universität freiburg

AUDITOR
CO2 Accounting of WLCG jobs

Michael Boehler

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Physikalisches Institut
Albert-Ludwigs-Universität Freiburg

AUDITOR Utilisation plugin

Prototype

```
{
   "logging": {
      "level": "INFO",
      "file": "app.log"
   },
   "auditor": {
      "hosts": [ "con1.bfg.uni-freiburg.de",
                 "con2.bfg.uni-freiburg.de"],
      "port": [ ..,.. ],
      "timeout": 60
   },
   "utilisation": {
      "groupedby"    : “VOMS",
      "grouped_list" :["production",
                       "lcgadmin",
                       “ops"],
      "site"         : "bfg"
      "watt_per_core": 4.6,
      "co2_per_kwh"  : 0.363,
      "interval"     : 7
   }
}
```

Input data per Job

```
,Cores,HEPscore23,RequestedMemory,UsedMemory,TotalCPU,DiskUsage,
BytesIn,BytesOut,CPUUsage,TardisDroneUUID,VOMS,site,…

0,1,18.4,3000,2569928,15628,135508,3566520,2002798,1.12244981647352,bfg,…
1,1,18.4,3000,2554244,17331,135111,3566515,2193363,1.201517322489823,bfg,…
2,1,18.4,3000,2535532,15923,135084,3566520,2028474,1.204714012954894,bfg,…
```

Output of prototype

```
Start: 2025-11-24 17:52:11

Retrieving data from host:  con1.bfg.uni-freiburg.de
Total Number of Records 120312 in last 7 days

Retrieving data from host:  con2.bfg.uni-freiburg.de
Total Number of Records 118579 in last 7 days

Storing data in file test.csv...
         user        khs23h   cpu_eff    corehours   power [kWh]     co2 [kg]
0  production  70966.632967  0.906273  3346.514036  14729.903408  5346.954937
1         ops      2.309578  0.967796     0.125521      0.577395     0.209594
2    lcgadmin      0.943710  0.231284     0.051289      0.235928     0.085642
```

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   "logging": {
      "level": "INFO",
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   "utilisation": {
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      "grouped_list" :["production",
                       "lcgadmin",
                       “ops"],
      "site"         : "bfg"
      "watt_per_core": 4.6,
      "co2_per_kwh"  : 0.363,
      "interval"     : 7
   }
}
```

- **Do we need more details:**

```
site:["bfg"]:{
  "node[01-296]"  : {"watt_per_core": 4.6}
  "node[297-512]" : {"watt_per_core": 7.6}
}
```

Input data per Job

```
,Cores,HEPscore23,RequestedMemory,UsedMemory,TotalCPU,DiskUsage,
BytesIn,BytesOut,CPUUsage,TardisDroneUUID,VOMS,site,…

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Output of prototype

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```

References

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Website: https://alu-schumacher.github.io/AUDITOR/

GitHub: https://github.com/ALU-Schumacher/AUDITOR

FIDIUM: https://fidium.erumdatahub.de

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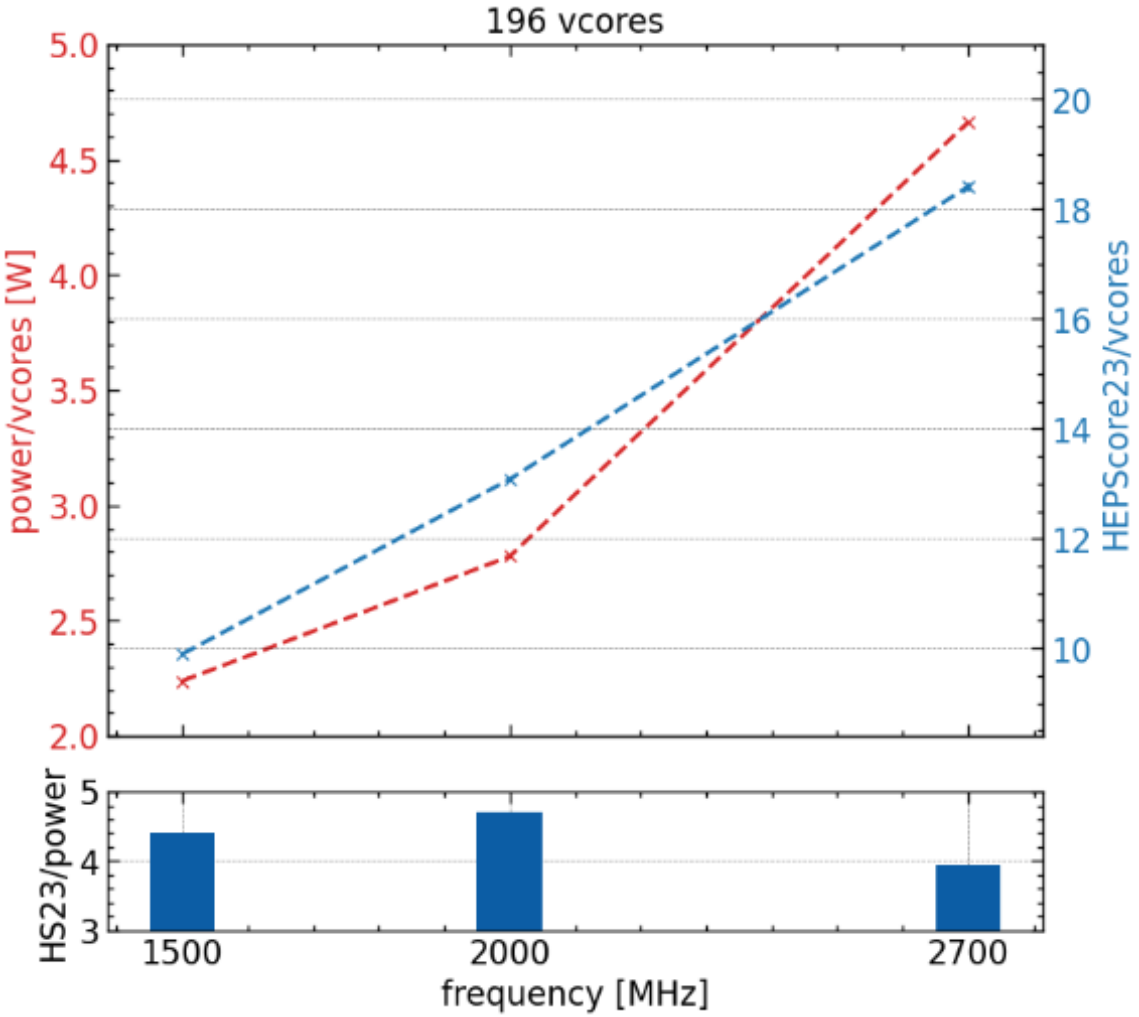
Reduce Peak Energy Consumption by Throttling CPU frequency

Accounting with AUDITOR



Latest CPU generation @ BFG in Freiburg

- high WP: 2.7 GHz, (18.4 hs23/vCore)
- low WP 2.0 GHz (13.4 hs32/vCore) or 1.5 GHZ (10 hs23/vCore)