POLSKI INTERNET OPTYCZNY

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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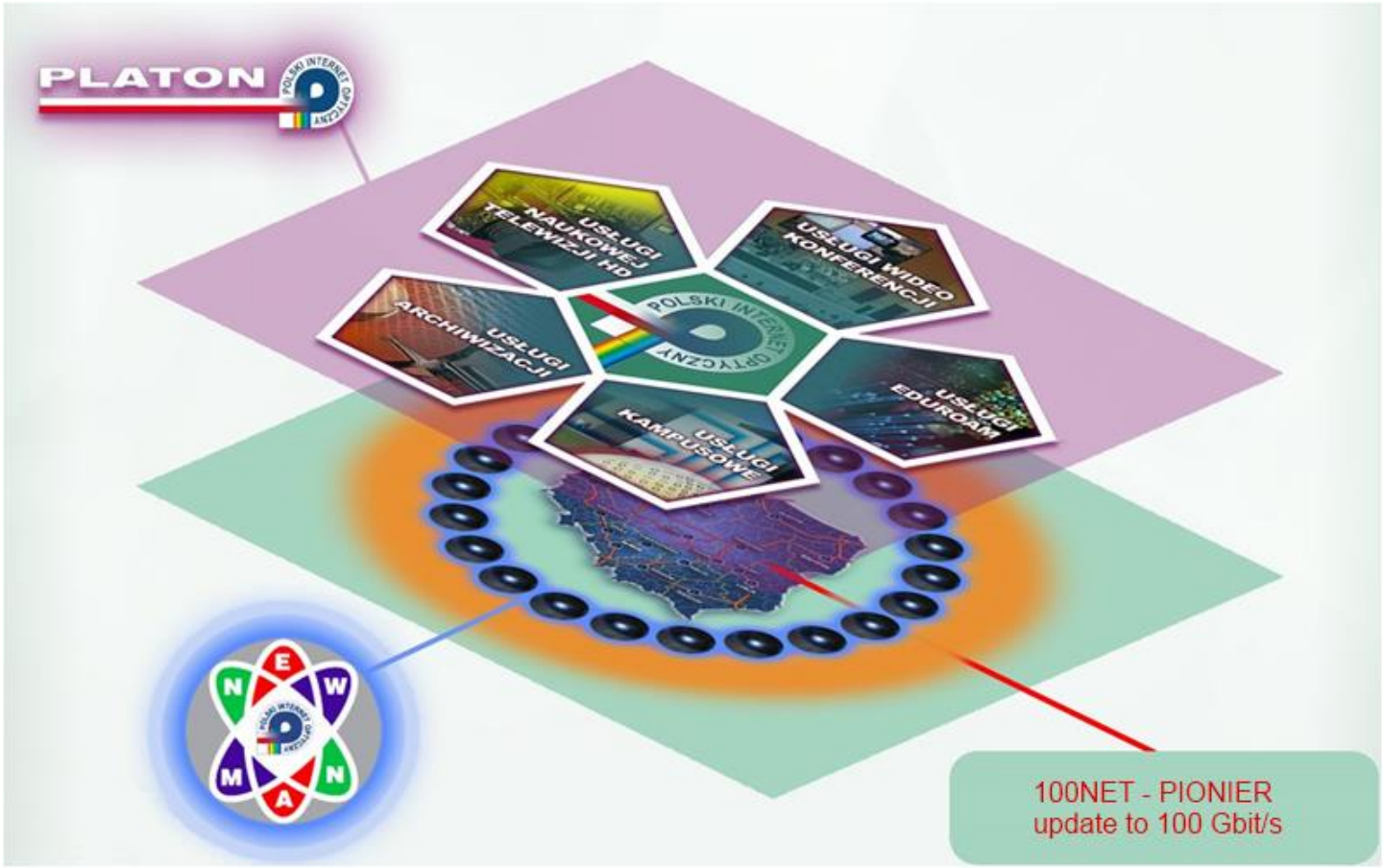
DOTACJE NA INNOWACJE

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)

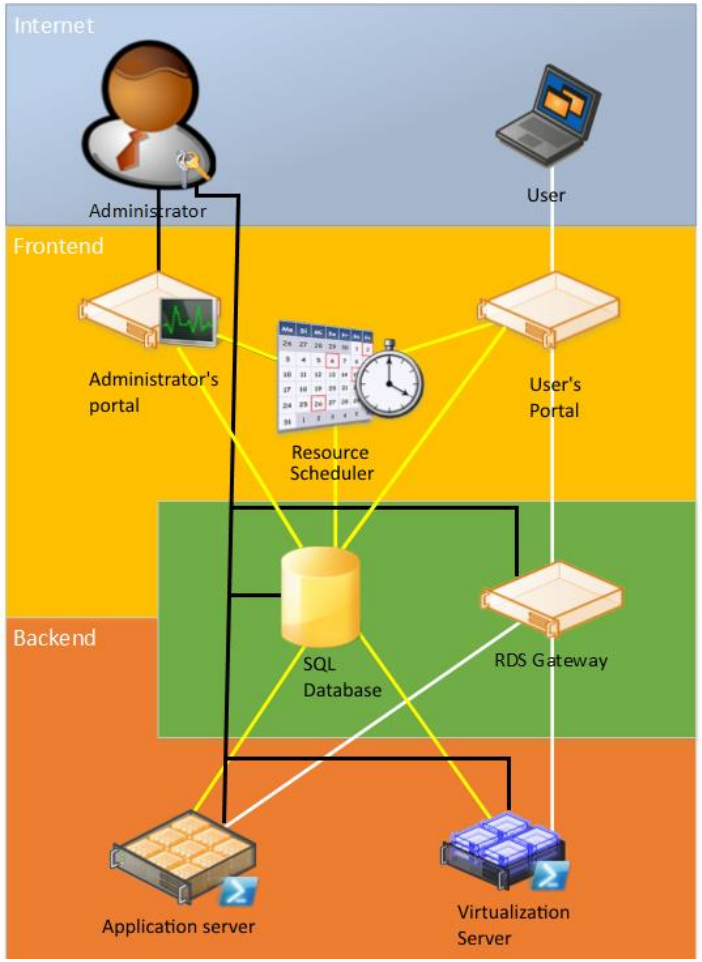
Introduction to Cloud Campus Services(3)

- 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:

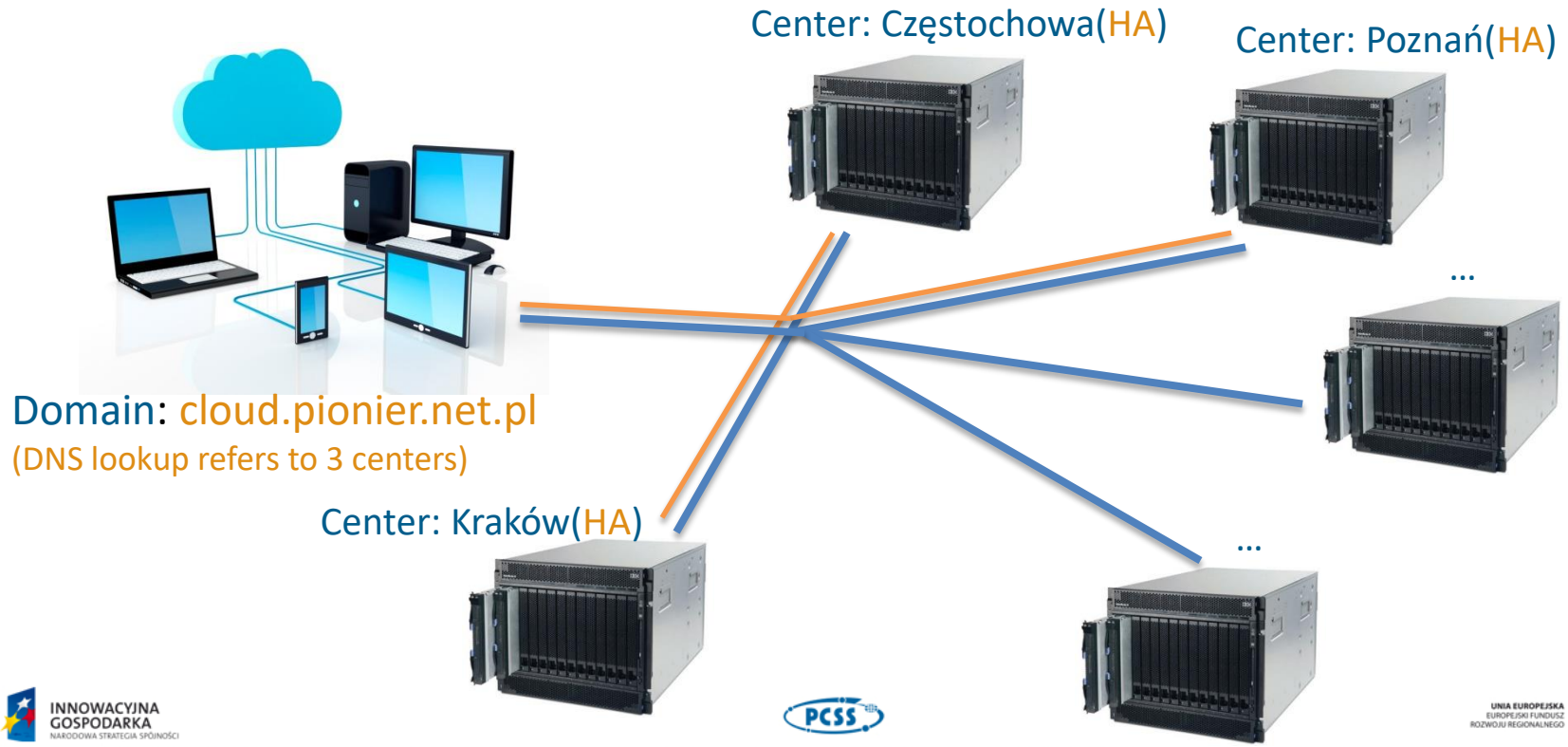
Main goals

- 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

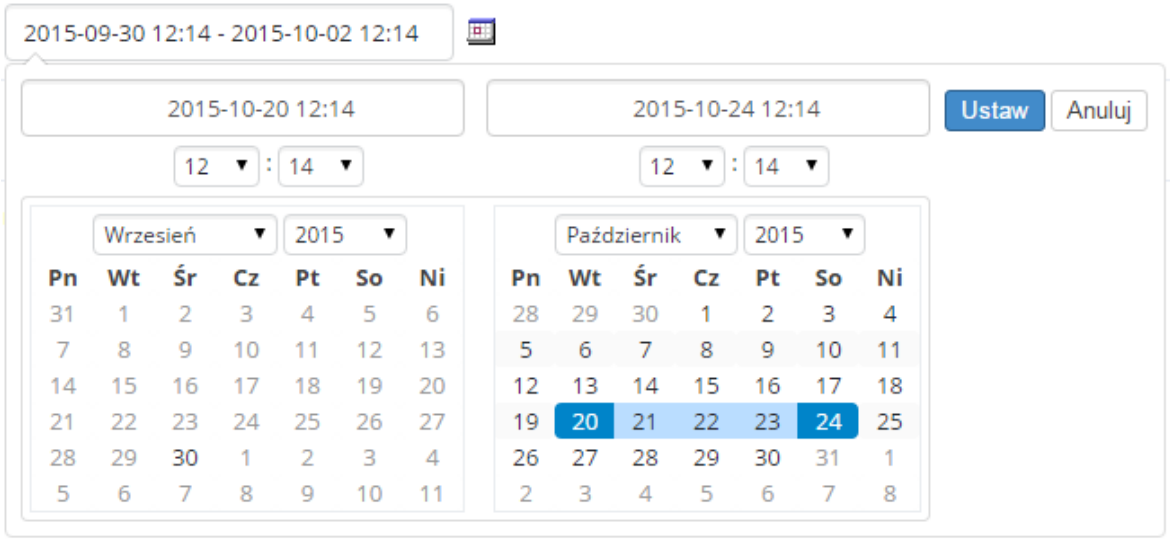
- **Central point of access** to MAN-HA resources for all users from all MANs
  - Critical services are distributed by 3 centers: Poznań, Częstochowa, Kraków
  - Single entrance for users, triple enhance of service reliability which is also scalable



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



Deploy now

MAN-HA project in brief:

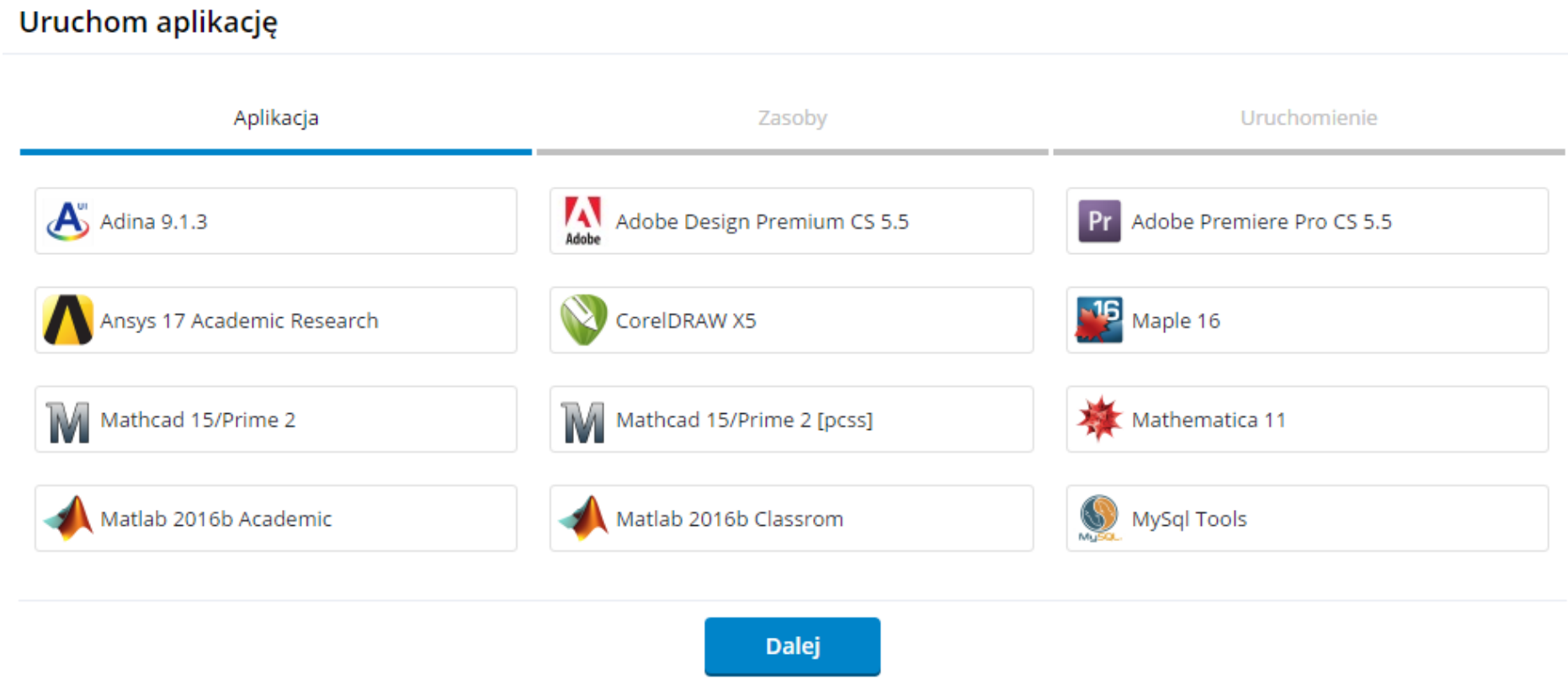
How to run virtual machine?

Usługi (Services)

Step I
Choose type of service

MAN-HA project in brief:

How to run virtual machine?(2)



Step II
Select application from list

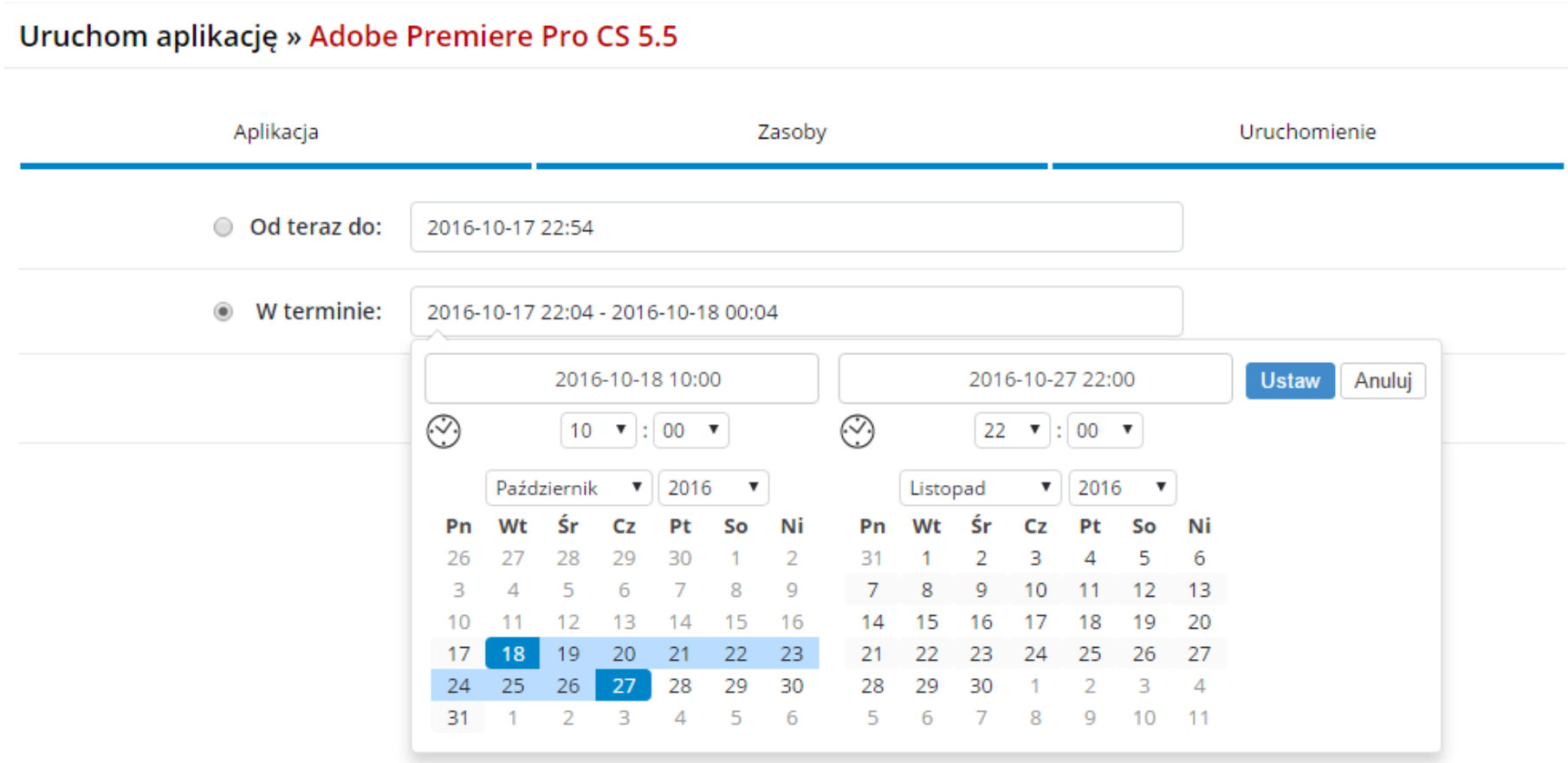
MAN-HA project in brief:

How to run virtual machine?(3)

Step III
Adjust resources to the needs

MAN-HA project in brief:

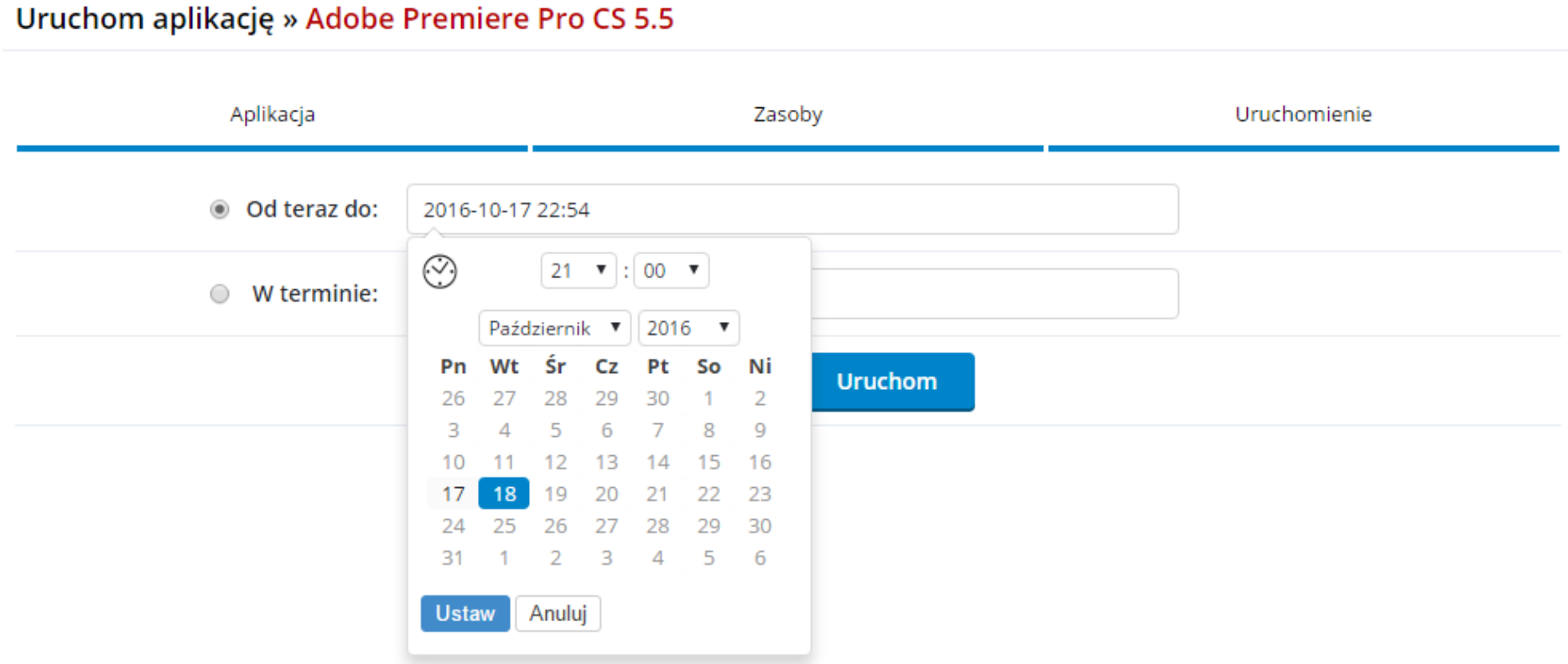
How to run virtual machine?(4)



Step IVa
Define reservation time in advance

MAN-HA project in brief:

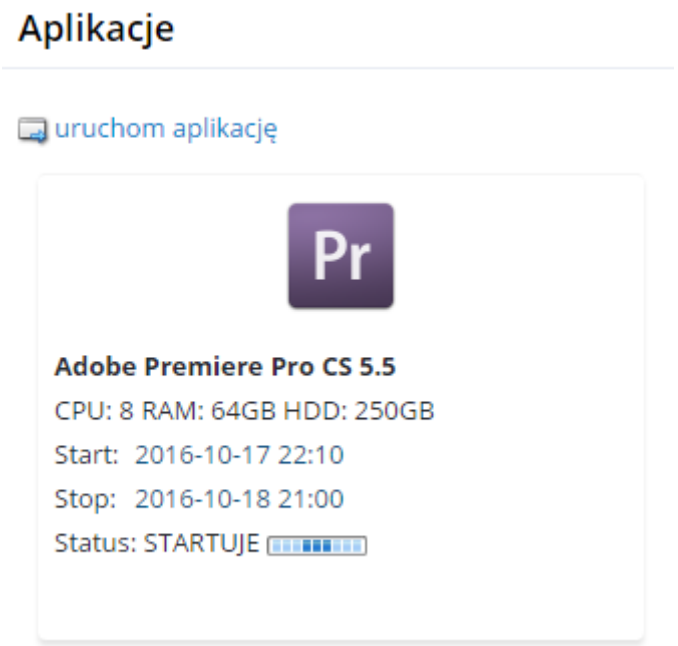
How to run virtual machine?(5)



Step IVb
Make it run immediately!

MAN-HA project in brief:

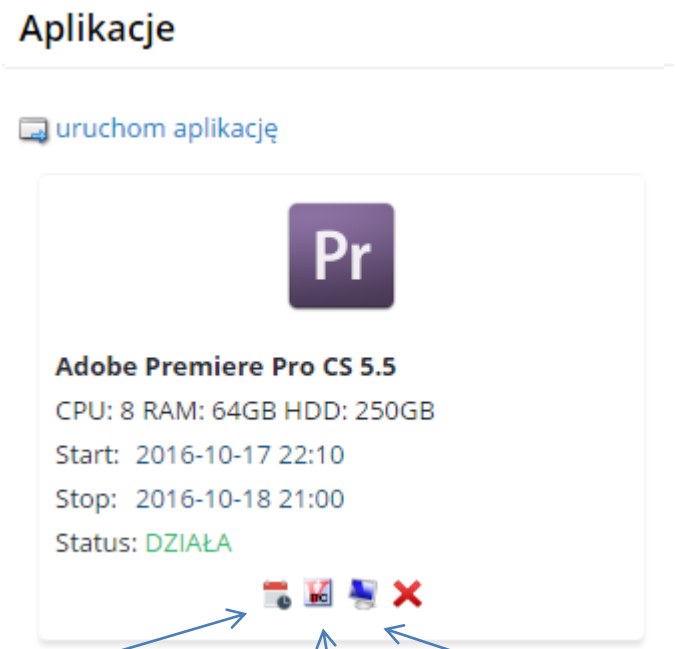
How to run virtual machine?(6)



Final step
Wait for VM to be ready

MAN-HA project in brief:

How to run virtual machine?(7)



Extend your reservation time

Show „zero console”

Get RDP connection file

It’s done
Now you can use your VM!

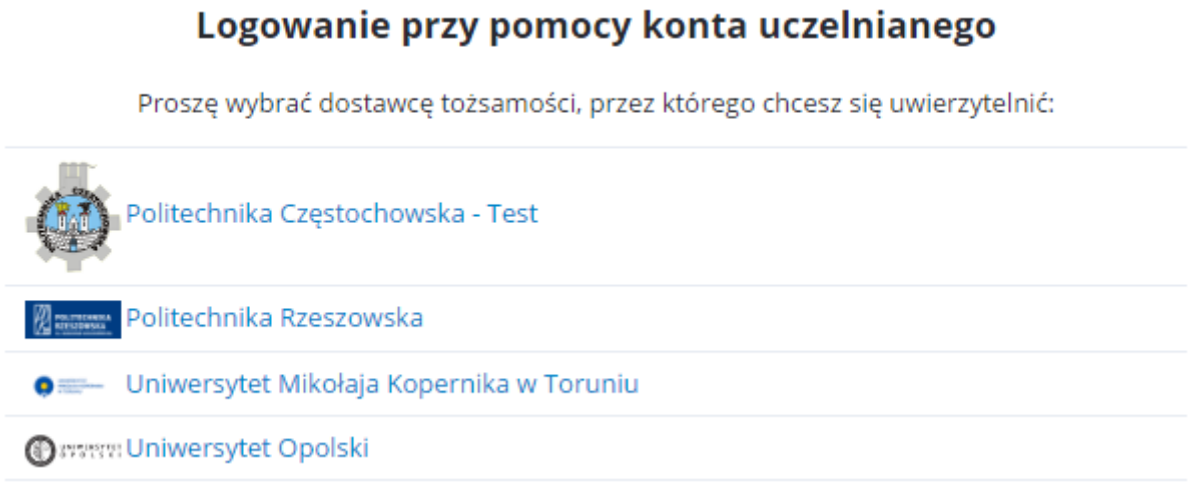
MAN-HA project in brief:

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

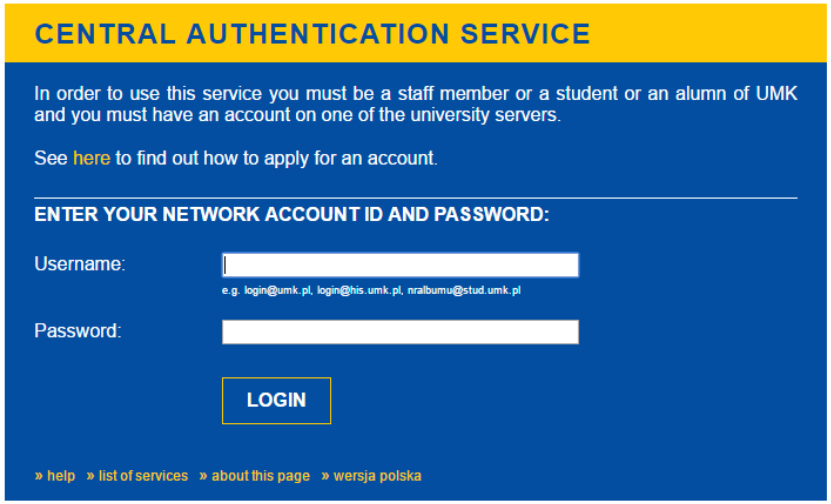


- Select your IDP Provider for authentication from MAN-HA portal
- After that system will redirect you into proper log-in page of selected provider

MAN-HA project in brief:

Log-in using the federation system(2)

NICOLAUS COPERNICUS UNIVERSITY IN TORUŃ



- 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:

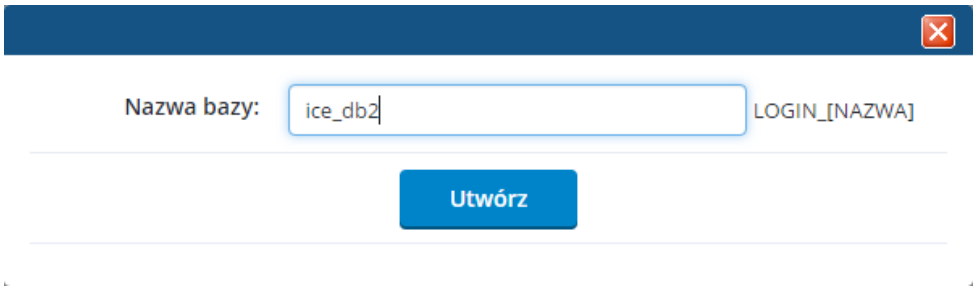
Database cloud services

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

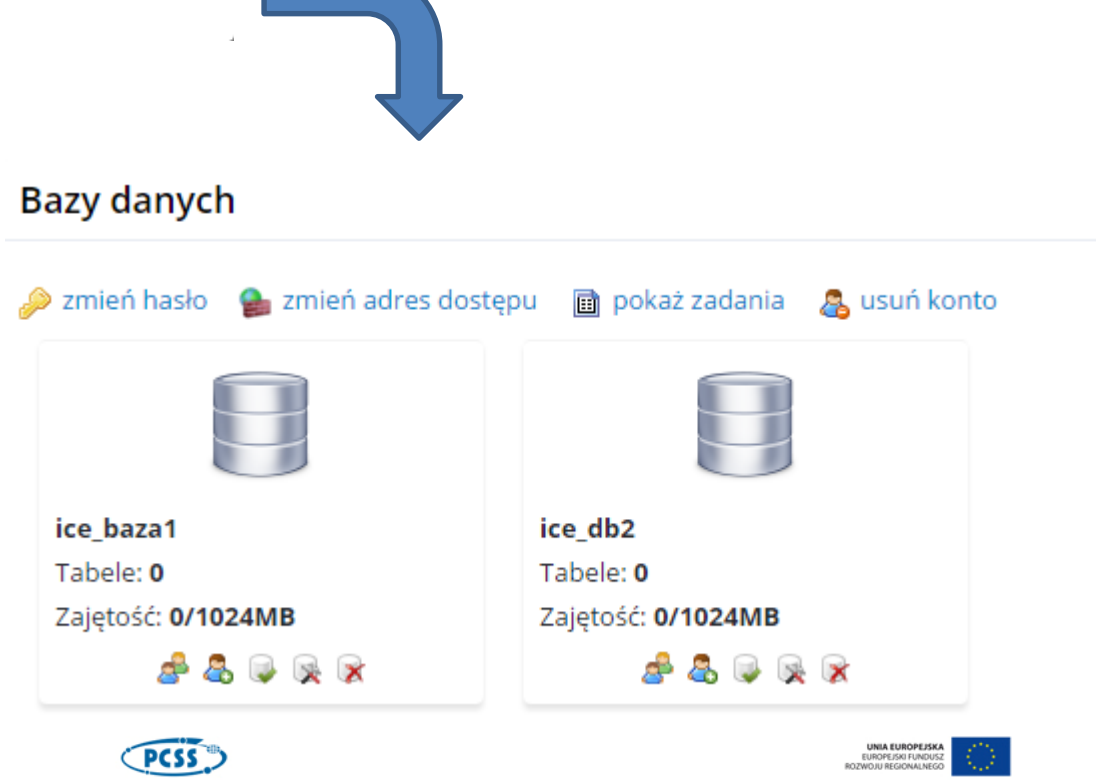
Databases are replicated asynchronously between servers located in different locations within the PIONIER network. Users can use databases in each virtual machine

MAN-HA project in brief:

Database cloud services (2)



Enter the name of database you wish to create



Now you can use your databases within all VM machines!

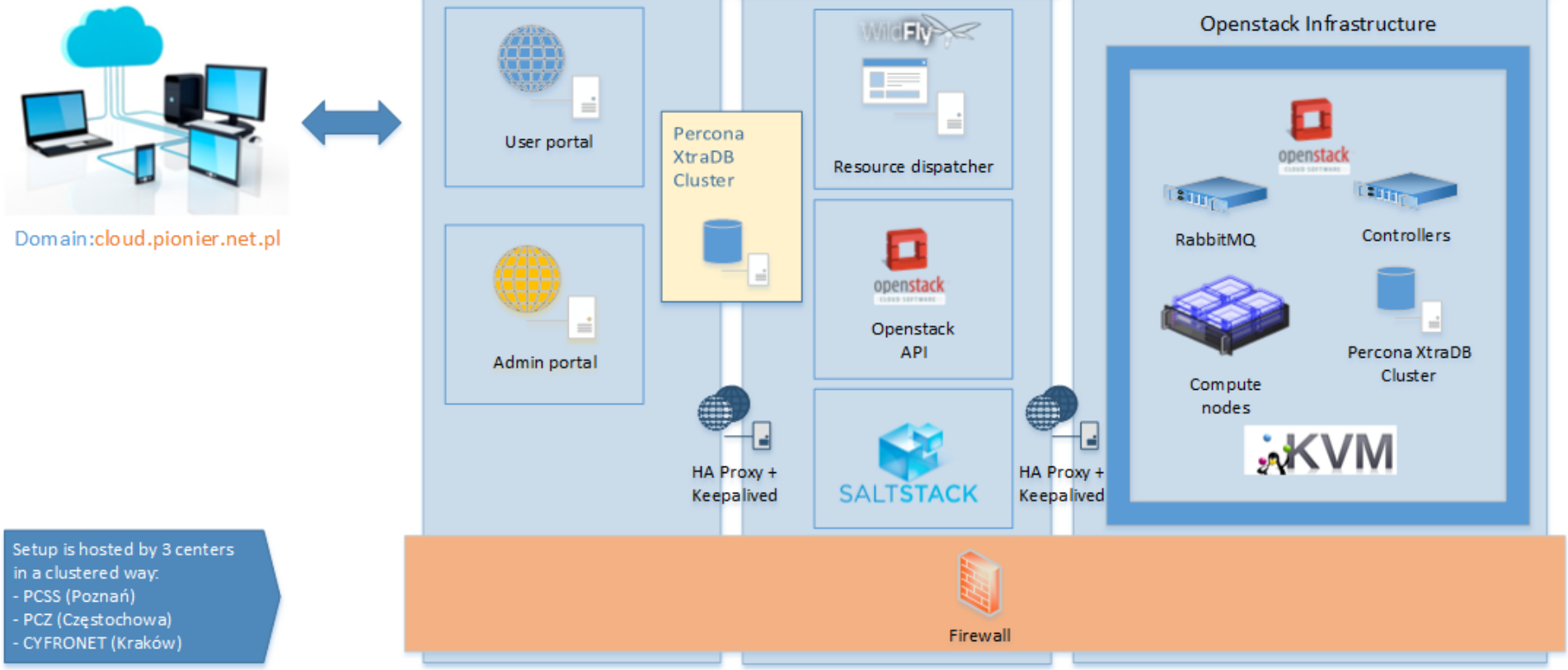
MAN-HA project in brief:

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



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.

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