

# Some thoughts about control systems and MTCA at DESY

PIP-II technical workshop Controls round table

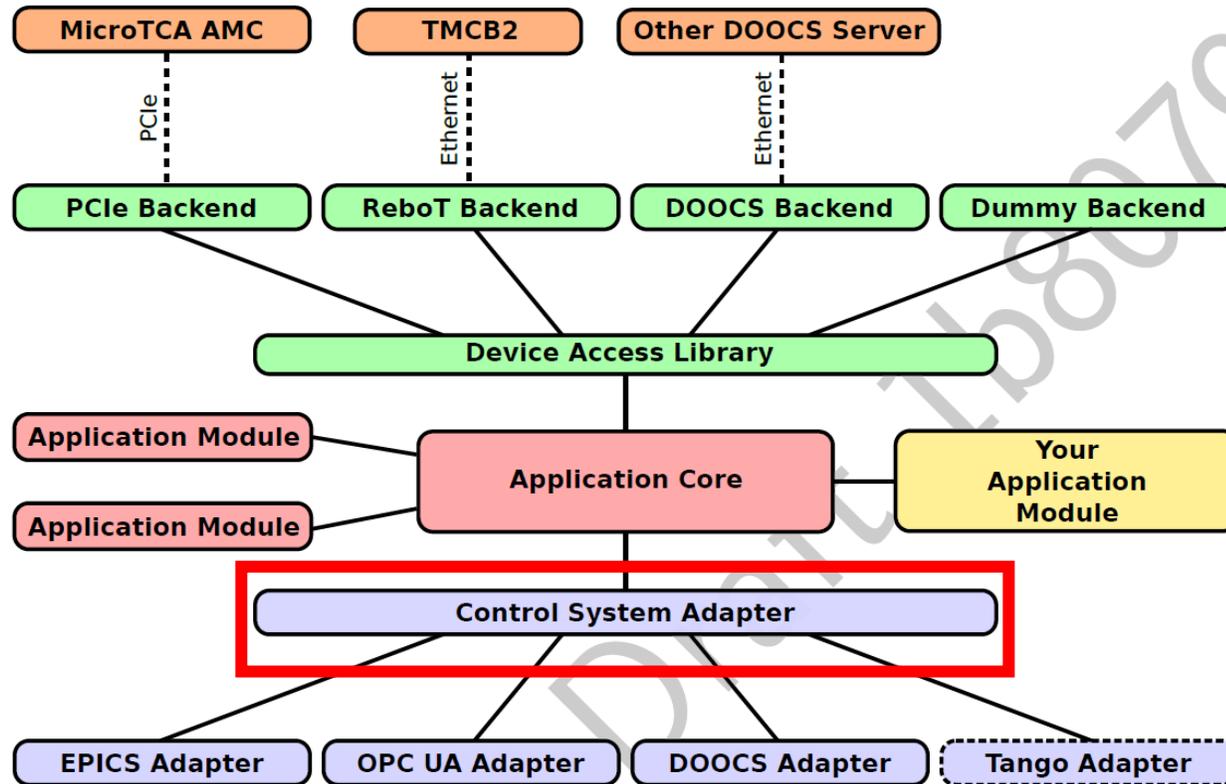
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# DOOCS

- **DOOCS: DESY Object Oriented Control System**
  - In house development
  - FLASH, XFEL + other accelerators at DESY based on this control system
  - Other groups use TINE, EPICS
  - Bridges between control systems (not ideal)
- In LLRF group, development of a **control system adapter**
  - Facilitate collaboration with other institutes (using EPICS, or OPC UA for example)
  - Unique server development but deployment under different control systems
  - Provides binding to EPICS, Tango, DOOCS, OPC UA, etc...

# ChimeraTK Overview



## DeviceAccess

- Abstract access to different hardware
- Extensible backend interface

## ApplicationCore

- ApplicationModules implement application logic
- Multi-threaded

## ControlSystemAdapter

- Abstract interface to different control system middleware
- Integrate via configuration

# Notable lessons learned with respect to controls

- **What is important in a control system**
  - Consistent device exception handling
  - Data validity and error propagation
  - Initial value propagation
- **What is important for end users**
  - Bindings for high-level programming languages (Python, Matlab)
- **Use of Repositories**
  - **GitLab** (migration from SVN)
  - Used consistently by software and firmware group
  - Integration tools such as **Jenkins** for **continuous integration**

# Experience with MTCA (1/2)

- **Used at DESY since < 2011**
  - 2011: first use in test stands (cryomodule tests stands)
  - 2013: installation at FLASH
  - 2017: installation at XFEL
  - LLRF, Controls, special beam diagnostics
- **Future developments**
  - Now over 200 crates at DESY
  - Many collaboration with other labs
  - New accelerators at DESY based on MTCA

# Experience with MTCA (2/2)

- **Positive experience**
  - Good linac availability so far (>95%) despite rough environment (radiation)
  - Redundancy (power supply)
  - Remote management (especially important during Covid)
  - Modularity (partial upgrades)