperation with companies.
- It is expected that this e-Infrastructure and services will form a base for further R&D projects developed by partners of the Polish Optical Network PIONIER.



POLSKI INTERNET OPTYCZNY

# MAN-HA

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## Partners



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