



<https://websrv.saske.sk/uef/>

Súčasný stav a plány do budúcnosti gridovej farmy IEPSAS-Kosice

Miloslav Straka

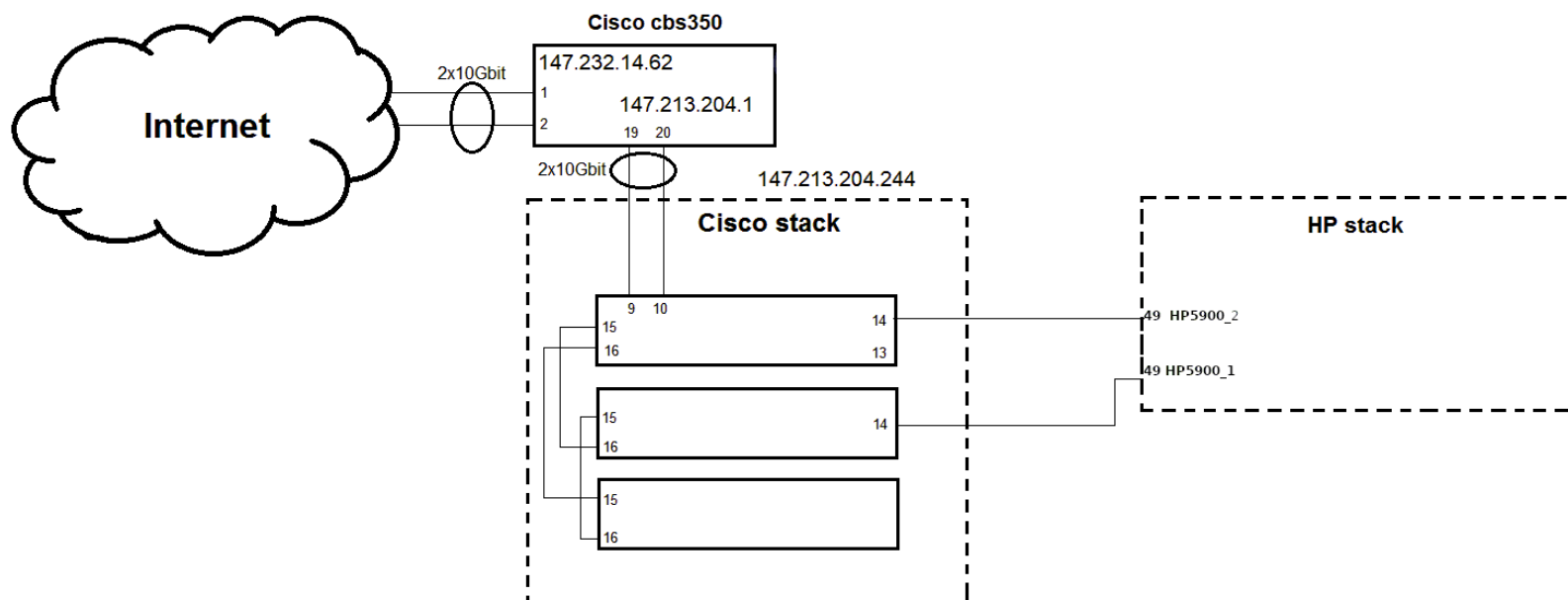
Česko-slovenský ALICE workshop Danišovce 2024

- **Súčasný stav a plán do budúcnosti gridovej farmy IEPASAS-Košice**
 - › Siet'ové rozhranie
 - › Technické a programové vybavenie
 - › Projekty ATLAS , ALICE
 - › Financovanie
 - › Personálne obsadenie
 - › NGI SK

- **Sieťové rozhranie gridovej farmy**
 - Pripojenie gridovej farmy do vonkajšej siete
 - Monitoring sieťového rozhrania

- **Pripojenie gridovej farmy do vonkajšej siete**

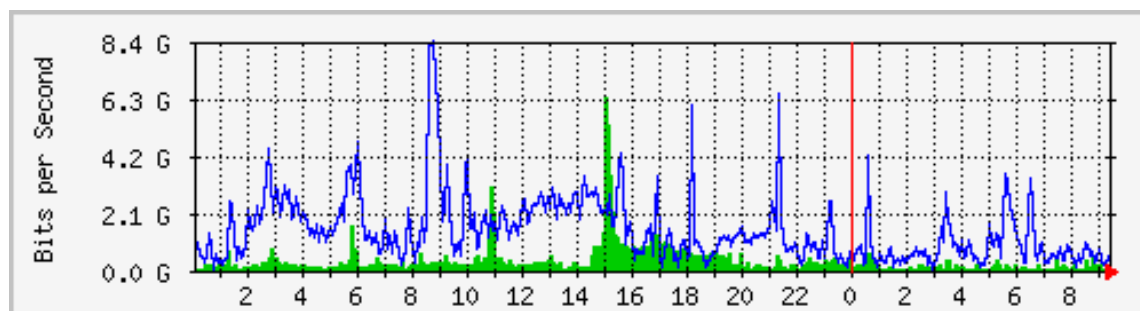
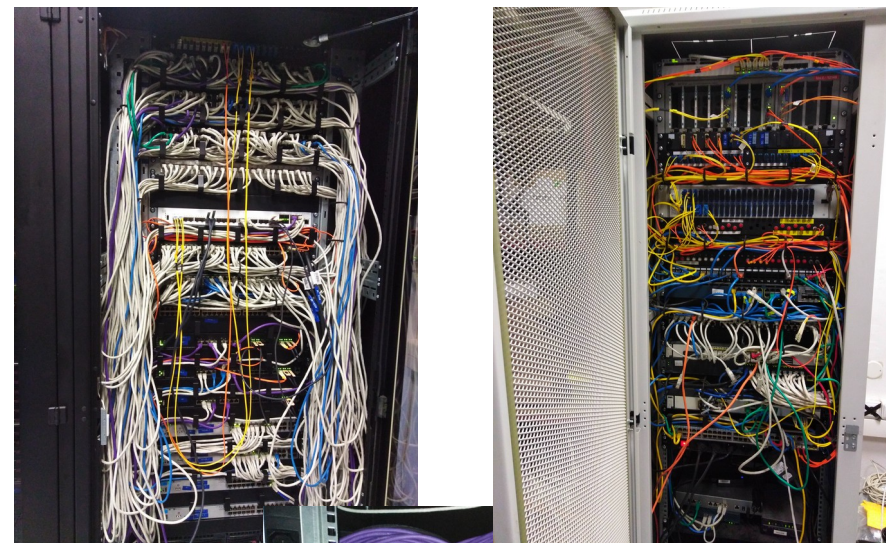
CERN GRID



- **Pripojenie gridovej farmy do vonkajšej siete**



SANET - Slovenská akademická dátová sieť
(Január 2023)



- **Technické a programové vybavenie gridovej farmy**
 - Riešenie a umiestnenie gridovej farmy
 - Technické charakteristiky serverov , worker nódov, diskových polí a sieťových komponentov gridovej farmy
 - Programové vybavenie gridovej farmy

- **Riešenie a umiestnenie gridovej farmy**

Umiestnenie gridovej farmy IEPSAS-Kosice

- *Budova ÚEF SAV Košice , Watsonova 47, Košice*

Technické riešenie gridovej farmy IEPSAS-Kosice

- *Conteg rackové riešenie s cieľným vodným chladením*



- **Riešenie a umiestnenie gridovej farmy**

➤ *Motor generátor Caterpillar Olympia GEP 150 150 kVA/120kW*



• **Technické charakteristiky server, worker nódov, diskových polí a sieťových komponentov gridovej garmy**

- Supermicro riešenia s procesormi Intel Xeon CPUs (E5-2620, E5-2630, E5-2640, E5-2640 v2, E5-2640 v3, E5-2630 v4, E5-2640 v3, Intel(R) Xeon(R) Silver 4209T CPU @ 2.20GHz)
- Upgradnuté chenbro riešenia (šasi) s novým obsahom ... ukončujeme a vyradujeme
- Storage Supermicro riešenia (Symbios Logic MegaRAID SAS 2108 , Areca Technology Corp. ARC-188x series PCIe 2.0/3.0 to SAS/SATA 6/12Gb RAID Controller , 3ware Inc 9650SE SATA-II RAID PCIe, 2 x 10Gb , 4 x 10 Gb, 4 x 1 Gb)
- Sieťové komponenty HP 5900-AF-48G-4XG-2QSFP+, HP2910 aI, CISCO SG550XG-8F8T-16,CBS350-24XS 24-Port 10G SFP+ Stackable Managed Switch



Supermicro Server SYS-6027TR-HTRF+ 2U DP

SBE-414E-422



Supermicro MicroBlade Enclosure MBE-314E-416 4 x 1600W



Supermicro Storage Server SSG6048R-E1CR36N 4U DP

SuperServer 6048R-E1CR24N (Black)




HP 5900-AF-48G-4XG-2QSFP+

CISCO SG550XG-8F8T-16
CBS350-24XS 24-Port 10G SFP+

- **Programové vybavenie gridovej farmy**

Operačný systém : Centos 7 / ALMA 9.3

Computing Element : ARC CE 6 

Batch System : SLURM 23.11.6 

Storage Element : dCache 8.2 (ATLAS) 

EOS 

Monitoring: NAGIOS 4.4.13 , Ganglia 7.2
Nagios

- **Projekty Atlas a Alice**

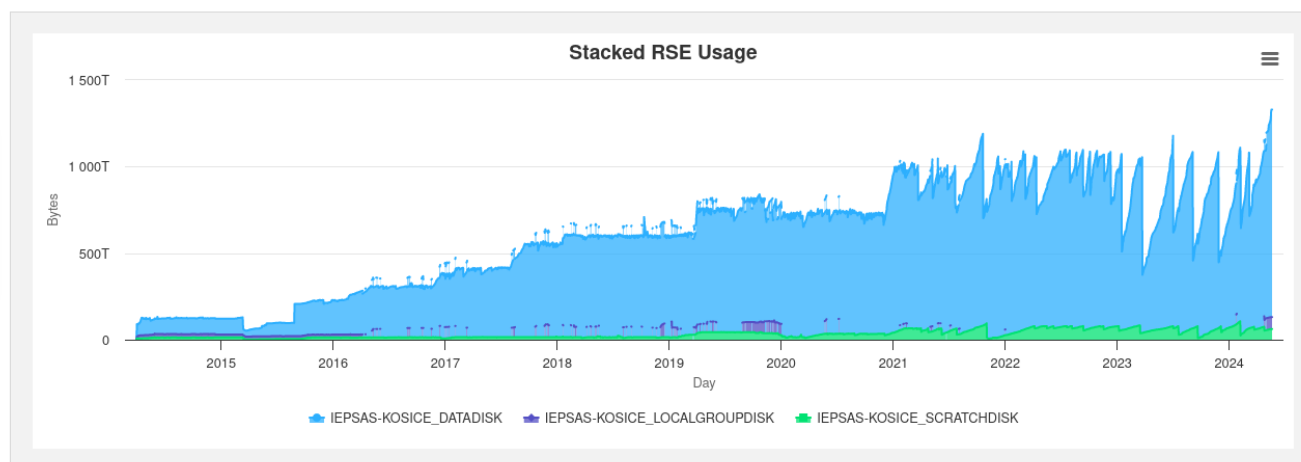
| Poskytované zdroje / 2023 | | | | |
|---------------------------|---------------|-----------|-----------|--------------------|
| | Celkom jadier | RAM/jadro | Disks(PB) | Siet'ové rozhranie |
| IEPSAS-Kosice | 1076 | 4GB | ~3.3 PB | 2x10 Gb WAN |

| SE Name | AliEn SE | | Catalogue statistics | | | | | | Storage-provided information | | | | | |
|-----------------------|-------------------------|------|----------------------|----------|----------|--------|--------------|------|------------------------------|----------|----------|--------|----------------------------|-------------|
| | AliEn name | Tier | Size | Used | Free | Usage | No. of files | Type | Size | Used | Free | Usage | Version | EOS Version |
| 25. Kolkata - EOS2 | ALICE::Kolkata::EOS2 | 2 | 1.124 PB | 579.6 TB | 571.4 TB | 50.35% | 13,066,875 | FILE | 1.124 PB | 1007 TB | 143.4 TB | 87.54% | Xrootd v4.12.8 | |
| 26. Kosice - EOS | ALICE::Kosice::EOS | 2 | 1.874 PB | 1.636 PB | 243.8 TB | 87.29% | 29,907,048 | FILE | 1.874 PB | 1.584 PB | 297.4 TB | 84.5% | | |
| 27. LBL_HPCS - AF_EOS | ALICE::LBL_HPCS::AF_EOS | 2 | 1.101 PB | 64.26 TB | 1.038 PB | 5.7% | 68,148 | FILE | - | - | - | - | Xrootd 5.5.10-1.el8.x86_64 | |

3 of 337 selected

IEPSAS

- [Select all]
- IEPSAS-KOSICE_DATADISK
- IEPSAS-KOSICE_LOCALGROUPDISK
- IEPSAS-KOSICE_SCRATCHDISK



- **Projekty Atlas a Alice**

| Poskytované zdroje / 2023 | | | | |
|---------------------------|---------------|-----------|-----------|--------------------|
| | Celkom jadier | RAM/jadro | Disks(PB) | Siet'ové rozhranie |
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IEPSAS-Kosice Grid > --Choose a Source v

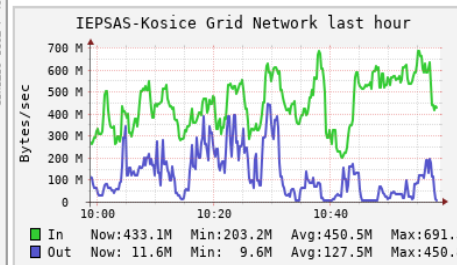
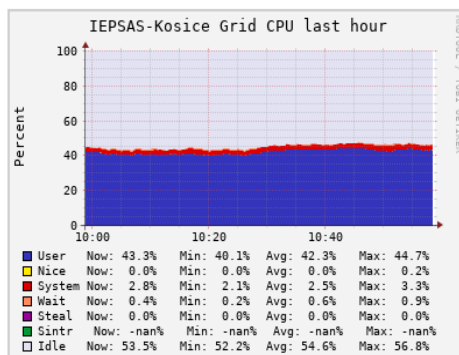
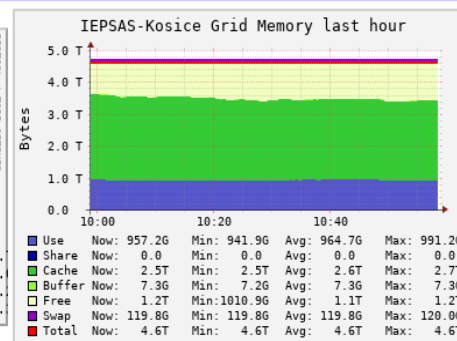
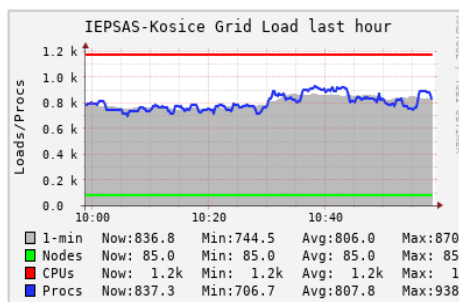
IEPSAS-Kosice Grid (4 sources) (tree view)

CPUs Total: **1182**
 Hosts up: **94**
 Hosts down: **0**

Current Load Avg (15, 5, 1m):
71%, 71%, 71%

Avg Utilization (last hour):
68%

Localtime:
 2023-09-10 08:58



IEPSAS-Kosice Server Nodes (physical view)

- **Projekty Atlas a Alice**

| GOCDB Site: <i>IEPSAS-Kosice</i> | | | | |
|---|------------------------------|------------|-----------|--------------------------------|
| Hostname (service type) | URL | Production | Monitored | Scope Tags |
| ui-iep-grid.saske.sk (UI) | | ✓ | ✓ | alice, atlas, EGI, wlcg |
| se-iep-grid.saske.sk (gLite-APEL) | | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| vobox-iep-grid.saske.sk (VO-box) | | ✓ | ✓ | alice, EGI, tier2, wlcg |
| glmon-iep-grid.saske.sk (Site-BDII) | | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| dcachetest-iep-grid.saske.sk (SRM) | | ✗ | ✗ | alice, atlas, EGI, tier2, wlcg |
| se-iep-grid.saske.sk (SRM) | | ✗ | ✗ | atlas, EGI, tier2, wlcg |
| glmon-iep-grid.saske.sk (gLite-APEL) | | ✗ | ✗ | alice, atlas, EGI, tier2, wlcg |
| perfsonar01-iep-grid.saske.sk (net.perfSONAR.Bandwidth) | | ✗ | ✓ | alice, atlas, EGI, tier2, wlcg |
| squid-iep-grid.saske.sk (org.squid-cache.Squid) | | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| se-iep-grid.saske.sk (eu.egi.storage.accounting) | | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| perfsonar02-iep-grid.saske.sk (net.perfSONAR.Latency) | | ✗ | ✓ | alice, atlas, EGI, tier2, wlcg |
| arc-ce-iep-grid.saske.sk (ARC-CE) | | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| arc-ce-iep-grid.saske.sk (APEL) | | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| arc-ce-iep-grid.saske.sk (gLite-APEL) | | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| se-iep-grid.saske.sk (webdav) | https://se-iep- | ✓ | ✓ | atlas, EGI, tier2, wlcg |
| se-iep-grid.saske.sk (XRootD) | root://se-iep- | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| test-arc-ce-iep-grid.saske.sk (gLite-APEL) | | ✗ | ✗ | alice, atlas, EGI, tier2, wlcg |
| se-iep-grid.saske.sk (eu.egi.storage.accounting) | https://se-iep-grid.saske.sk | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| test-arc-ce-iep-grid.saske.sk (ARC-CE) | | ✗ | ✗ | alice, atlas, EGI, tier2, wlcg |
| test-arc-ce-iep-grid.saske.sk (APEL) | | ✗ | ✗ | alice, atlas, EGI, tier2, wlcg |
| perfsonar04-iep-grid.saske.sk (net.perfSONAR.Latency) | | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |
| perfsona03-iep-grid.saske.sk (net.perfSONAR.Bandwidth) | | ✓ | ✓ | alice, atlas, EGI, tier2, wlcg |

- **Projekty Atlas a Alice**

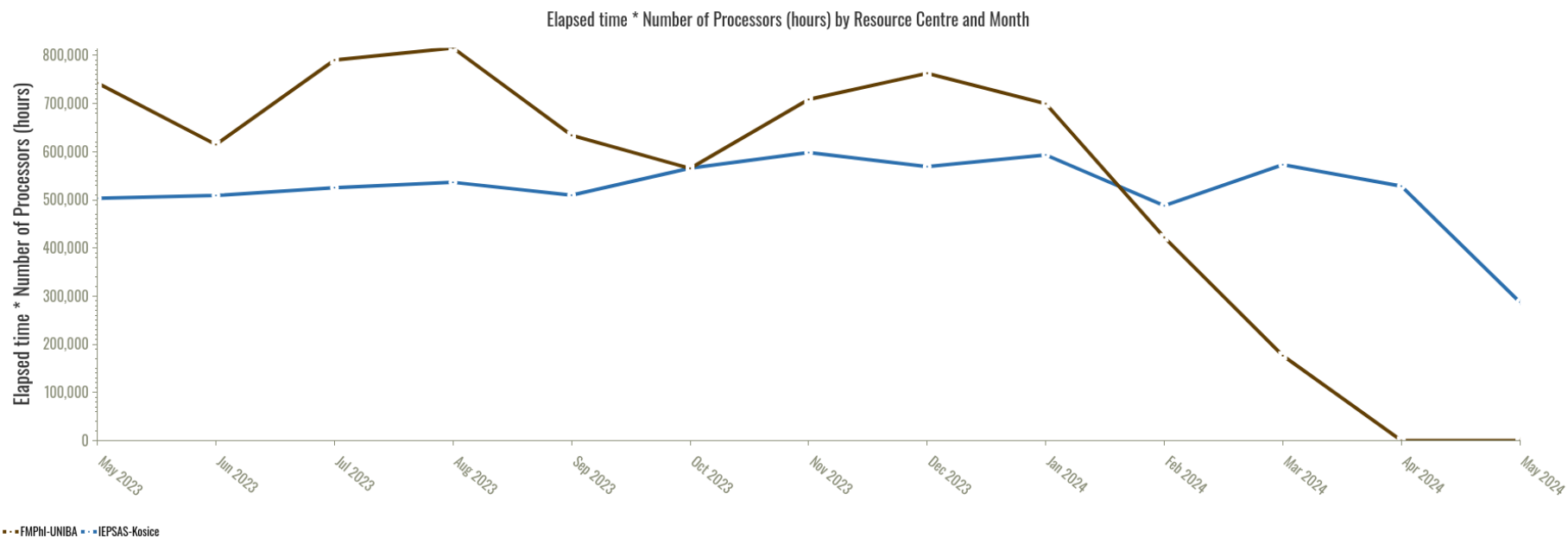
NGI_SK — Elapsed time * Number of Processors (hours) by Resource Centre and Month (Official VO)

| Resource Centre | May 2023 | Jun 2023 | Jul 2023 | Aug 2023 | Sep 2023 | Oct 2023 | Nov 2023 | Dec 2023 | Jan 2024 | Feb 2024 | Mar 2024 | Apr 2024 |
|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------|----------------|----------------|
| FMPH-UNIBA | 742,599 | 614,819 | 790,271 | 815,448 | 634,040 | 565,386 | 708,539 | 762,957 | 699,818 | 421,939 | 176,385 | 0 |
| IEPSAS-Kosice | 503,046 | 509,020 | 525,238 | 536,328 | 509,661 | 565,875 | 598,083 | 568,991 | 593,392 | 487,828 | 572,975 | 528,461 |
| Total | 1,245,645 | 1,123,839 | 1,315,509 | 1,351,777 | 1,143,701 | 1,131,261 | 1,306,623 | 1,331,948 | 1,293,210 | 909,768 | 749,360 | 528,461 |
| Percent | 9.08% | 8.19% | 9.59% | 9.85% | 8.34% | 8.25% | 9.52% | 9.71% | 9.43% | 6.63% | 5.46% | 3.85% |

1 - 2 of 2 results < 1 > Number of rows per page 30

[Download JSON Data](#) / [Download CSV Data](#)

The information in the previous table is also shown in the following graph.



- **Projekty Atlas a Alice**

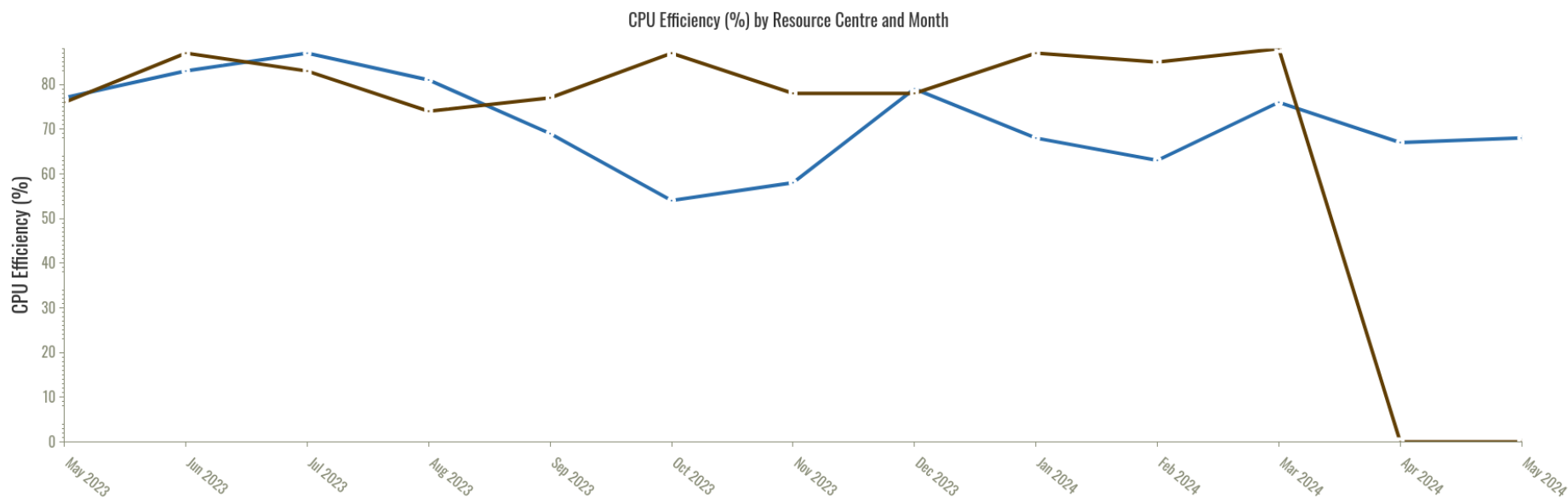
NGI_SK — CPU Efficiency (%) by Resource Centre and Month (Official VOs)

| Resource Centre | May 2023 | Jun 2023 | Jul 2023 | Aug 2023 | Sep 2023 | Oct 2023 | Nov 2023 | Dec 2023 | Jan 2024 | Feb 2024 | Mar 2024 | Apr 2024 |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| FMPHI-UNIBA | 76.72% | 87.63% | 83.5% | 74.66% | 77.72% | 87.65% | 78.17% | 78.07% | 87.7% | 85.26% | 88.08% | 0% |
| IEPSAS-Kosice | 77.02% | 83.32% | 87.47% | 81.15% | 69.14% | 54.96% | 58.31% | 79.59% | 68.1% | 63.81% | 76.62% | 67.86% |
| Total | 76.86% | 85.39% | 85.35% | 77.65% | 73.33% | 69.16% | 67.77% | 78.82% | 77.41% | 72.37% | 78.81% | 67.86% |

1 - 2 of 2 results Number of rows per page: 30

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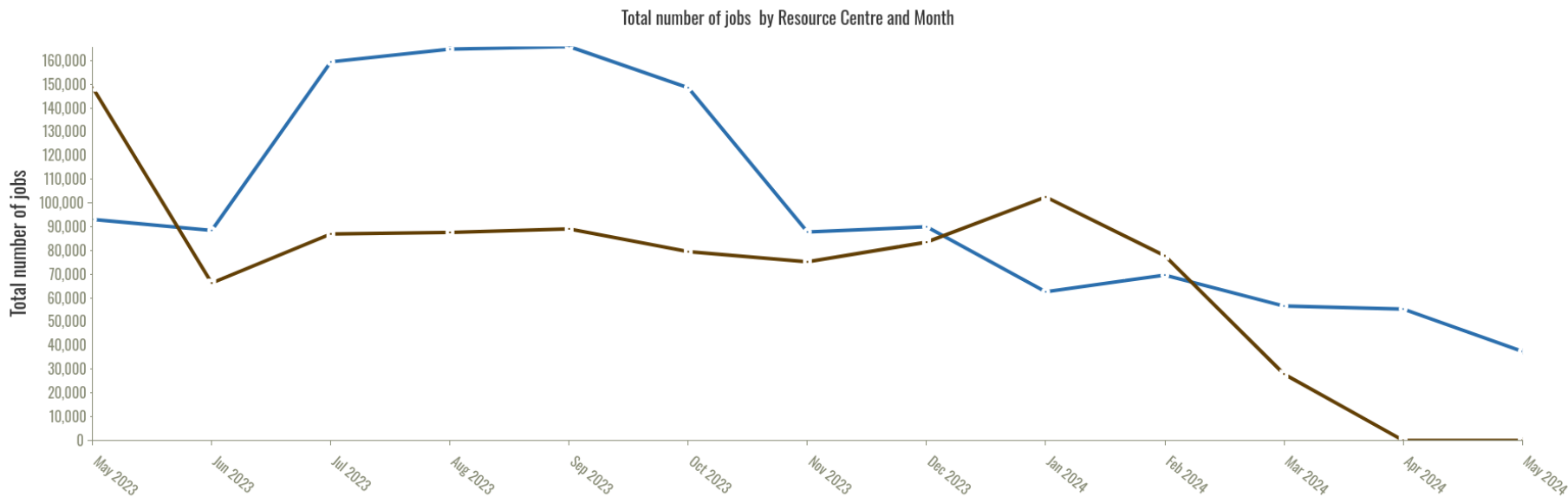
NGI_SK — Total number of jobs by Resource Centre and Month (Official VOs)

| Resource Centre | May 2023 | Jun 2023 | Jul 2023 | Aug 2023 | Sep 2023 | Oct 2023 | Nov 2023 | Dec 2023 | Jan 2024 | Feb 2024 | Mar 2024 | Apr 2024 |
|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|---------------|
| FMPH-UNIBA | 148,758 | 66,278 | 86,985 | 87,629 | 89,122 | 79,504 | 75,206 | 83,513 | 102,556 | 77,775 | 27,954 | 0 |
| IEPSAS-Kosice | 93,128 | 88,448 | 159,481 | 164,809 | 165,938 | 148,581 | 87,806 | 89,991 | 62,573 | 69,659 | 56,596 | 55,367 |
| Total | 241,886 | 154,726 | 246,466 | 252,438 | 255,060 | 228,085 | 163,012 | 173,504 | 165,129 | 147,434 | 84,550 | 55,367 |
| Percent | 10.97% | 7.02% | 11.18% | 11.45% | 11.57% | 10.34% | 7.39% | 7.87% | 7.49% | 6.69% | 3.83% | 2.51% |

1 - 2 of 2 results < 1 > Number of rows per page 30

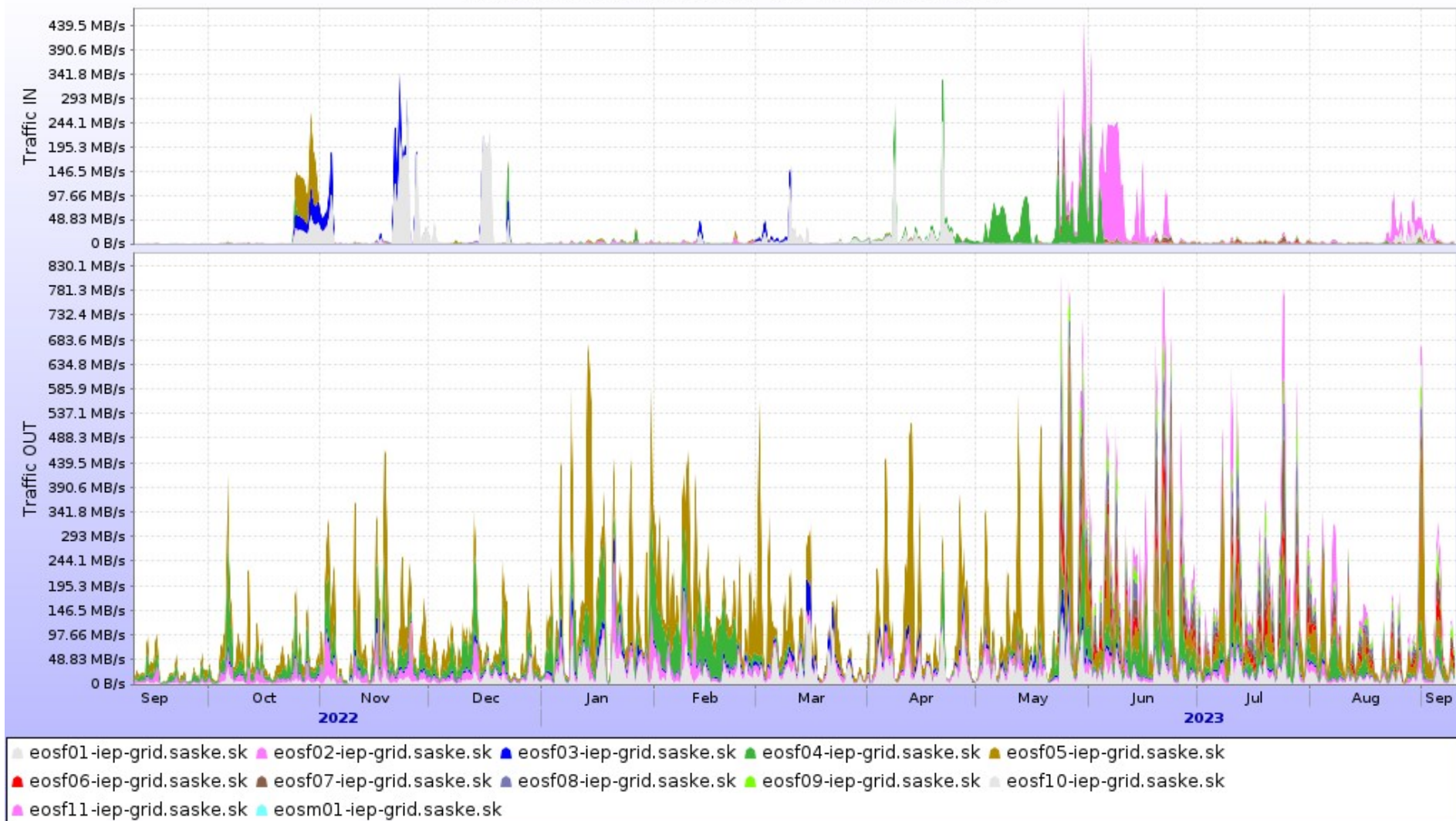
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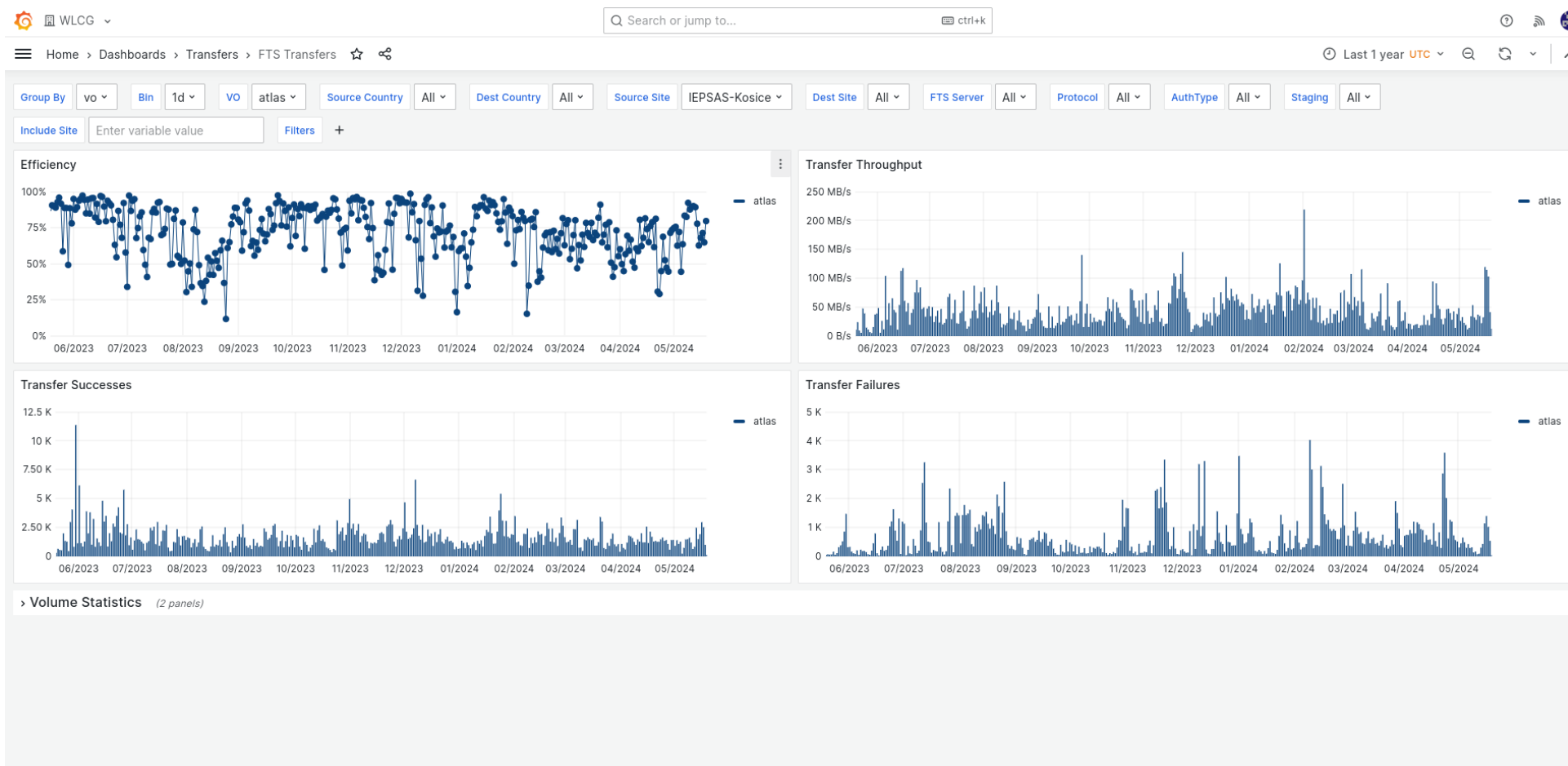


- **Projekty Atlas a Alice**

Network traffic on ALICE::Kosice::EOS



- **Projekty Atlas a Alice**



Financovanie a personálne obsadenie

- Financovanie so zdrojov Ministerstva školstva, vedy, výskumu a športu Slovenskej republiky z rovnakých zdrojov z akých je financovaná naša účasť v Cerne a v LHC experimentoch
- Peronálne obsadenie IEPSAS 2.0 FTE (dve osoby) plus podpora z CITKE
- Financovanie zamestnancov je zabezpečené zo zdrojov ÚEF SAV Košice , nie z centrálnych zdrojov



| cej energie - serverovňa (bez CITKE) | | | | | | | | | | | | | |
|--------------------------------------|------|------------------|--------------|-------|------------------|--------------|--------|------------------|--------------|-------|------------------|--------------|------------|
| Rok | I.Q. | | | II.Q. | | | III.Q. | | | IV.Q. | | | cena spolu |
| | kWh | € cena za kWh | € Dotácia | kWh | € cena za kWh | € Dotácia | kWh | € cena za kWh | € Dotácia | kWh | € cena za kWh | € Dotácia | |
| 2019 | ### | 0.16 | | ### | 0.16 | | ### | 0.19 | | ### | 0.19 | | 49764.08 |
| 2020 | ### | 0.22 | | ### | 0.21 | | ### | 0.19 | | ### | 0.20 | | 57812.50 |
| 2021 | ### | 0.21 | | ### | 0.20 | | ### | 0.20 | | ### | 0.28 | | 62526.11 |
| 2022 | ### | 0.40 | | ### | 0.48 | | ### | 0.49 | | ### | 0.62 | | 124747.04 |
| 2023 | ### | 0.65 | ### | ### | 0.55 | | | | | | | | 57456.35 |

Ďakujem za pozornosť