



# ICALEPCS2017

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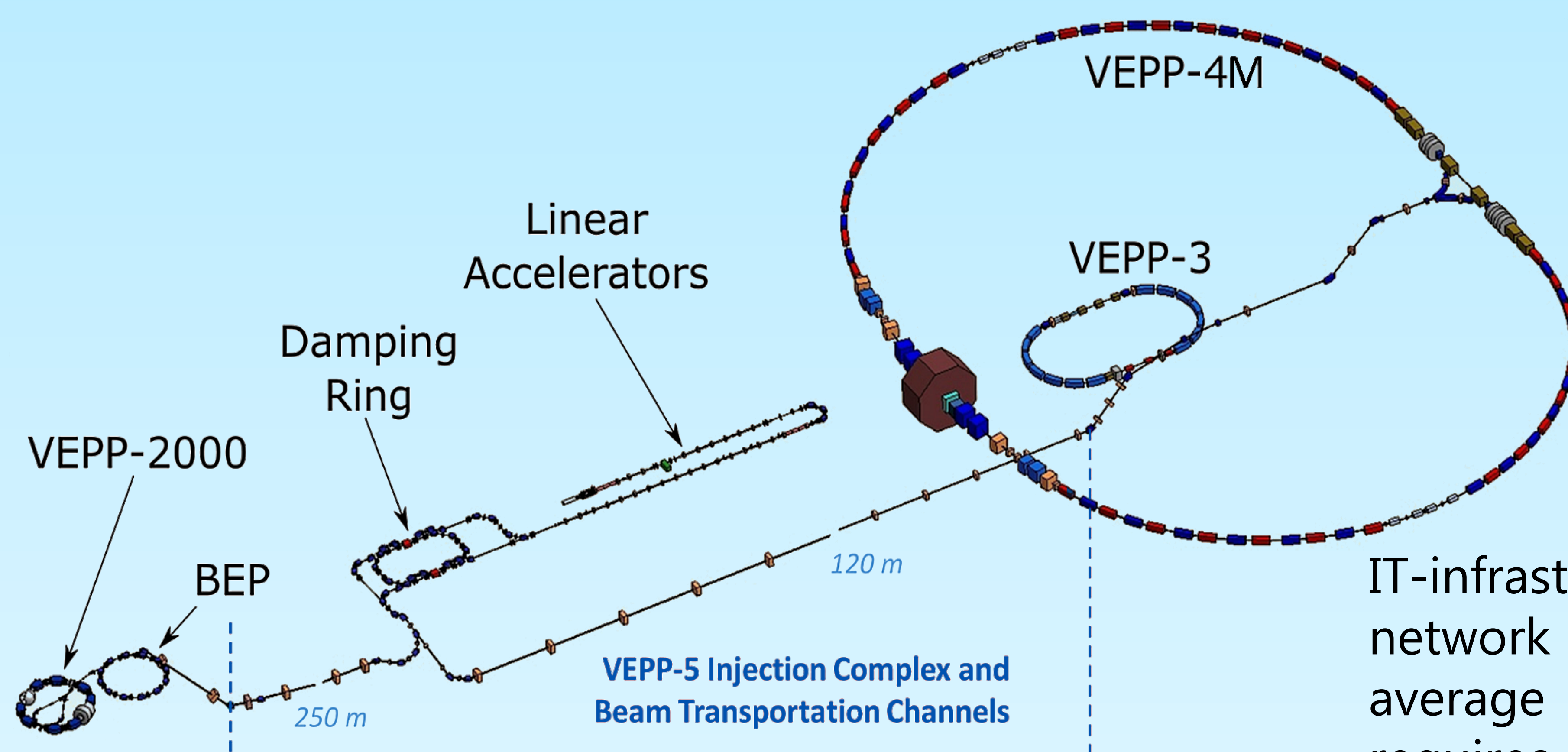


BUDKER INSTITUTE OF NUCLEAR PHYSICS

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## NEW IT-INFRASTRUCTURE OF ACCELERATORS AT BINP



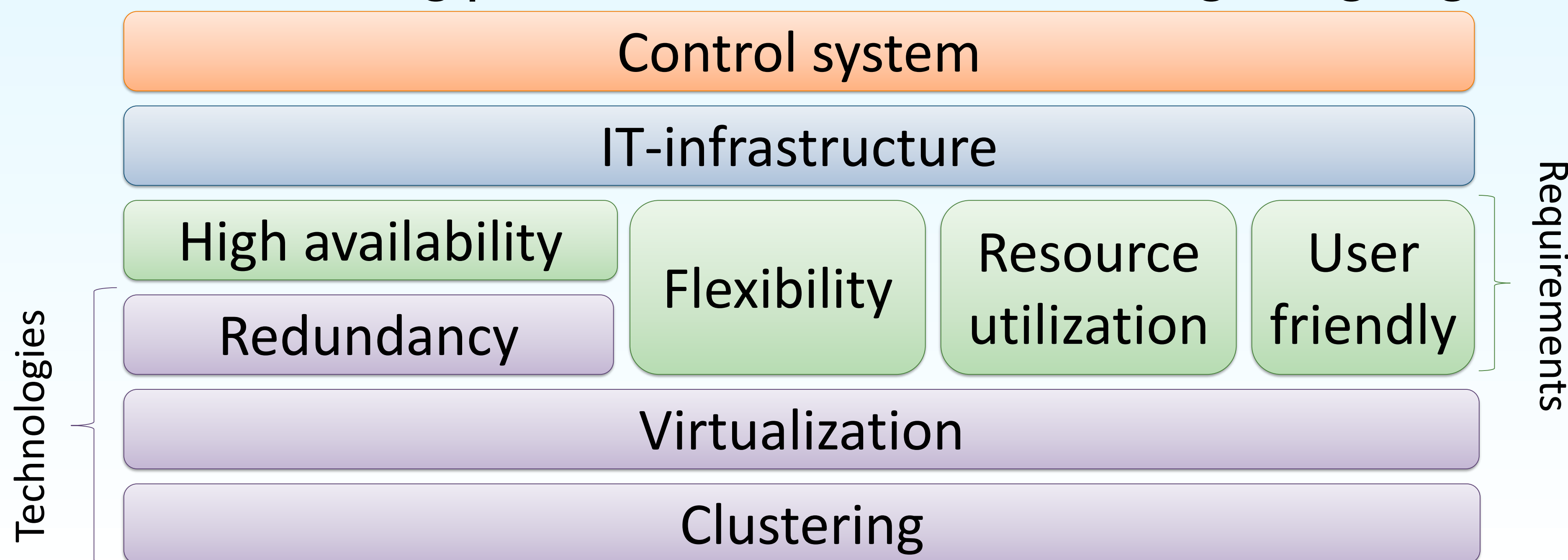
Two BINP colliders **VEPP-4M** and **VEPP-2000** were commissioned with feeding from **VEPP-5 Injection Complex** in 2016/2017. In order to ensure continuous operation it was proposed to create highly available IT-infrastructure for both colliders and Injection Complex.

IT-infrastructure for accelerators consist of servers, network equipment, UPS and system software with average operation life cycle about 10 - 20 years. It requires support and periodical upgrade.

Since all facilities have similar requirements

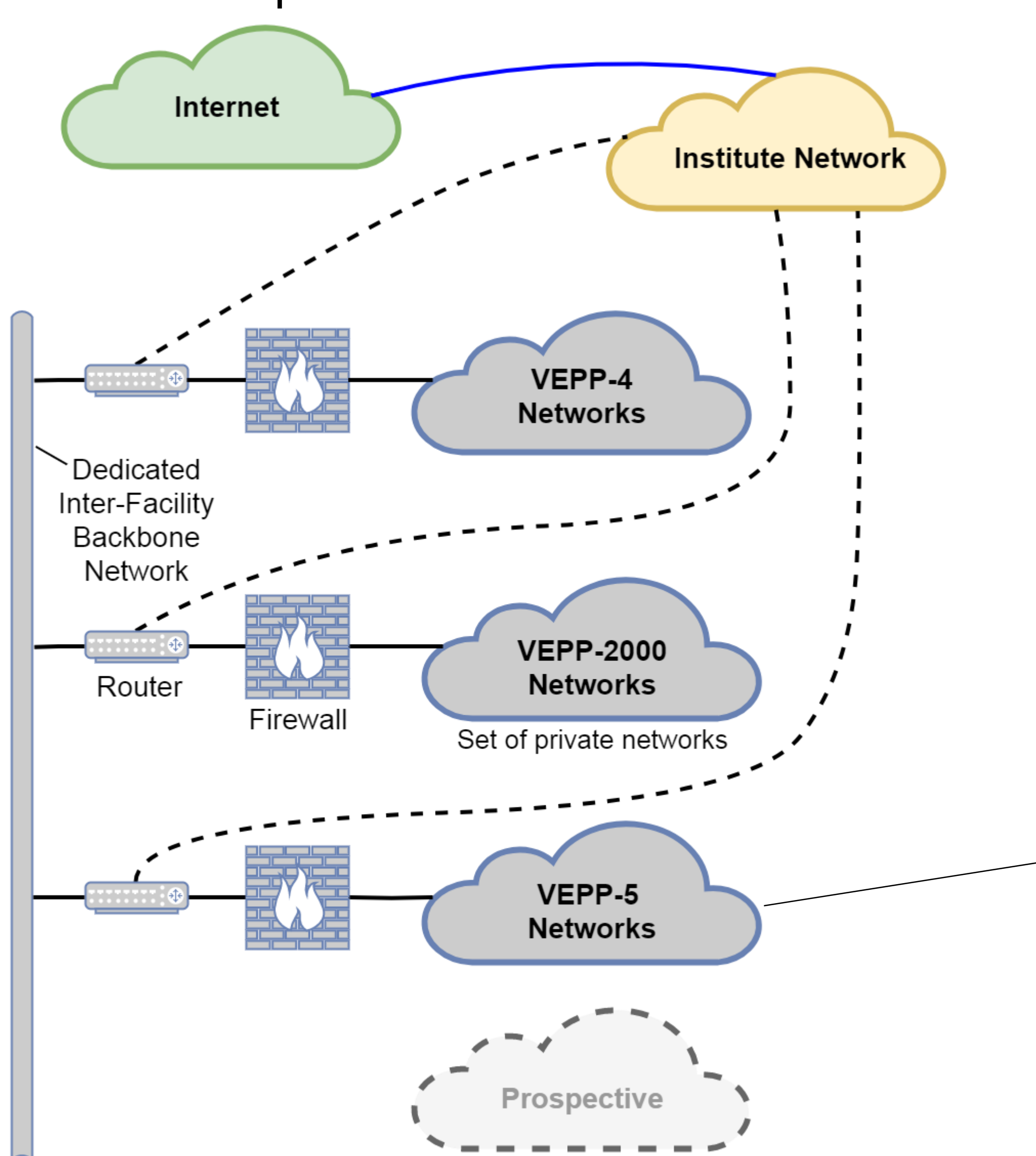
**VEPP-5, VEPP-4M and VEPP-2000'** IT-infrastructures share same ideas and have common concept in order to minimize costs, simplify deployment and maintenance.

The following points where laid down during designing:



The following points where laid down during designing: high availability, flexibility and low cost. High availability is achieved through hardware redundancy – doubling servers, disks and network interconnections. Flexibility is reached by extensive use of virtualization that allows easy migration from one hardware to another in case of fault and gives users an ability to use custom system environment. Low cost – from equipment unification and minimizing proprietary solutions.

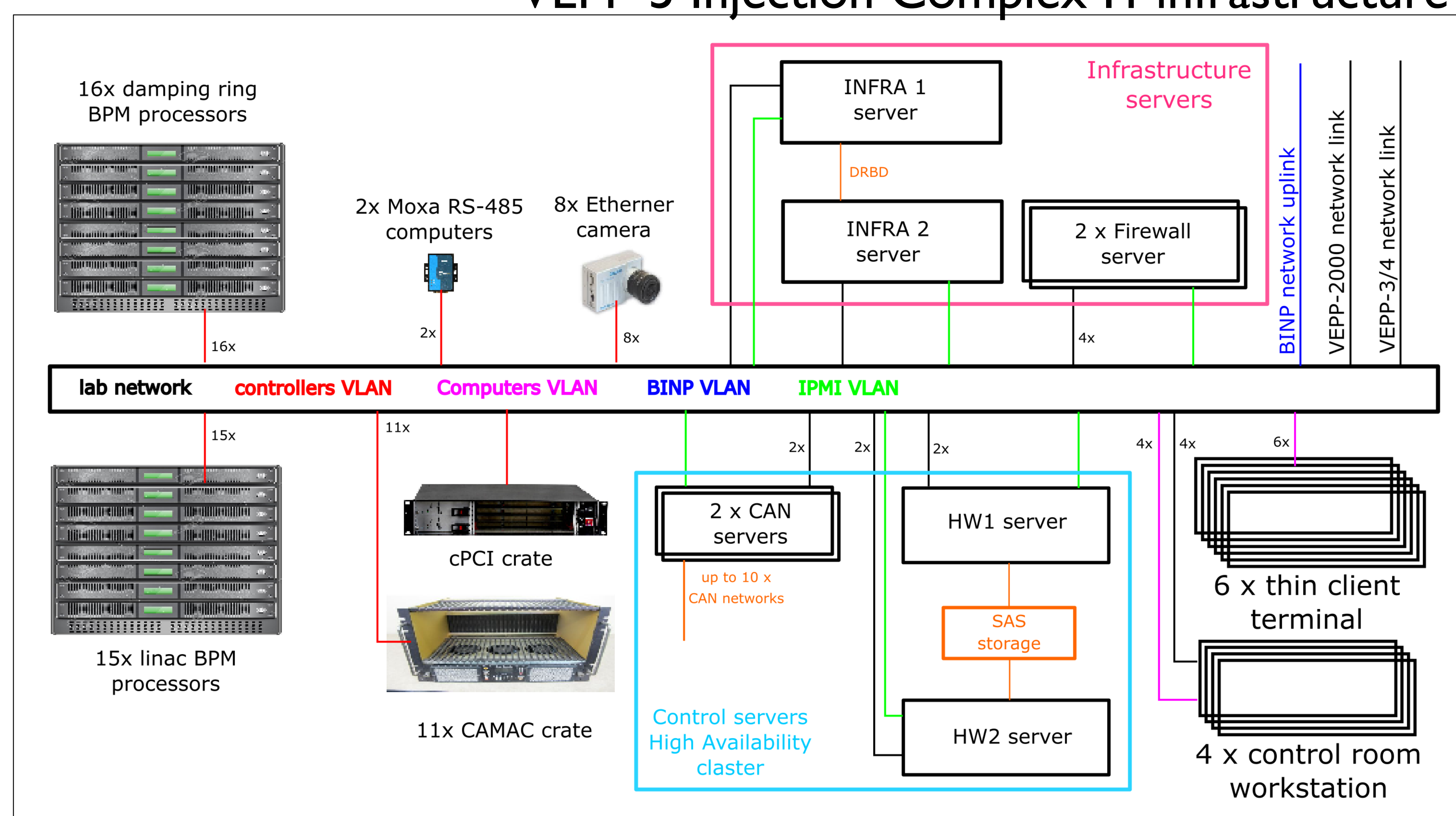
Injection complex and colliders' control systems exchange online operation data and send queries over network:



— Designed interconnection  
- - - "Old" (alternative) interconnection

To increase reliability we created **dedicated inter-facility network** with strong isolation between facilities' network and especially from institute network.

### VEPP-5 Injection Complex IT-infrastructure



- Custom-made **hybrid SAN/NAS** was developed on top of two nodes with **shared DAS**.
- Virtualization is based on **Proxmox VE** using **LXC** and **KVM**.
- **CentOS 7** was chosen as a primary OS for virtual machines.

