

# Introduction to HPC Systems: Login and Environmental Setup



- A linux based operating system
  - Virtual Machines could work
    - Problems could occur due to incorrect settings
    - Can be slow
  - Mac is also ok
    - When you encounter an error, you should ask Google as most of us dont use mac.
  - Linux distro suggestions:
    - Mint
    - Ubuntu
    - Manjaro
    - Pop! OS

- Good knowledge of C/C++ or Fortran
  - In Lab, we will use C
- Understanding of computer memory
- Understanding of HPC networks



“High-Performance Computing, or HPC, is the application of supercomputers to computational problems that are either too large for standard computers or would take too long”

*National Institute for Computational Sciences*

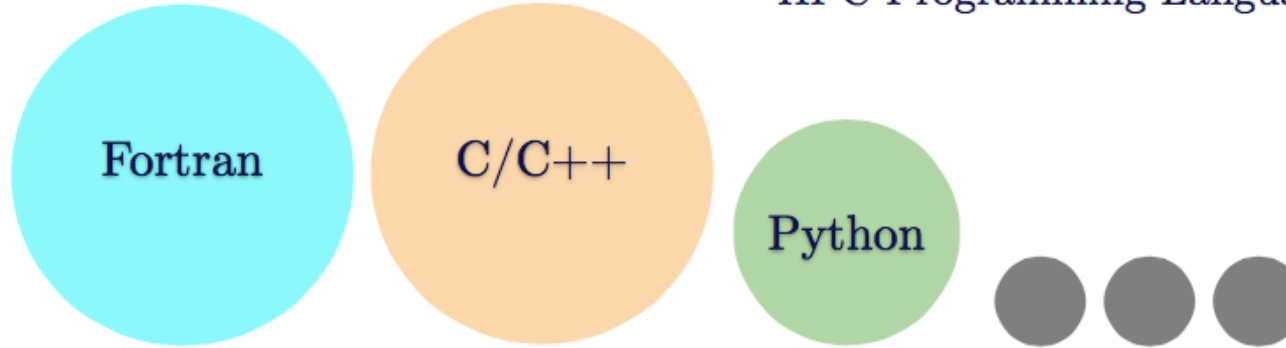


# HPC is everywhere

- Medicine
- Climatology
- Economic
- Materials
- Cosmology
- ...



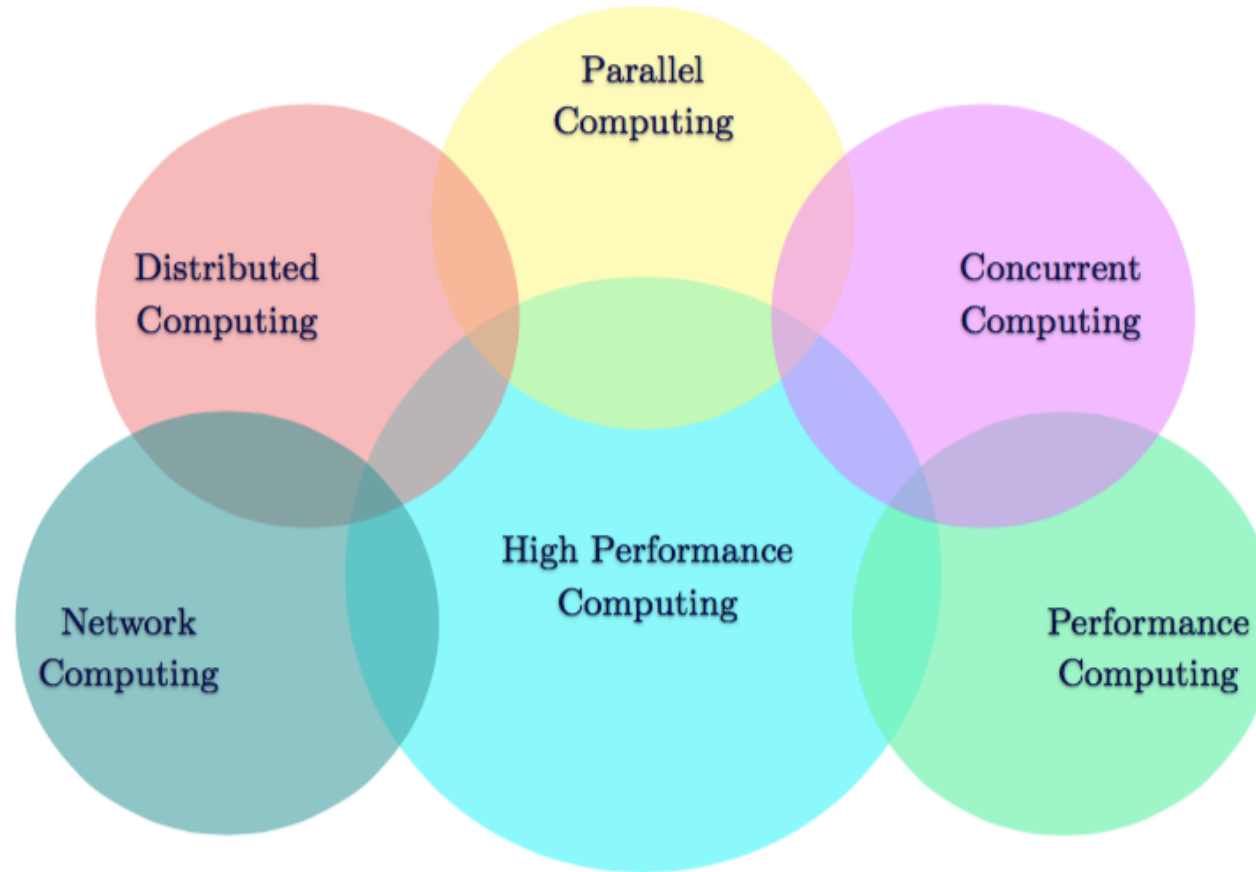
## HPC Programming Languages



Newcomers: Julia -> <https://julialang.org/>

Go -> <http://golang.org.tr/>

# HPC visual definition



- UHeM

- <https://www.uhem.itu.edu.tr/>



- TrGrid (Truba)

- <https://www.truba.gov.tr/>





- UHeM

- <https://www.uhem.itu.edu.tr/>

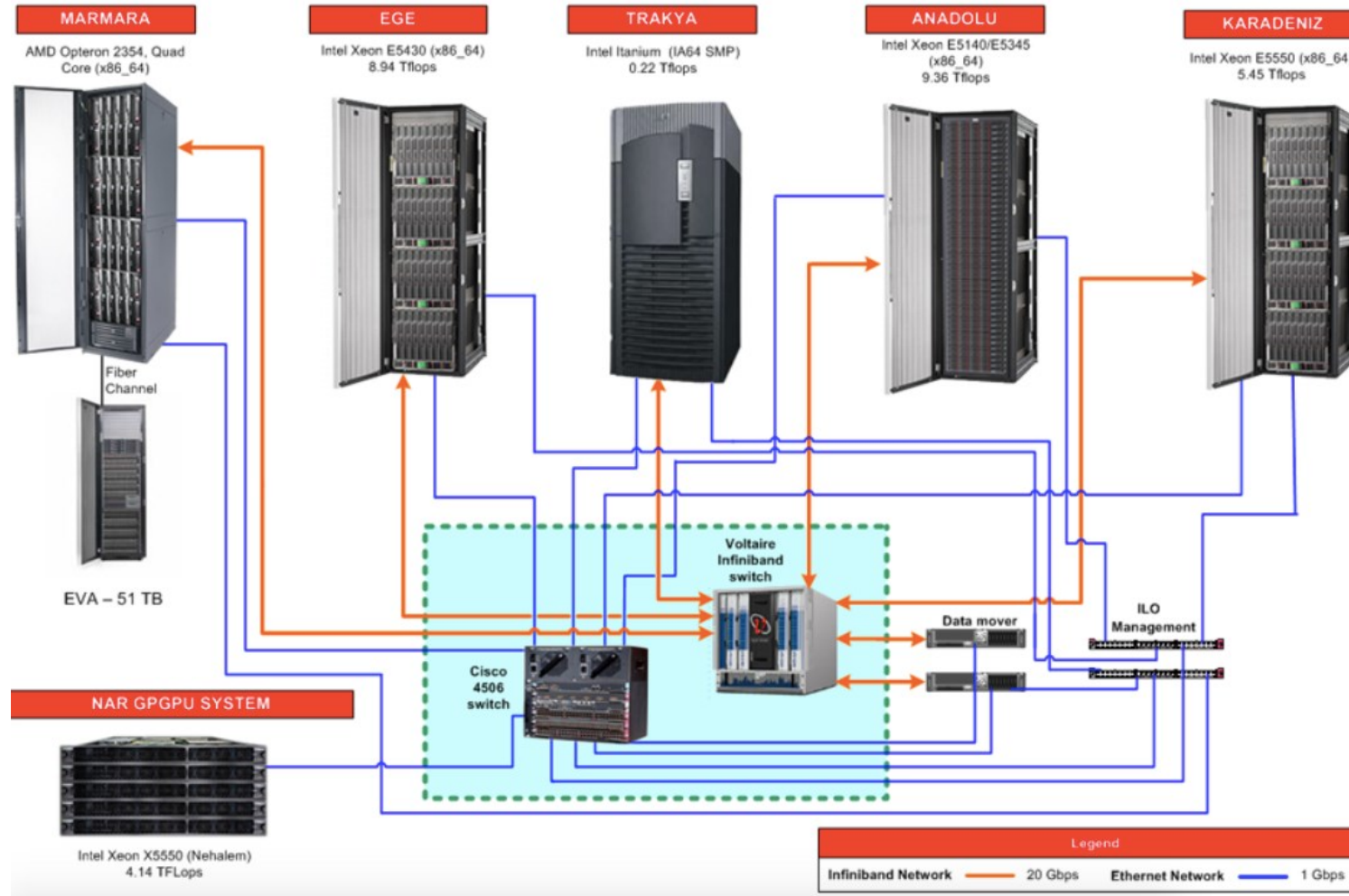


*Ulusal Yüksek Başarımlı Hesaplama Merkezi*

- 2004: Project approval by State Planning Organization (DPT)
- 2006: HPC services started. 353rd in Top 500 with the 1st phase server system of 3.28 Tflops.
- 2007: 240th in Top 500 with a system upgrade: 6.067 TFlops Rmax
- 2008: Participation to PRACE
- 2009: Service structuring and system upgrades
- 2010: PRACE First Implementation Phase
- Intel v3,v4 and v5 machines (2010-2020)



# HPC System Topology (ex. Old UHeM Structure)



## Technical Specifications of Sariyer Server



Server name	SARIYER
Processor	Intel Xeon Gold 6148 v5, Intel Xeon E5-2680 v4, Intel Xeon E5-2680 v3
Number of compute nodes	35 (Gold 6148) + 93 (v4) + 15 (v3)
Number of compute cores	4364
Memory amount of compute node	192 GB (35 node), 64 GB (15 node), 128 GB (83 node), 512 GB( 10 node)
High performance network	InfiniBand FDR 56 Gbps / EDR 100 Gbps
File system	Lustre, 349 TB
Operating system	CentOS 7 x86_64



# How to login

- On Ubuntu and Debian based operating systems (e.g. Mint, Pop! OS,Mx):  
`sudo apt install vpnc`
- On Arch based systems (e.g. Manjaro):  
`sudo pacman -S vpnc`
- On RHEL based systems (e.g. Fedora,Centos):  
`sudo yum install vpnc`
- Other operating systems → Search Google :)



# Creating configuration file

```
sudo vim /etc/vpnc/uhem.conf
```

```
IPSec gateway 160.75.120.250
```

```
IPSec ID UYBHM-Users
```

```
IPSec secret ZYYV3J95
```

```
Xauth username your_username
```

```
Xauth password your_password
```



# Establishing connection

Just write: `sudo vpnc uhem`

```
[mulo@bomba ~]$ sudo vpnc uhem
[sudo] password for mulo:
VPNC started in background (pid: 6785)...
[mulo@bomba ~]$
```

Then ssh with: `ssh -l your_username sariyer.uhem.itu.edu.tr`

```
kirpi@kirpi:~$ ssh -l hbm51301 sariyer.uhem.itu.edu.tr
hbm51301@sariyer.uhem.itu.edu.tr's password:
Last login: Wed Oct  9 13:47:35 2019 from 10.1.0.242
```

KUYRUK ADI	ISLEMCİ BOS	ISLEMCİ TUMU	KAYNAK BEKLYEN	DİĞER BEKLYEN	MAKİNA BOS	MAKİNA TUMU	ENFAZLA-SURE GUN-SA:DK:SN	EN-AZ MAKNA	EN-COK MAKİNA	ISLEMCİ /MAKİNA	HAFİZA (GB)
defq	588	2408	0	0	21	86	7-00:00:00	1	-	28	126
shortq	616	2576	0	0	22	92	01:00:00	1	2	28	126
longq	0	336	240	0	0	14	21-00:00:00	1	-	24	62
gpuq	28	112	0	0	1	4	7-00:00:00	1	-	28	126
bigmemq	84	280	0	0	3	10	7-00:00:00	1	-	28	510
b224q	616	2520	0	0	22	90	1-00:00:00	8	40	28	126
hbm513q	532	2212	0	0	19	79	00:15:00	1	10	28	126
core40q	160	1400	360	0	4	35	7-00:00:00	1	-	40	190
all	776	4312	0	0	26	141	1-00:00:00	1	-	40	62

QUEUE NAME	FREE CORES	TOTAL CORES	RESOURC WAITING	OTHER WAITING	FREE NODES	TOTAL NODES	MAX-JOB-TIME DAY-HR:MN:SC	MIN NODES	MAX NODES	CORES PERNODE	MEMORY (GB)
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Bu cikti bosmakinalar (snodes) komutu ile olusturulmaktadir.  
DİĞER BEKLYEN sutunu lisans gibi diger sebeblerle bekleyen isleri gosterir.  
**anket** komutuyla dusuncelerinizi bize iletebilirsiniz.

- When you establish connection for the first time please change your password with passwd command
- Also please protect your run space folder with chmod 700

```
[hbm51301@sariyer ~]$ pwd
/okyanus/users/hbm51301
[hbm51301@sariyer ~]$ cd ..
[hbm51301@sariyer users]$ chmod -R 700 hbm51301
```

- If you want to disconnect from uhem vpn: sudo vpnc-disconnect



# That's all

If you encounter a problem, first SEARCH GOOGLE.

If you can't solve the problem by yourself, ask to your classmates first.

Still can't solve your problems?

You can send an email with detailed explanation of your problem to

Samet Demir: [sametdemir@gmail.com](mailto:sametdemir@gmail.com)

Gözde İniş Demir: [gozdeinis90@gmail.com](mailto:gozdeinis90@gmail.com)

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