HammerHAI Kick-Off

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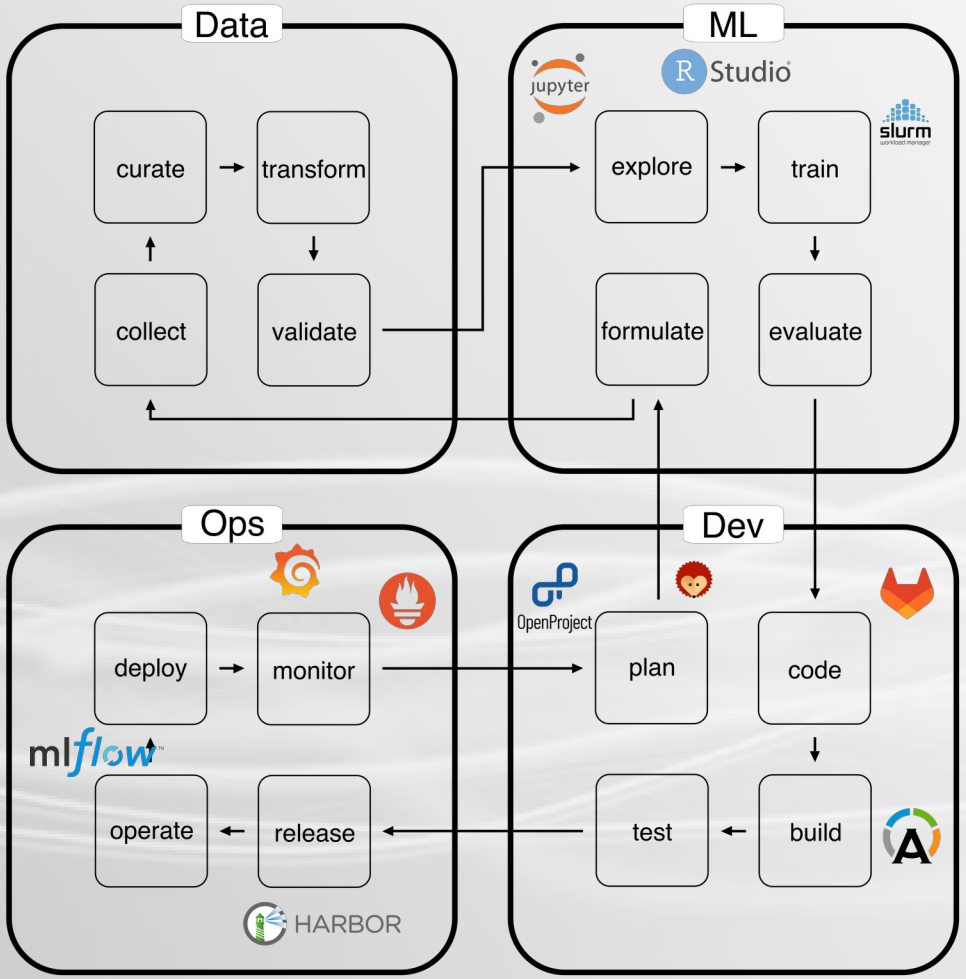
WP 2: OpenStack Cloud Backend

- Main aspects of OpenStack architecture to decide / conceptualize
  - IAM/SSO via Keystone (Backend-IDM? Keycloak?)
  - Network model (SDN vs. VLANs, VPN-access)
  - Partitioning per use case for security?
  - Supported compute platforms (VMs, GPUs via MIG or virtualization?, Bare-Metal?, Kubernetes?)
  - Deployment type and automation (SCS vs. Kolla/Ansible vs. something custom)
  - General operating system choice (aligned with other parts)
  - General security aspects (s. WP4)
- Kubernetes
  - Via OpenStack (Magnum) or
  - Via other frameworks like Rancher (using OpenStack / Bare-Metal-Resources directly)
  - Supported compute platforms (VMs, GPUs via MIG or virtualization, Bare-Metal)

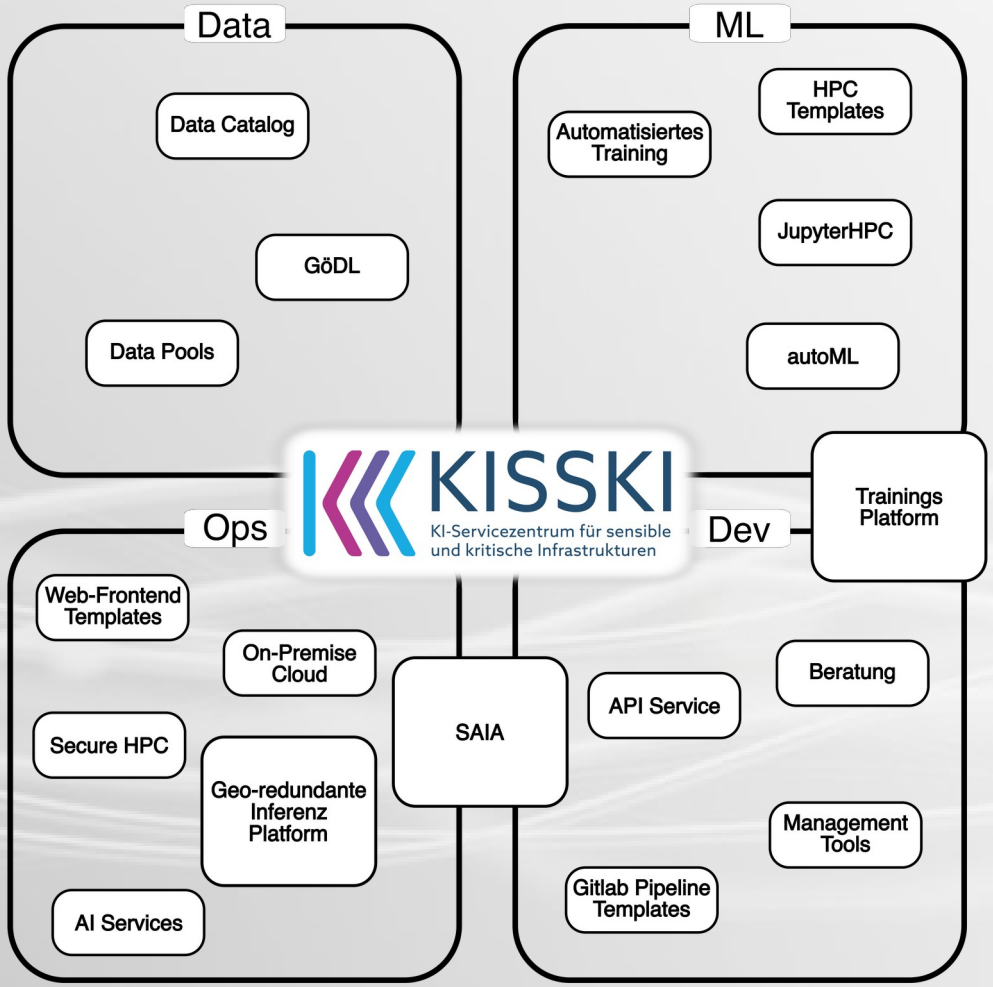
WP 2: MLOps Lifecycle - General

- Data
  - Data Collection and Preprocessing
  - Data Governance and Compliance
- Machine Learning (ML)
  - Model Development and Training Pipelines
  - Model Evaluation and Validation
- Development (Dev)
  - CI/CD Pipelines
  - Code Version Control
- Operations (Ops)
  - Model Deployment and Serving
  - Monitoring and Maintenance



WP 2: MLOps Lifecycle - KISSKI

- Training new models
  - MLOps pipeline in SAIA 2.0
  - Training process via GUI
  - JupyterLab Integration
- Fine-tuning
  - Resource-saving integration of model weights (e.g. LoRa)
  - Fine-tuning web service for models with high demand
- Inference using SAIA 2.0 as broker
  - Deployment of own models in self-service
  - Models can run on third-party systems
  - Simple web frontends from blueprints



WP 4: Secure and Trustworthy Environment

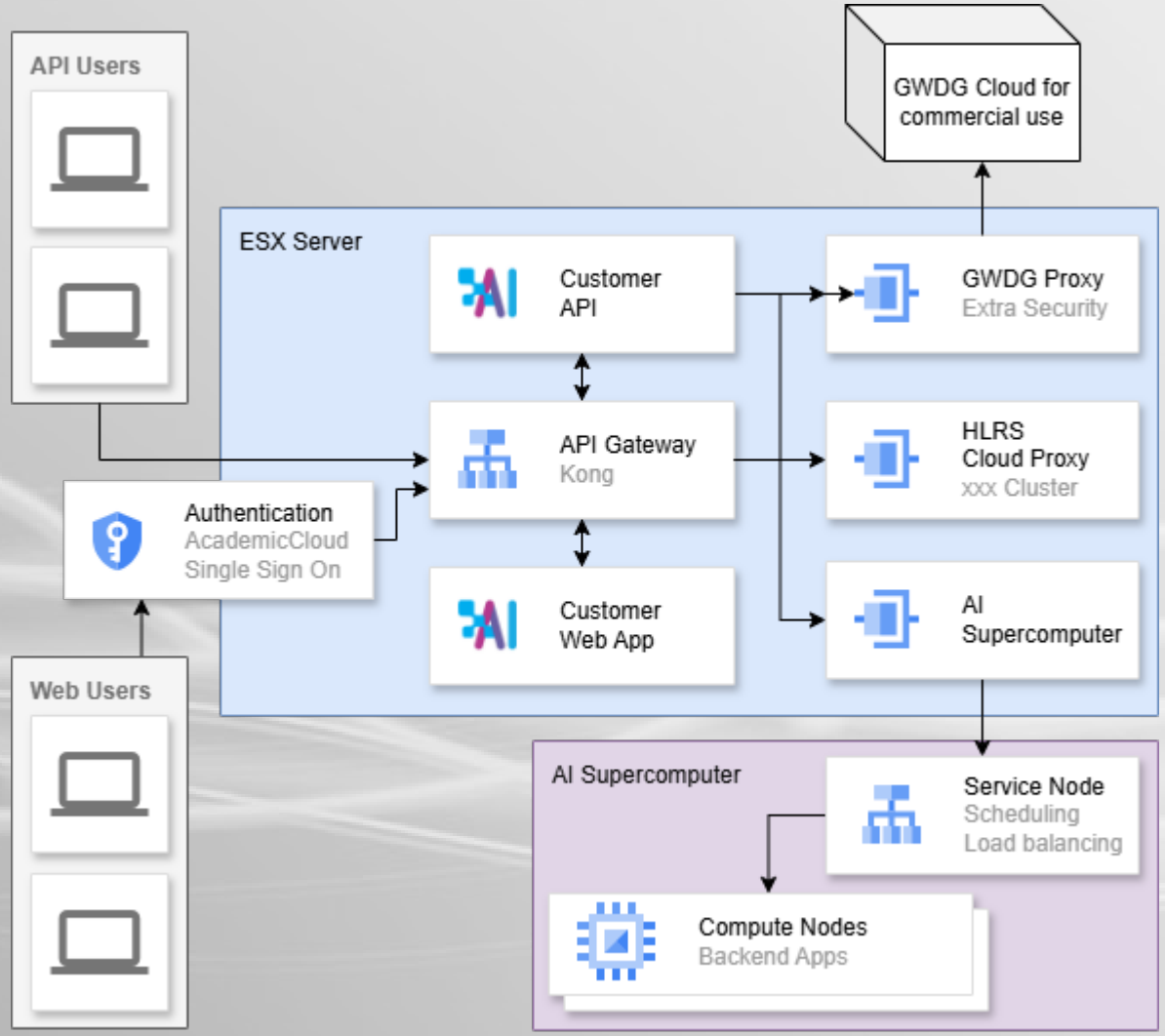
- Participants: **GWDG** (54 PM), USTUTT (54 PM)

- Task 1: Scalable AI Accelerator (SAIA) Platform (**GWDG**, USTUTT, M1-M24)
  - Adapt and extend secure inference platform by GWDG
  - Frontend in hardened GWDG cloud, inference jobs on HPC/cloud
- Task 2: Secure HPC Workflow (**GWDG**, USTUTT, M13-M36)
  - Port workflow by GWDG for highly sensitive data on HPC
  - Encrypted data, containers, batch scripts
- Task 3: Secure Data Transfer and Exchange (**USTUTT**, GWDG, M1-M36)
  - Overcome barriers with data management platforms
  - Integrate USTUTT solutions like SWAN, SCALES

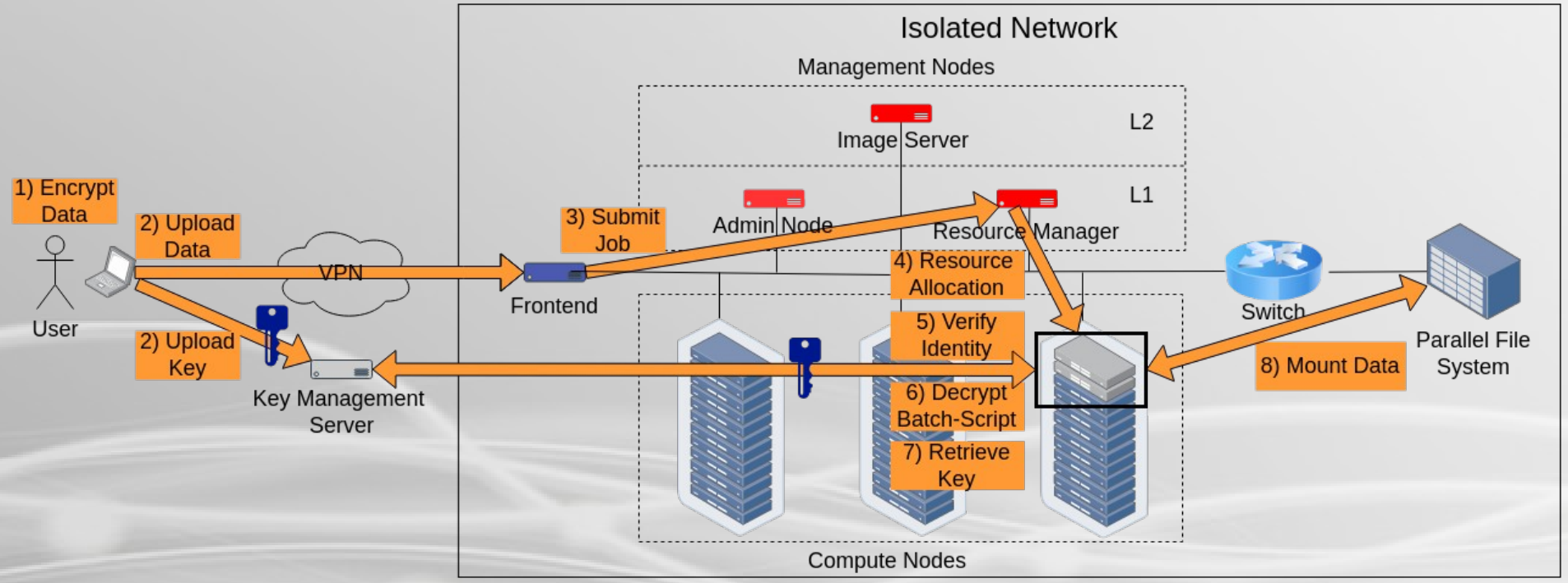
WP 4: Hardened GWDG Cloud

- Identity and Access Management: MFA, role-based access control
- Network Security: VPNs for secure remote access, network segmentation
- Data Encryption: Encrypt data at rest
- Monitoring and Logging: Auditing, analysis, anomaly detection
- Backup and Disaster Recovery
- Security Policies and Training
- ISO 27001 certification
- Security Tools: Intrusion detection, anti-virus, security information and event mgmt.

WP 4: Scalable AI Accelerator (SAIA) Platform



WP 4: Secure HPC Workflow



Secure HPC partition only accessible via dedicated workflow
Data fully end-to-end encrypted (LUKS containers or GoCryptFS)

WP 4: References

- SAIA Platform
  - https://docs.hpc.gwdg.de/services/saia

  - https://github.com/gwdg/saia-hpc
  - https://github.com/gwdg/saia-hub
  - https://arxiv.org/abs/2407.00110

- Secure HPC Workflow
  - https://docs.hpc.gwdg.de/services/secure-hpc

  - https://github.com/gwdg/secure-hpc
  - https://doi.org/10.1016/j.future.2022.12.019