WBU has 3 server rooms: UI420 UL011 UL008 + Cheb

What is inside:

- **RACKS with:**
  - **Computers**
  - **Data storages - disk arrays (RAID)**
  - **Network device**
- **Power supply**
- **Air conditioning**
- **Fire protection system**

RACKS

- **UNITs (2-UNIT) in drawers**
- **Central device for graphical output – monitr/LCD, can switch from one to another unit**
  - **CTRL + CTRL + wait…**
- **SAFETY**
- **REDUNDANCY - data backups**
  - **To another geographical location (Cheb)**

Computers

- **Lot of systems**
  - **Study**
    - **IS/STAG**
      - **Since 1993, commercial systém, 15 schools 100 thousands users… Gabrielas and my „work“**
        - **DEVELOPMENT / TEST / PRODUCTION**
        - **OUTSOURCING for smaller schools**
  - **Economical / Safety / Databases**
    - **Oracle – STAG**
    - **Cca 250 GB Data**
      - **50 GB DB management + 50 GB (no VŠKP) + 150 GB VŠKP**
- **Email ----- SHOW IMAGE / CLEAR / SPAM rate**
- **SHOW HOW THE UNIT LOOKS LIKE…**

Data storage

- **ARRAYs – RAID**
- **Half of the array is in ui420 seccond half is in ul008**
- **Connected by fibre chanels (24 threads)**
- **Mirrors or copies**
- **Capacity 2x (40T fast disks + 70T slow disks)**
    - **Fast disk means: ~40.000 KKC**
- **Backup**
    - **Big slow disks, cca 750T**
    - **daily / monthly**
    - **To another geographical location (Cheb)**

Network devices

- **Switeches**
- **Bridges**
- **Firewall**
- **data/flow analyzers**
- **VPN Concentrators**
- **Wireless LAN controllers**
- **Wavelength-division multiplexing devices**

In fiber-optic communications, wavelength-division multiplexing (WDM) is a technology which multiplexes a number of optical carrier signals onto a single optical fiber by using different wavelengths (i.e., colors) of laser light. This technique enables bidirectional communications over one strand of fiber, as well as multiplication of capacity.

There are about almost 800 APs spread in the university locations and areas

Conectivity – high, with full backup redundancy for backbone routes and important systems

POWER SUPPLY

- **Energy center has own diesel aggregates with batteries, powered by 2 branches of the electrical network**
- **installed power input about 57KW (without air conditioning)**
    - **SHOW COUNTERS – two branches + heat exchangers**
- **Backup – diesel engine (smaller train locomotive)**
    - **up to 1000 l of diesel**
    - **200l / h consumption**
    - **VERY LOUD!**
- **The batteries have the task of keeping the server room energized until the backup diesel engine starts (within 2min).**
- **In case of bigger blackout, all systems should be switched off gracefully, otherwise it is not an easy task to bring everything back to safe normal production state – especially the order of switching off is important.**

AIR CONDITIONING

- **We take the cold from the energy center (the building between UF and NTIS)**
- **Cold means – COLD WATER**
- **Down-flow air conditioning - this type of air conditioning unit draws the air into the top of the air handling unit, cools the air over the heat exchanger, then distributes the air out of the bottom into the floor void.**
- **The units contain filters (replacing about once a year) and also regulate room humidity.**

FIRE SYSTEM

- **when the alarm is triggered for a short time (about 20-30sec) to leave the room, otherwise it is necessary to wait in the room for extinguishing and cooling the fire (minimum 30min)**
- **red bombs are sized (in each room different number) just enough to force the air out of the room and thus the level of oxygen drops so that the fire is no longer burned, so the room can not be opened after extinguishing**
- **the bombs are gradually released into the room by the metal pipeline, the next bomb will always be dropped if the pressure in the previous, the first bomb unlocks the "patron" controlled by the autonomous extinguishing system**
- **in bombs is a mixture of gas (INERGEN), which allows the person to survive - it accelerates the pulse and breathing, it is similar to being at very high altitude, the consequences are then headache, malaise, ...**
- **Of course, the bomb can not displace all the oxygen, but it pushes it out so that the fire does not has oxygen enough for further burning (it will suffocate) but man is able to survive**
- **the sensors are located on the ceiling and under the floor and**
- **there are two evaluation systems (classical sensors + continuous air intake and its evaluation, see plastic pipe) to initiate firefighting, a fire notification must be received by at least two sensors (due to possible malfunctions)**
- **the price of one bomb is about 10.000, - CZK**

INERGEN® is a mixture of inert atmospheric gases containing

- **52% Nitrogen**
- **40% Argon**
- **8% carbon dioxide.**

INERGEN uses a fire extinguishing principle called oxygen replacement, that is, the principle of lowering the oxygen level in the protected room to reduce the fire. The additives in the INERGEN internal extinguisher, ie nitrogen and argon, serve to compensate for the weight of carbon dioxide and thus prevent its escape from the protected room.

The INERGEN fire extinguisher also has a three-dimensional (3D) fire-extinguishing effect, which means it also reaches places where water fire extinguishing systems do not get.

8% carbon dioxide in inert extinguisher INERGEN has a special function for the human body as it increases the amount of blood pumped. The result is a situation where the human body gets the same oxygen despite the reduced oxygen level in the room from normal 20.9% to 15%.

INERGEN is composed of substances that are free of nature and therefore INERGEN has no negative impact on the ozone layer nor the health of people who have inhale the INERGEN extinguisher at the anticipated concentration.

- **after release does not damage the environment**
- **ensures a clean extinguishment of the fire without consequential damage**
- **is almost non-conductive (nevodivy)**
- **reduces air humidity**
- **temperature drop by max. 5 ° C**
- **Water vapor condensation does not occur during draining**
- **fire poisoning does not elicit poisonous compounds**
- **it is a little heavier than air and therefore remains in a closed space after it is released**
- **Inert gas eliminates corrosive effects**
- **after the launch, there is normal visibility in the space**