Advanced Photon Source
Argonne National Laboratory

Relational Database Collaboration @ APS & SNS

Dec. 8, 2004

Argonne National Laboratory

Office of Science
U.S. Department of Energy

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Office of Science Laboratory
Operated by The University of Chicago

"Top Down" meets "Bottom Up"

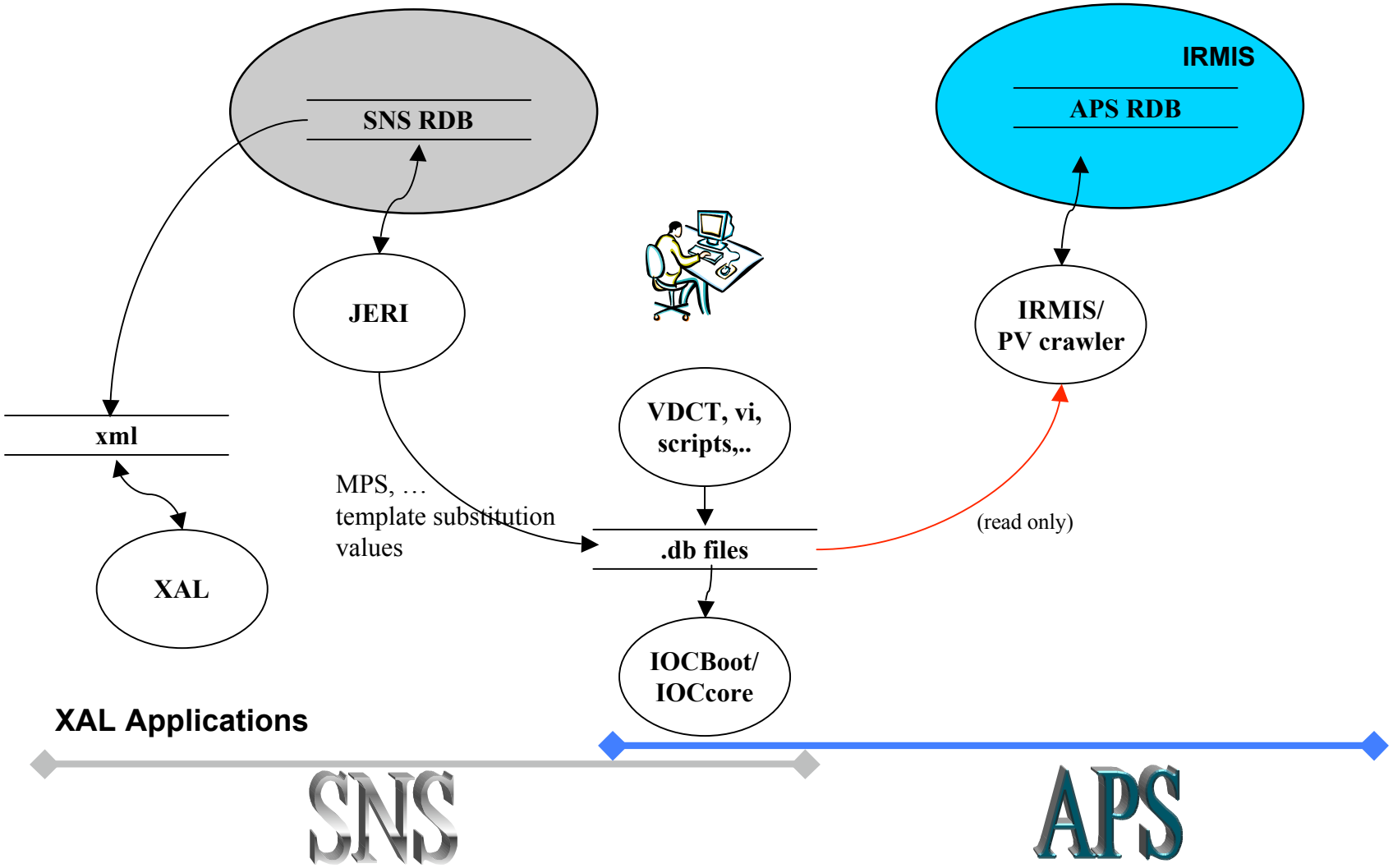
- **Background**

  - SNS has always been very ambitious with RDB's
    - *Physics parameters, accelerator devices, MPS inputs/modes*
    - *XAL (JAVA Framework)*
    - *JERI*

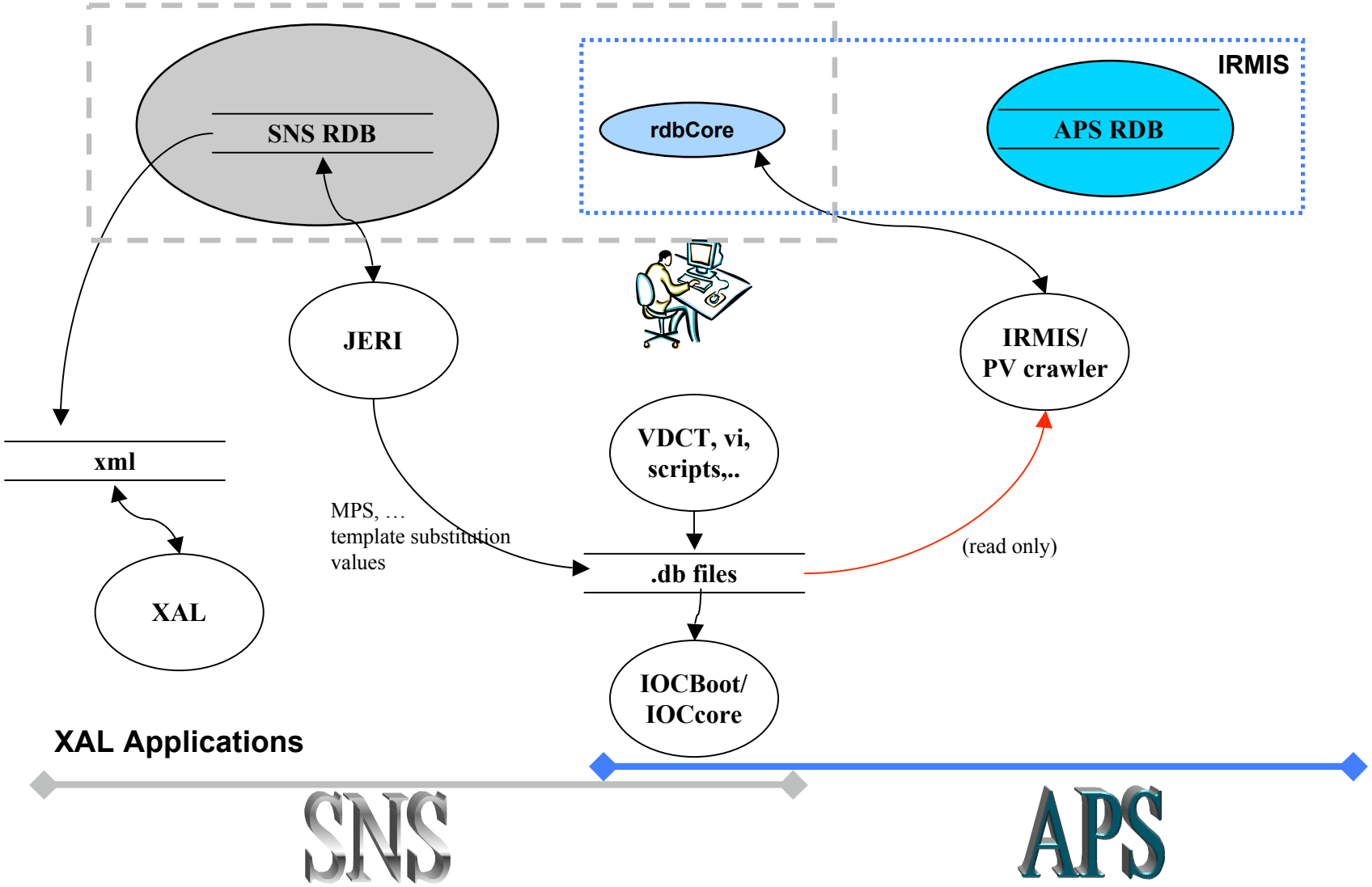
  - APS has undertaken "as-built" documentation using RDBs
    - *Descriptive rather than prescriptive*

  - Do the two approaches indicate a set of tables that are useful in almost any EPICS environment?
    - *rdbCore*

RDB Approaches



First Step – identify common needs



Current Efforts

Plans are still developing … but as of today …

- First tables of rdbCore
  - *PV database (every field of every record)*
  - *Installed device database*
    - Control Flow/Housing/Power
  - *Cable database*

- First Tools
  - *'Controls Framework' extension of XAL access rdbCore*
  - *st.cmd crawler to populate PV database*
  - *PV Viewer*
  - *"vcct" – Visual Connection Configuration Tool*
    - View relationships between installed devices
    - Cable Editor/Viewer

Primary Tables

- **Process Variable Table (of rdbCore)**
  - Contains an entry for each Process Variable (record.field) name loaded into an IOC
  - Custom record definitions (and even modified record definitions) are recognized
  - 100% self-populated by “st.cmd crawler” that interprets dbLoadRecords & dbLoadDatabase lines
    - *Need a plan to accommodate other CA servers*
  - “extensions” to rdbCore can be added to reference client use of all PVs
    - *Crawl through MEDM, ALH, Archiver config files*
  - “Generic SQL” which can generate Oracle or MySQL tables

Primary Tables

- **Installed Devices Table (of rdbCore)**
  - Contains an entry for every replaceable component installed in the control system.
  - Each device is fully described by the following hierarchies:
    - *Control parent – What is it connected to?*
    - *Housing parent – What is it housed in?*
    - *Power parent – What is it powered by?*
  - 40-70% self-populated by EPICS business rules (INP/OUT fields, configDevice(), dbior, etc)

- **Cable Table (of rdbCore)**
  - Contains an entry for every cable installed in the control system
  - Uses ports on “installed devices” as source and destination

Primary Tables

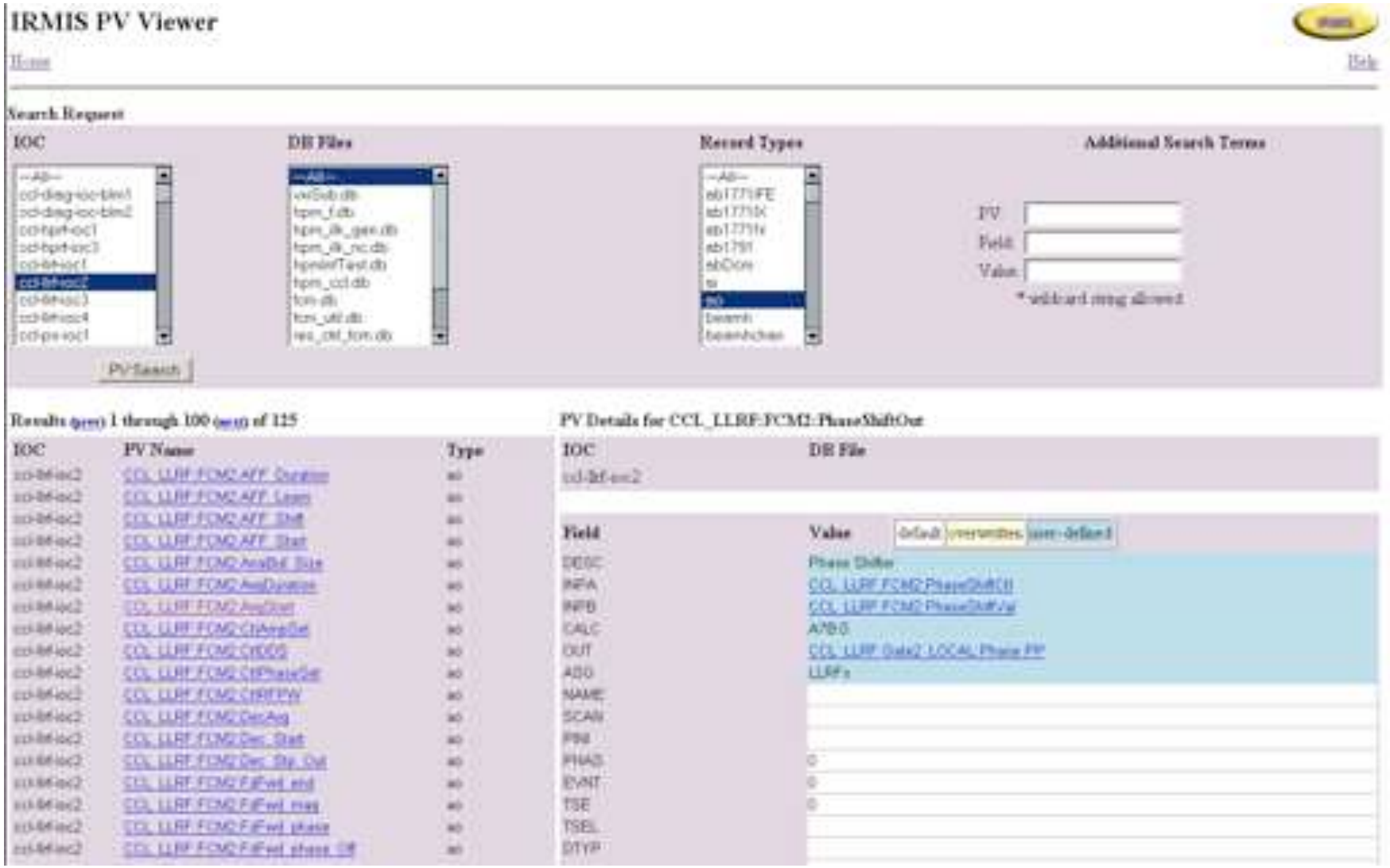
- **PV Table, Installed Device Table, Cable Table provide numerous relationships for advanced queries**
  - What PVs will be affected by a particular device failure?
  - What PVs will be affected if this cable is disconnected?
  - What set of devices could cause a particular set of PVs to all be INVALID?
- **And with "extended" tables …**
  - What applications (MEDM displays, scripts, XAL apps, etc) will be affected if this device is powered off?
  - What applications (MEDM displays, scripts, XAL apps, etc) will be affected if this breaker trips?

Primary Tools

- **Controls Framework**
  - Extended from XAL (JAVA)
  - Predefined access methods to rdbCore
    - *Place to implement "business logic"*
  - Plan to make the st.cmd crawler a Controls Framework service
  - Work is underway on a persistent object API for the rdbCore tables.
    - *a standardized object view of the items in the relational database using Object Relational Mapping (ORMs)*

- **Non-Java RDB access applications can also be written for routine queries and prototyping (PHP, Perl, Python, etc.)**

Primary Tools – PV Viewer



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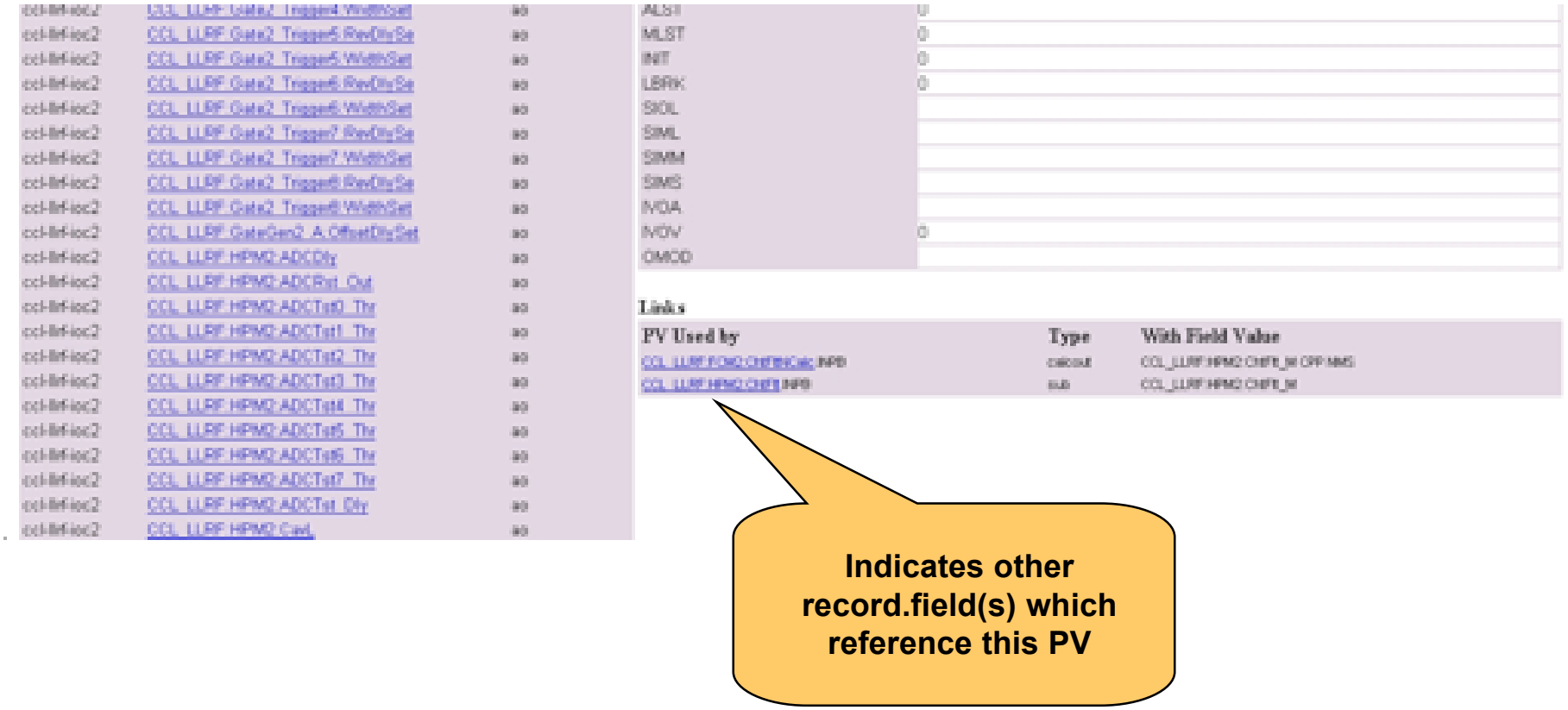

Primary Tools - VCCT – Control/Housing/Power