

2. odprti dan za gospodarstvo



SLAIF
Slovenska
tovarna UI

Slovenian
AI Factory

Uporabniško usmerjene storitve SLAIF

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10. April 2026

Glavni cilji

Izvedba „cloud-alike“ storitev na HPC VEGA2:

- Poenostavljena uporaba
- Visoka zmožnost integracije v lastne rešitve

Podatkovni laboratorij:

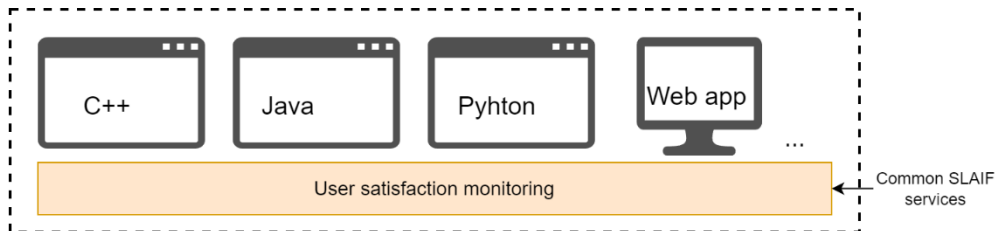
- Podatki in storitve UI na enem mestu
- Pred-pripravljeni splošno-uporabni podatki na „srebrnem nivoju“
- Pred-pripravljene storitve UI

Namen:

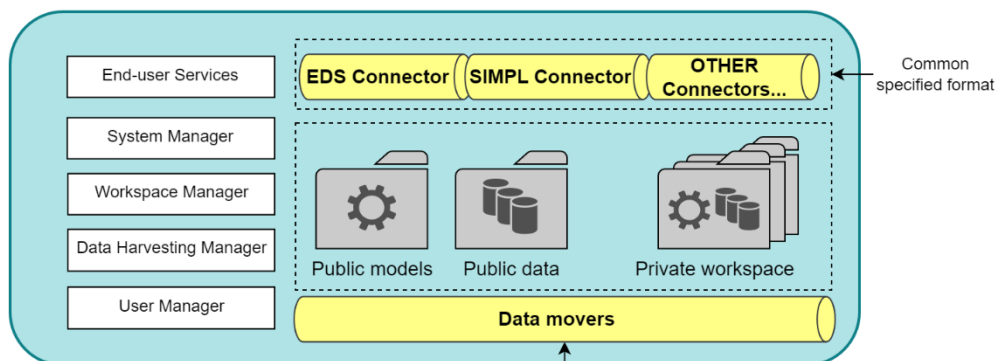
- Učenju, testiranje in izvedba (testna inferenca)

Uporabniško usmerjene storitve

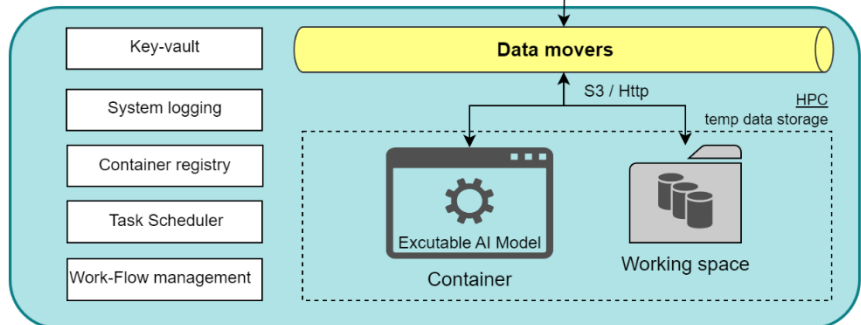
End-user tools and libraries



Data management services



HPC - development environment

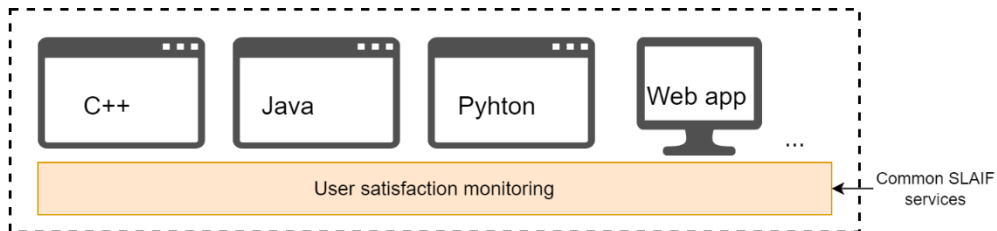


• Generična uporabniška zgodba:

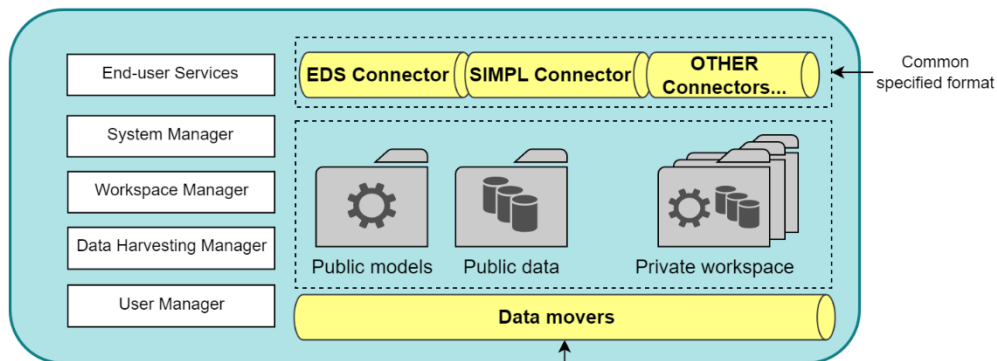
- Prijava v sistem
- Organizacija podatkov lastnih delovnih prostorov
 - Uvedba omejitev/deljenje dostopa do podatkov
- Registracija zunanjih podatkovnih virov
- Konfiguriranje zbiranja podatkov iz zunanjih podatkovnih virov
- Programsko nalaganje privatnih podatkov in kontejnerja
- Pogajanja o izvedbi
- Izvedba in prenos rezultatov

Uporabniško usmerjene storitve

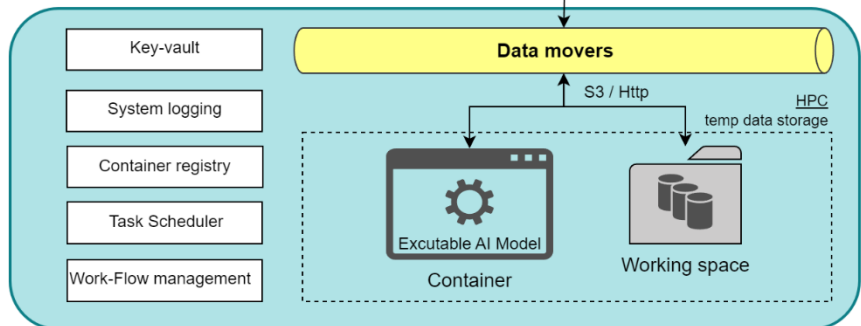
End-user tools and libraries



Data management services



HPC - development environment



- Uporabniški nivo (SLAIF Toolbox)

- Nabor orodij za enostavno integracijo storitev SLAIF v lastne rešitve
- Sistem posodabljanje knjižnic
- Sistem za spremljanje zadovoljstva uporabnikov

- Podatkovni nivo

- DS Connectors
- Data harvesting manager
- Delovni prostori

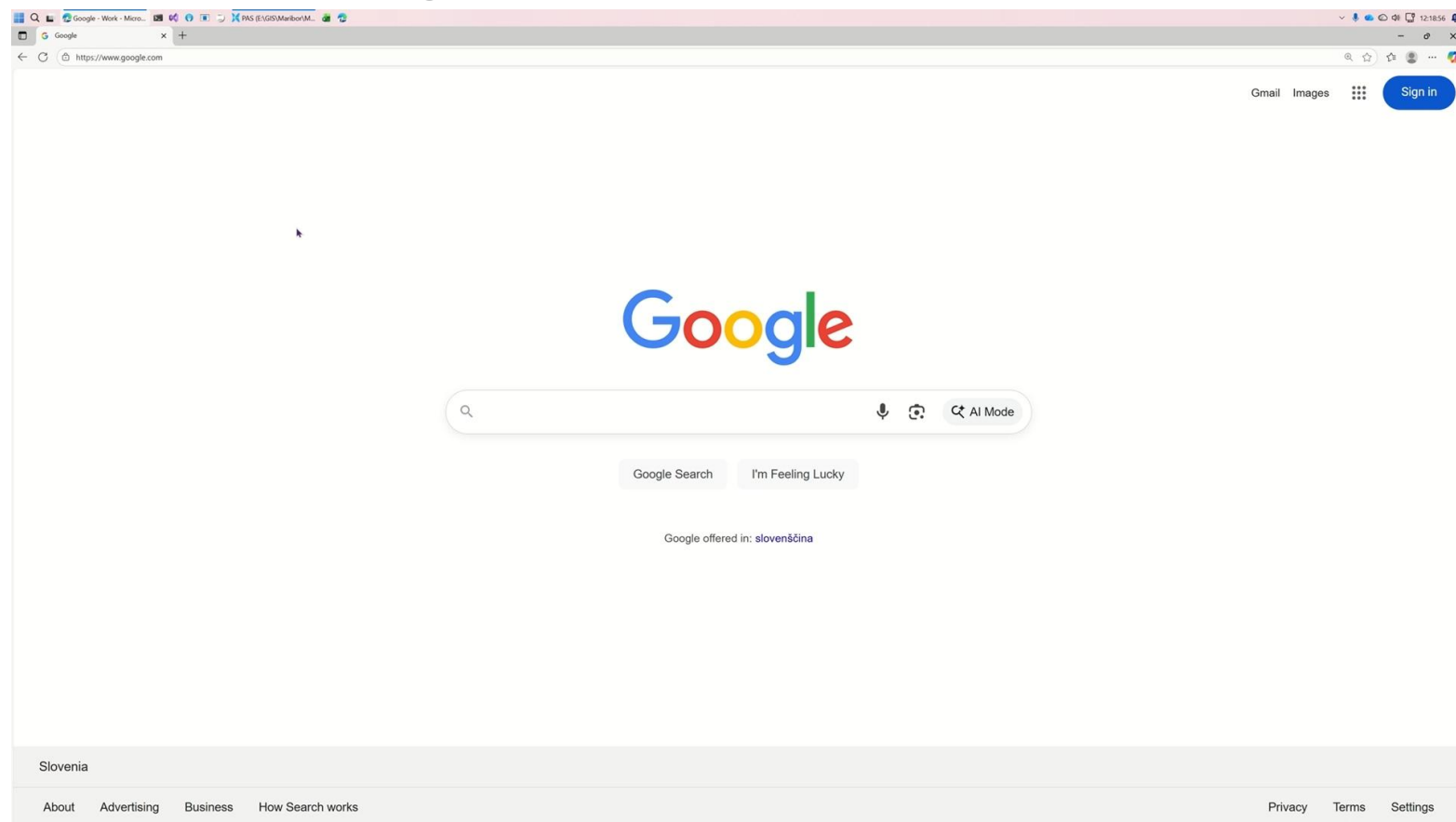
- HPC Nivo

- Izvedba „containerja“ nad dostavljenimi podatki

Delovni prostori

- Ključne lastnosti:
 - Nameščen na podatkovni center
 - Organizacija v mape
 - Hrani datoteke, baze, kontejnerje in rezultate izvedbe
- Uporabniška zgodba:
 - Ustvarjanje delovnega prostora
 - Ustvarjanje mape
 - Ustvarjanje podatkovne baze znotraj mape
 - Navigacija med mapami
 - Nalaganje posamezne datoteke
 - Generiranje API Key za programsko uporabljanje

Video uporabniške zgodbe skozi GUI



Delovni prostori

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Programska koda uporabniške zgodbe

```
1 #include "pch.h"
2
3 using namespace Data;
4 using namespace Platform;
5 using namespace Platform::Network::Http;
6 using namespace Platform::Network;
7 using namespace Platform::Logger;
8 using namespace Platform::Process;
9 using namespace Platform::IO;
10 using namespace GF::Api::Services;
11 using namespace GF::Api::Workspace;
12 using namespace GF::Api::Data::Compression;
13 using namespace GF::Api::Database;
14
15 int main()
16 {
17     Url workspace("https://fusion.gemma.feri.um.si/gf-test/api/ws/31ec45c5-39ca-4d0b-9a59-60b4073e7cc6/services/storage");
18
19     // 01 Povezava na delovni prostor
20     StorageServices ss(workspace.GetUrl());
21     ss.SetApiKey(SecureString(Environment::Get("GF_WS_API_KEY")));
22
23     // 02 Ustvari datoteko v "Mapa/Hello.txt"
24     std::string fileContent = "Hello world!";
25     ss.WriteSequentialFileStream("Mapa/Hello.txt", MemoryStream(Array(fileContent.data(), fileContent.size())));
26
27     // 03 Ustvari podatkovno bazo "Costumers"
28     Table costumers;
29     costumers.SetName("Costumers");
30     costumers.AddColumn("Id");
31     costumers.AddColumn("Name");
32     costumers.AddColumn("Email");
33     costumers.SetPrimaryKey("Id");
34
35     Array database = CreateSqliteDatabaseBlob({ costumers });
36     ss.WriteSequentialFileStream("Databases/MyDatabase.db", MemoryStream(database));
37
38     // 04 Dobi seznam vseh datotek na delovnem prostoru
39     for (auto file : ss.GetFilesList("/", true)) {
40         Log::Info("File: {}", file);
41     }
42
43     // 05 Ustvari podatkovni vir za novo bazo in posodobi delovni prostor
44     Array wsdata = ss.ReadSequentialFileStream("ws.gfdb").Value.ReadToEnd();
45     WorkspaceManager ws(wsdata.data(), wsdata.size());
46     ws.AddFileDataSource(UUID(), "Customers", "Databases/MyDatabase.db");
47     ws.SaveChanges();
48     ss.WriteSequentialFileStream("ws.gfdb", MemoryStream(ws.Serialize()));
49
50     return 0;
51 }
```

Sistem za zbiranje podatkov

Video uporabniške zgodbe skozi GUI

```

1 # Harvester demo
2
3 Compile with IDE for Release|x64 build target.
4
5 Open terminal and cd to path of this readme file.
6
7 ### Configure GFS to load extensions from `_build` directory.
8
9 ```powershell
10 gfs configure-host add path "$pwd/_build/x64/Release/bin"
11 ```
12
13 Now you can access the harvester interface via cli
14
15 ```powershell
16 gfs harvester-demo --help
17 ```
18

```

```

PS F:\gemma\s\laif\03_CppSamples\03_Harvester>

```

• Ključne lastnosti:

- Samodejno zbiranje splošno-uporabnih podatkov
- Priprava splošno-uporabnih podatkov za UI
- Poveza s podatkovnimi prostori

• Uporabniška zgodba:

- Seznam že registriranih podatkovnih virov
- Registracija novih podatkovnih virov
- Nalaganje cevovodov za orkestracijo podatkov (transformacije/harmonizacije)
- Določitev urnikov izvedbe zajema, časovni obseg vzdrževanja podatkov itd.

• [Navodila za uporabo](#)

Sistem za zbiranje podatkov

Programska koda za zbiranje podatkov

```

void Replicate(const ::Data::Properties& properties)
{
    using namespace std::string_literals;
    using namespace Platform::Network::Http;
    using namespace Platform::Network;
    using namespace Platform::IO;
    using namespace Platform;
    using namespace Data;

    auto [workspace, storage] = OpenWorkspace(properties.Get<InputWorkspaceProperty>());
    for (auto const& dataSource : workspace.GetDataSources()) {
        if (!dataSource.IsUrlDataSource()) continue;
        // Each datasource can have custom properties through which harvesting behaviour can be modified
        // Datasource (or any workspace object) properties can only be set programatically... Currently there is no UI support yet.
        // For example: For Url based datasources we could tell harvester how to download data. We can store anything such as request meth
        // Here we use it to check if we should harvest the datasource (by default yes)
        auto properties = dataSource.GetProperties();
        if (!properties.GetPropertyDefaultValue("EnableHarvesting", Core::True).as<bool>()) continue;

        // If you need credentials to access the datasource you can store them securely in the workspace. For demo we don't need them
        SecureString username = properties.GetPropertyDefaultValue("Username", Variant(SecureString(""))).as<SecureString>();
        SecureString password = properties.GetPropertyDefaultValue("Password", Variant(SecureString(""))).as<SecureString>();

        Url url = dataSource.AsUrlDataSource().GetUrl();
        Log::Info("Harvesting: {}", url.GetUrl());

        HttpClient web(url.GetBaseUrl());
        HttpRequest request = web.CreateRequest(url.GetPathWithParameters(), AcceptTypes(), RequestMethod::Get);
        auto [response, err2] = request.GetResponseStreamAsync().AwaitWithError();
        if (err2.is_error()) {
            Log::Error("Failed to get data: {}", err2.message());
            // We continue with harvesting of other datasources
            continue;
        }
        Stream stream = response.GetStream();
        std::string fileName = properties.GetPropertyDefaultValue("FileName", dataSource.GetName());
        std::string filePath = std::format("HARVESTED_DATA/{}", fileName);
        Log::Info("Downloading data {} and storing it into {}", Core::String::FormatSize(stream.GetLength()), filePath);
        storage.WriteSequentialFileStream(filePath, stream);
    }
}

```

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Navodila za uporabo

EDS Connector

- Dostop do „skupnih“ EU in nacionalnih podatkovnih prostorov
 - Iskanje po katalogu podatkov
 - Preverjanje ponudb politik uporabe
 - Sklepanje pogodbo o prenosu podatkov
 - Prenos podatkov
- Mogočena tudi distribucija podatkov ostalim članom DS

The image displays a collage of screenshots from the EDS Connector web application. The top-left screenshot shows the main navigation menu with sections for 'DATA SHARING PLATFORM' (Home, Documents, Use Cases, Datasets, Credentials, Logs, API Market) and 'DSX ENGINE' (Provider, Policies). The top-right screenshot is the 'Edit connector' form, showing fields for Name (Example DSX Engine Connector 1), Participant ID, and Connector endpoints (Data plane service URL, Control plane service URL, Catalog API URL, Management API URL). The middle-left screenshot is the 'Edit policy' form, showing Basic info (Name: EU policy, ID: eu-policy), Requirements (Region: EU, Data must be handled inside EU), and an 'ADD MORE' button. The middle-right screenshot is the 'Edit asset' form, showing Basic info, Source (Base URL, Base URI, Authorization: Bearer (Token)), and an Authorization header example. The bottom-left screenshot is the 'Contract negotiation' form, showing Asset (FLW-technological reasons loss data), Organization (ITC - Innovation Technology Cluster), and Requirements (Region: EU, Data must be handled inside EU). The bottom-center screenshot shows a 'DSX Engine / Consumer / Dataspace catalog' table with columns for ID, Name, and Organization, listing a dataset 'flw--technological-reasons-loss-data'. The bottom-right screenshot shows a 'Data' modal displaying JSON data for agricultural products like 'Apples' and 'Peaches yellow SP'. The bottom-most screenshot shows a 'Get Transfer Processes' modal displaying a list of transfer processes in JSON format.

Sistem za zbiranje podatkov

Konfiguracija preko GUI

The screenshot displays the 'Tasks' section of the system's GUI. At the top, there are navigation tabs for 'Datasources', 'Datasets', 'Files', 'Services', and 'Tasks'. Below these is a 'New task' button and a table listing existing tasks. The table has columns for Name, Workspace, Next run, Last Execution, and Enabled. Three tasks are listed: 'StreamHandler Weather Forecast', 'Arso Weather Forecast', and 'ArsoMeteo'. Each task has a status icon (a blue checkmark) and a set of action icons (edit, copy, delete).

Below the table, two 'Edit scheduled task' windows are shown. The left window is on the 'Scheduled Task data' tab, showing fields for Implementation (ARSO Meteo Replicator), Name (ArsoMeteo), Task type (Normal), Run every (1440 minutes), and Description (Weather data replication from Arso Meteo Service (Slovenia)). The right window is on the 'Parameters' tab, showing a list of parameters such as DateFrom, DateTo, DataUrl, LocationUrl, SettingsUrl, IntermediatePath, TargetPath, Language, MaxRequests, and MailHourlyDays. A red error message at the bottom of the parameters window states: 'StringList type in 'StationIds' not supported.'

Trenutno stanje:

- Vzpostavljeno razvojno okolje (HPC RIVR)
 - podatkovni in izvajalni del
- Validirana integracija s podatkovnim prostorom
- V teku 6 PoC

Naslednji koraki:

- Registracija podatkovnih virov in prostorov
- Izboljšave uporabniške izkušnje
- Zbiranje odziva prvih uporabnikov ustrezne korekcije sistema

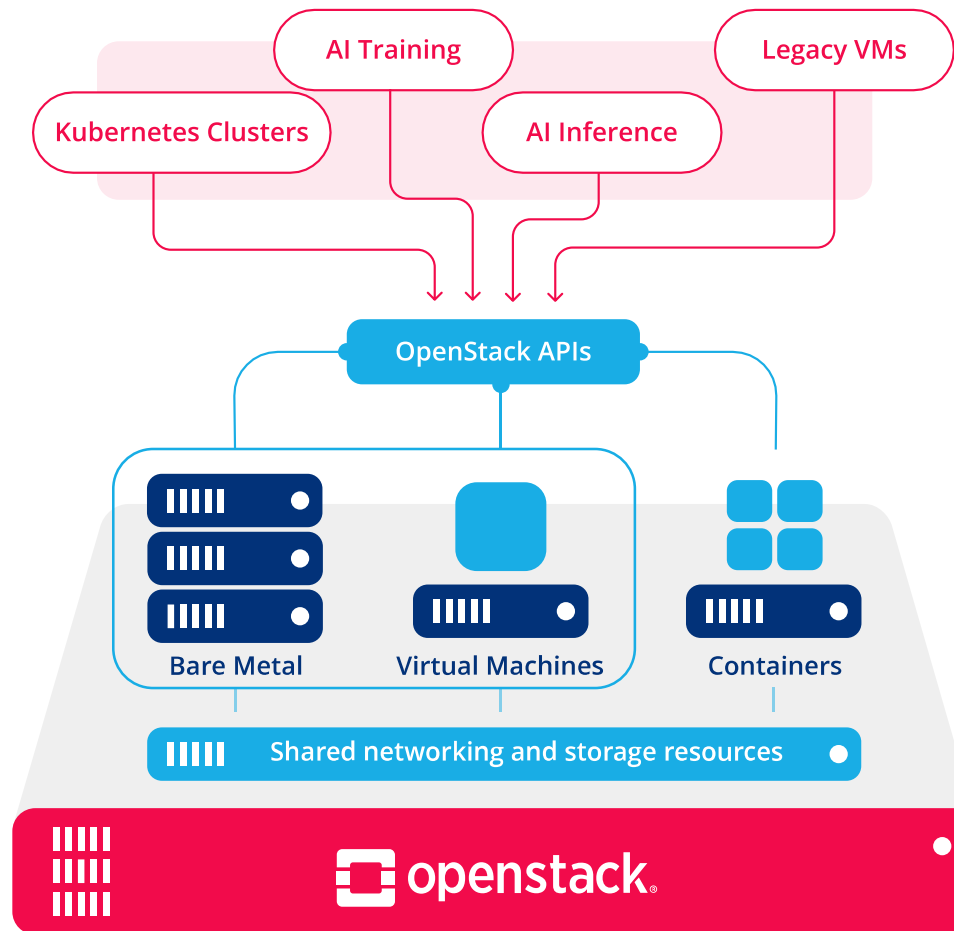
Kako se vključiti?:

- Delovni prostori: dms.slaif.lhrs.si/mgmt/SignIn
 - [Navodila za uporabo](#)

Platforma OpenStack®

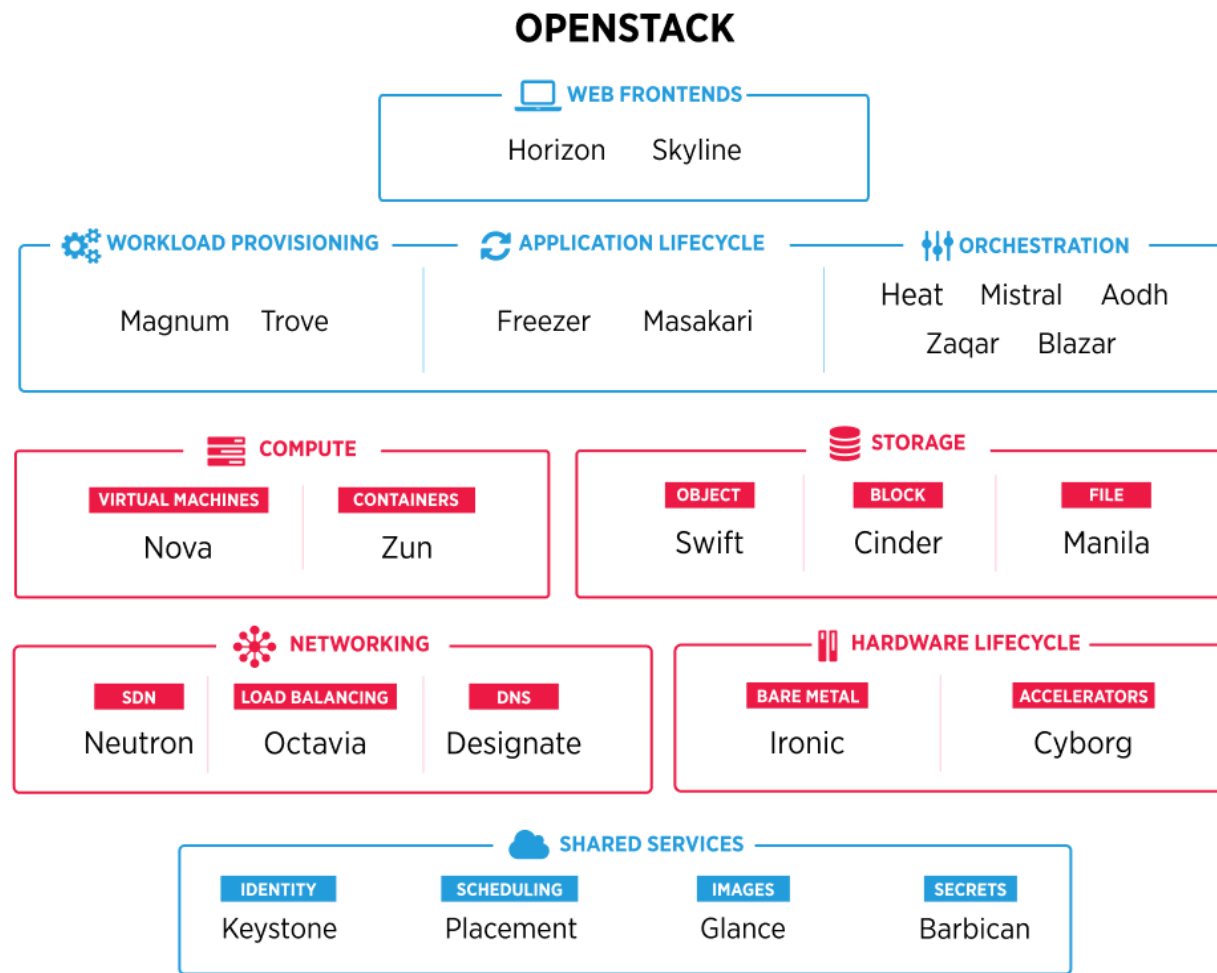
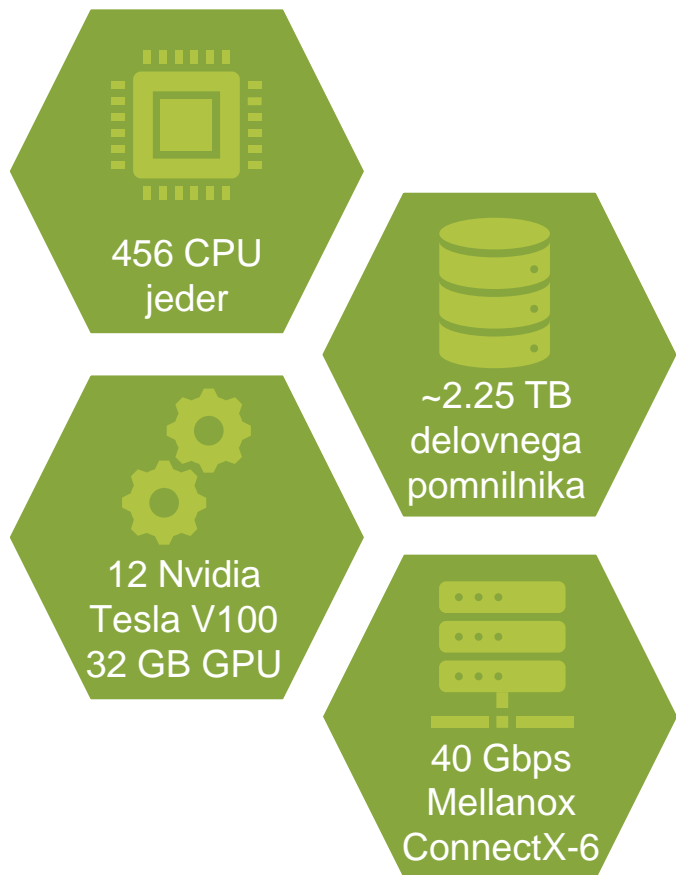


Compute, Storage and Networking infrastructure
for all your workloads



<https://www.openstack.org/>

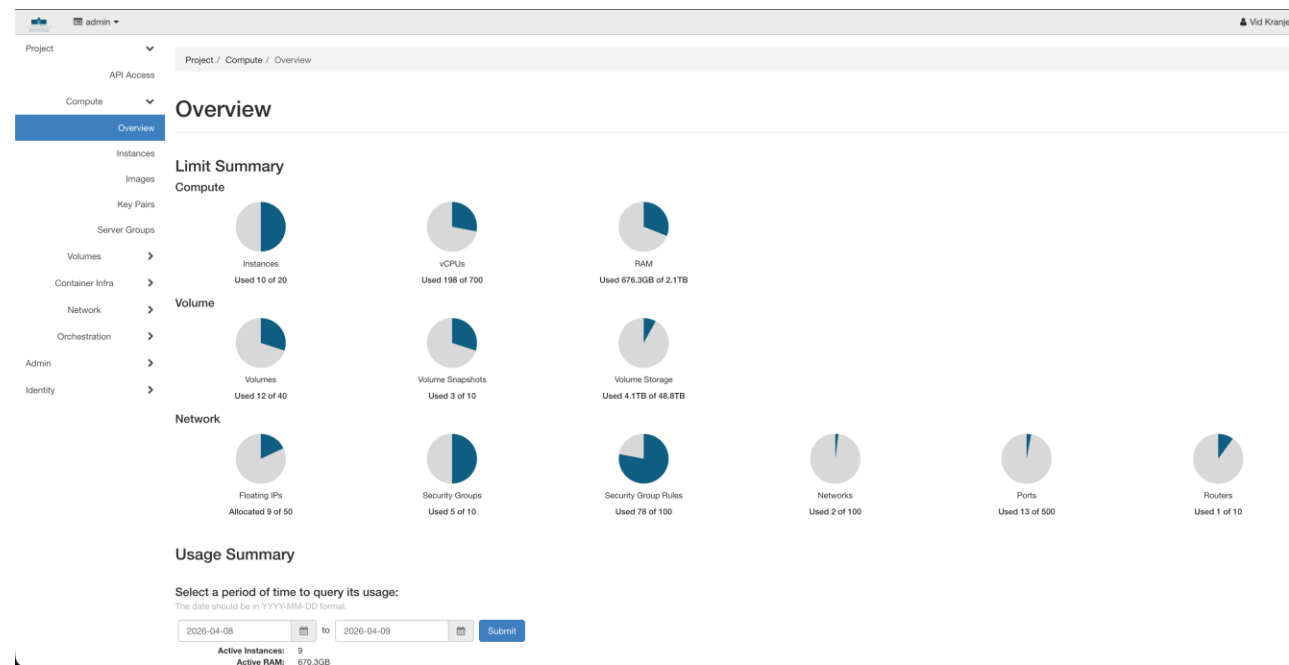
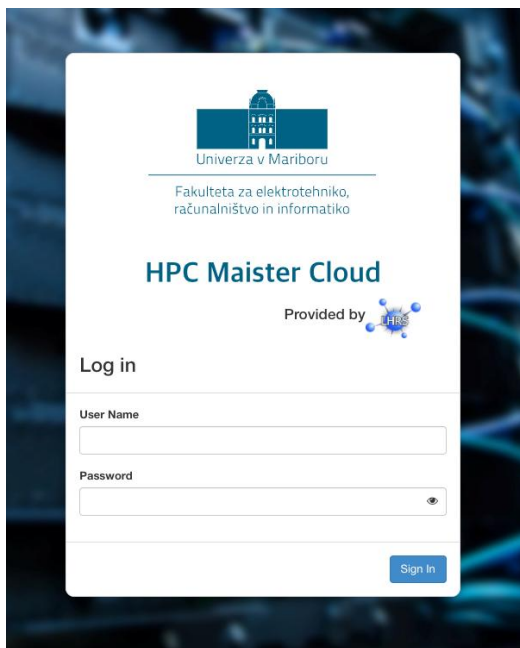
Tehnologije, storitve in računaska moč



<https://www.openstack.org/>

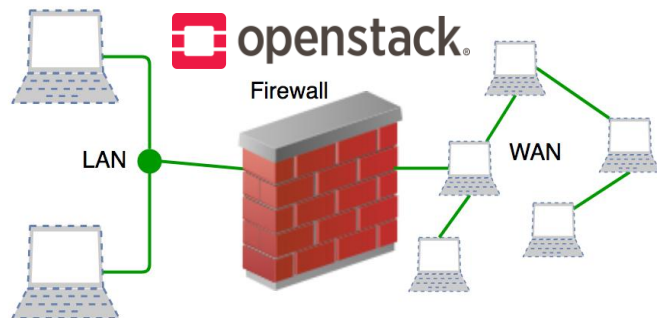
Kako do dostopati do navideznega stroja (1)

- SSH dostop
- RDP dostop
- Dostop preko Horizon dashboarda (<https://horizon.slaif.lhrs.si>) -> noVNC povezava

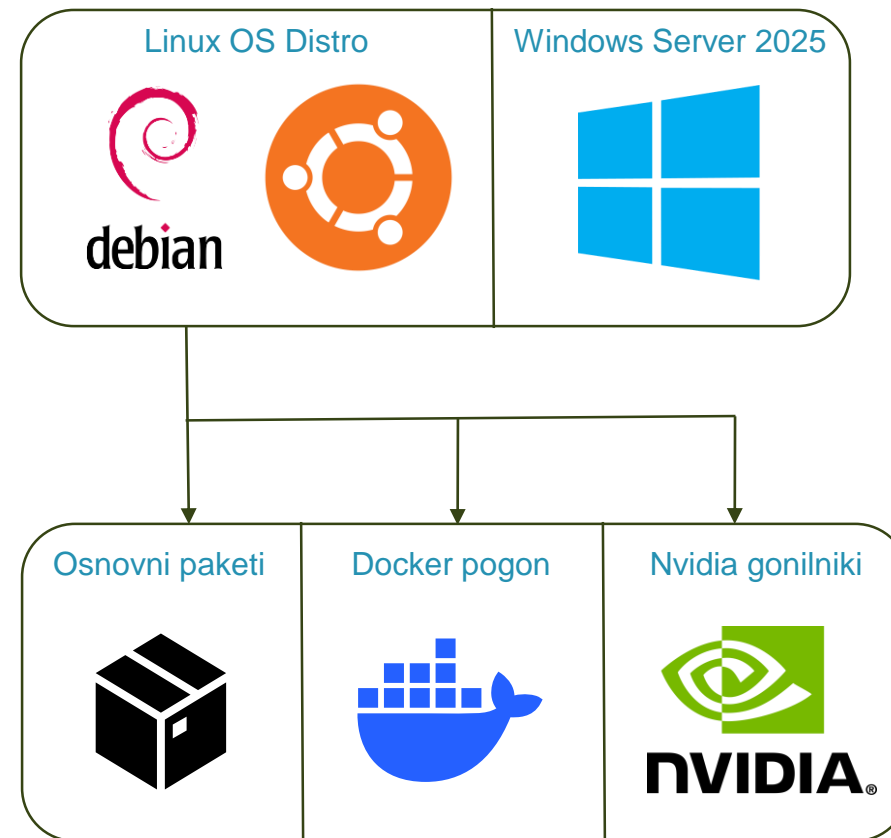


Kako do dostopati do navideznega stroja (2)

<input type="checkbox"/> Flavour Name	vCPUs	RAM	Root Disk	Ephemeral Disk
<input type="checkbox"/> cpu10.ram120.gpu2	10	120GB	0 GB	0 GB
<input type="checkbox"/> cpu10.ram60.gpu2	10	60GB	0 GB	0 GB
<input type="checkbox"/> cpu12.ram32	12	32GB	0 GB	0 GB
<input type="checkbox"/> cpu128.ram512	128	488.3GB	0 GB	0 GB
<input type="checkbox"/> cpu128.ram512.windows	128	488.3GB	0 GB	0 GB
<input type="checkbox"/> cpu16.ram120.gpu2	16	120GB	0 GB	0 GB
<input type="checkbox"/> cpu16.ram128.gpu4	16	128GB	0 GB	0 GB



<https://www.geeksforgeeks.org/computer-networks/introduction-of-firewall-in-computer-network/>





Kako dostopati do Kubernetes grozda

k8s-cluster

Cluster Template

Name	k8s-template
ID	bb2ecb73-9a1e-4664-8025-ba66c032f554
COE	kubernetes
Image ID	fedora-coreos-38.20230806.3.0-openstack

Miscellaneous

Discovery URL	https://discovery.etcd.io/ee9a64630a6702cf48a55ce51f860cb4
Cluster Create Timeout	60 minutes
Keypair	magnum-key
Docker Volume Size	- GB
Master Flavour ID	k8s.small
Node Flavour ID	k8s.small
COE Version	v1.25.16-rancher1
Container Version	1.12.6

Stack

Stack ID	f26cb044-a9b2-476b-be5d-91babab633a2
Stack Faults	None

Nodes

Master Count	1
Node Count	1
API Address	https://164.8.239.31:6443
Master Addresses	164.8.239.31
Node Addresses	164.8.239.44

Labels

dns_nameserver	8.8.8.8
container_runtime	containerd
containerd_version	1.6.19
containerd_tarball_sha...	3262454d9b3581f4d4da0948f77d4e1be51cfc42347a1548bc9ab6870b055815
containerd_tarball_url	https://github.com/containerd/containerd/releases/download/v1.6.19/containerd-1.6.19-linux-amd64.tar.gz
cgroup_driver	systemd
kube_tag	v1.25.16-rancher1
k8s_keystone_auth_tag	v1.25.6
cinder_csi_plugin_tag	v1.25.6
cloud_provider_tag	v1.25.6
helm_client_sha256	da36e117d6dbc57c8ec5bab2283222fbd108db86c83389eebe045ad1ef3e2c3b
helm_client_tag	v3.12.0
helm_client_url	https://get.helm.sh/helm-v3.12.0-linux-amd64.tar.gz

Record Properties

Created	4/9/26 10:11 AM
Updated	4/9/26 10:22 AM
ID	3f9dd58e-f71e-4cf1-8bf0-d9cd616af06a
Status	CREATE_COMPLETE
Status Reason	-
Health Status	HEALTHY

Show Certificate ▾

- Sign Certificate
- Get Cluster Config
- Resize Cluster
- Rolling Cluster Upgrade
- Rotate Cluster Credentials
- Delete Cluster

Uporabniški scenariji

1. Playground

SSH dostop
RDP dostop
Horizon dostop



2. AI Training

Navidezni stroji
Kubernetes grozdi



3. Service deployment

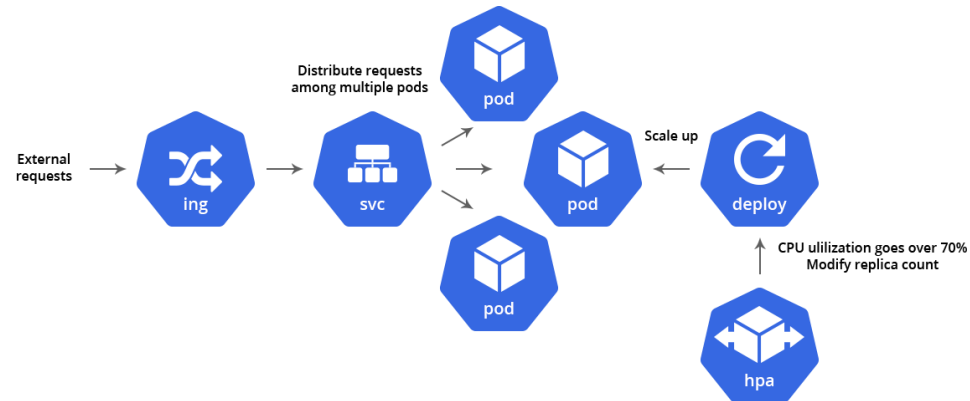
Navidezni stroji
Kubernetes grozdi



Posodobitve in načrti za prihodnost (1)



Kubernetes Autoscaling



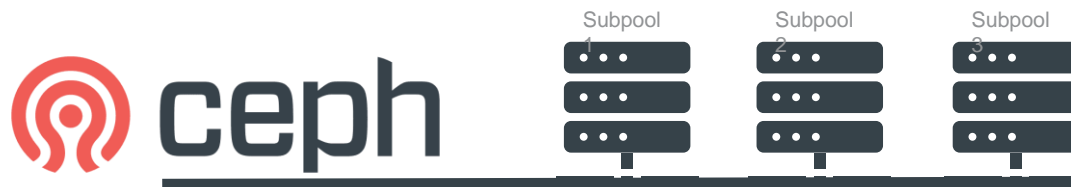
<https://www.virtuozzo.com/company/blog/scaling-kubernetes/>

AI Pipeline Core Components

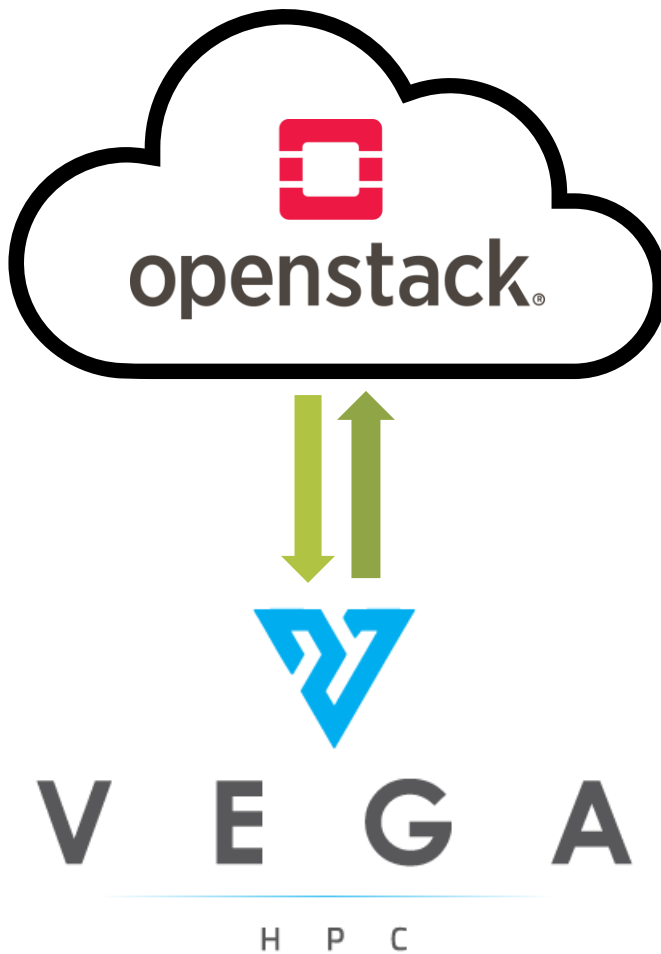


<https://airbyte.com/data-engineering-resources/ai-data-pipeline>

Izolirana podatkovna shramba



Posodobitve in načrti za prihodnost (2)



Vprašanja in predlogi?

Questions and suggestions?



Kontakti

- Splošna vprašanja: domen.mongus@um.si; • Delovni prostori: matej.brumen@um.si; • Izvajanje vsebnikov: marko.ferme@um.si;



Financerja / Financed by:



Projekt SLAIF: Slovenska tovarna umetne inteligence je finančno podprlo Ministrstvo za visoko šolstvo, znanost in inovacije. Projekt je bil na razpisu skupnega podjetja EuroHPC izbran za financiranje v okviru programov Obzorje Evropa ter Digitalna Evropa.

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