Application of PyCDB for K-500 Beam Transfer Line

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K-500 is a transfer line for electrons and positrons from Injection Complex VEPP-5 to VEPP-4 and VEPP-2000 colliders. It is under construction in Budker Institute of Nuclear Physics, Novosibirsk, Russia.

**Power Supplies of K-500 Transfer Line**

<table>
<thead>
<tr>
<th>Power Supply Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dipole</td>
<td>1</td>
</tr>
<tr>
<td>DC Corrector</td>
<td>4</td>
</tr>
<tr>
<td>Pulsed Quad</td>
<td>10</td>
</tr>
<tr>
<td>Pulsed Corrector</td>
<td>4</td>
</tr>
<tr>
<td>Pulsed Magnet</td>
<td>1</td>
</tr>
</tbody>
</table>

**Data model example**

- **Power Supply Type** represents power supply of certain type; it has four Logical Pins: DCCT0, DCCT1, Fault and On/Off.
- **Power Supply 01 and Power Supply 02** are instances of Power Supply Type.
- **Logical Socket 0 Type** defines socket type which has four "wires" for connection with ADC40 controller.
- **Power Supply Profile** is associated with Logical Socket 0 Type and applied to both power supplies. Therefore each power supply has Logical Socket 0 and able to be connected with ADC40 controller.

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**Facility Informational Model**

- **Scientific Facility** – is a large and diverse system.
- **It is necessary to collect and store all relevant information about subsystems and their relationships.**
- **Knowledge Base** is essential idea for storing and handling such data.
- **Semantic Network** is a form of knowledge representation; it represents semantic relations between concepts.
- **Ontology** is used to name and define types, properties, and interrelationships of a problem domain.
- **Semantic Network** designed for a problem domain (a Scientific Facility) is a **Facility Informational Model**.
- **Graph database** is used to store and handle a Facility Informational Model.

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**Part of K-500 Facility Informational Model (Control System)**

- **Server** is a hardware server hosting EPICS IOC.
- **Device** is any power supply, electronic device or even magnet.
- **Device Type** defines a set of associated control system (CS) channels, logical pins, and associated **Device Profile**.
- **Logical Pins** are a representation of device’s physical pins.
- **Logical Socket** is an instance of Logical Socket Type.
- **Logical Socket Type** combines Logical Pins together for grouped connection with another Device.
- **Device Profile** defines a set of Logical Sockets for specific Device.

The conceptual data scheme for K-500's Power Supply System.

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**Visual Graph Editor for PyCDB**

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The experimental force graph layout and navigation.