



Logical Nodes for Photovoltaic Systems

IEC 61850 Part 7-420

Jean Goulet
Member, WG17
Institut de recherche
Hydro-Québec



Natural Resources
Canada

Ressources naturelles
Canada



Institut de recherche

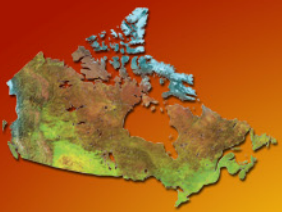
Canada 



IEC 61850 – Logical Node

- Building block
 - Smallest entity used to represent a system function
 - Contains attributes
 - Status
 - Measurements
 - Controls
 - Settings
 - Instantiated inside an IED





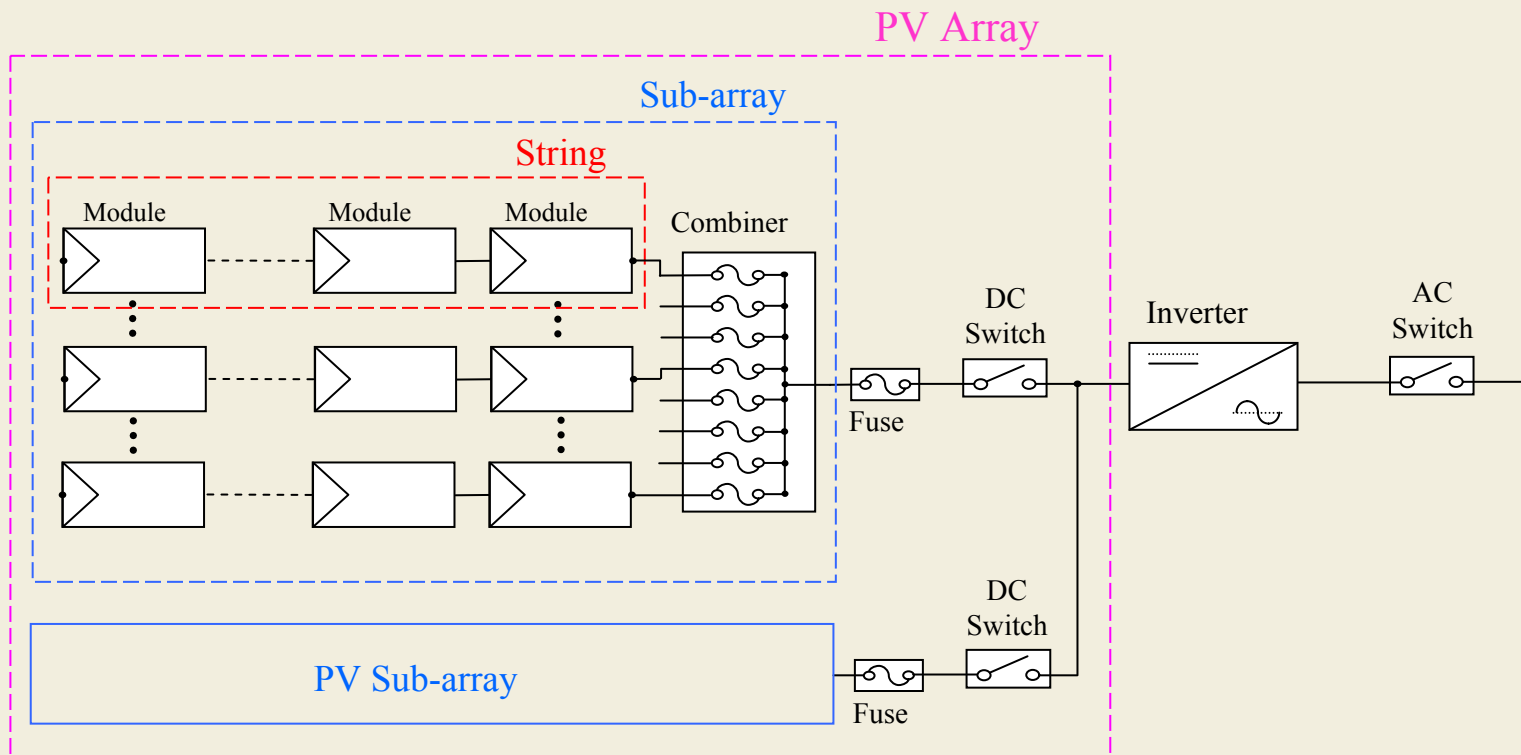
Reusability

- Key modeling aspect
- Enable the use of LNs designed for substations
 - Protection: PTOC, PTOV, PTTR, PHIZ...
 - Switchgear: XSWI, XCBR, CSWI...
 - Metering: MMXU, MMXN...





Grid connected photovoltaic system

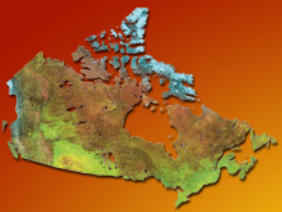




Proposed Logical Nodes for PV

- DPVC – PV system controller
- DPVA – PV assembly
- DPVM – PV module ratings
- DTRC – Tracking controller





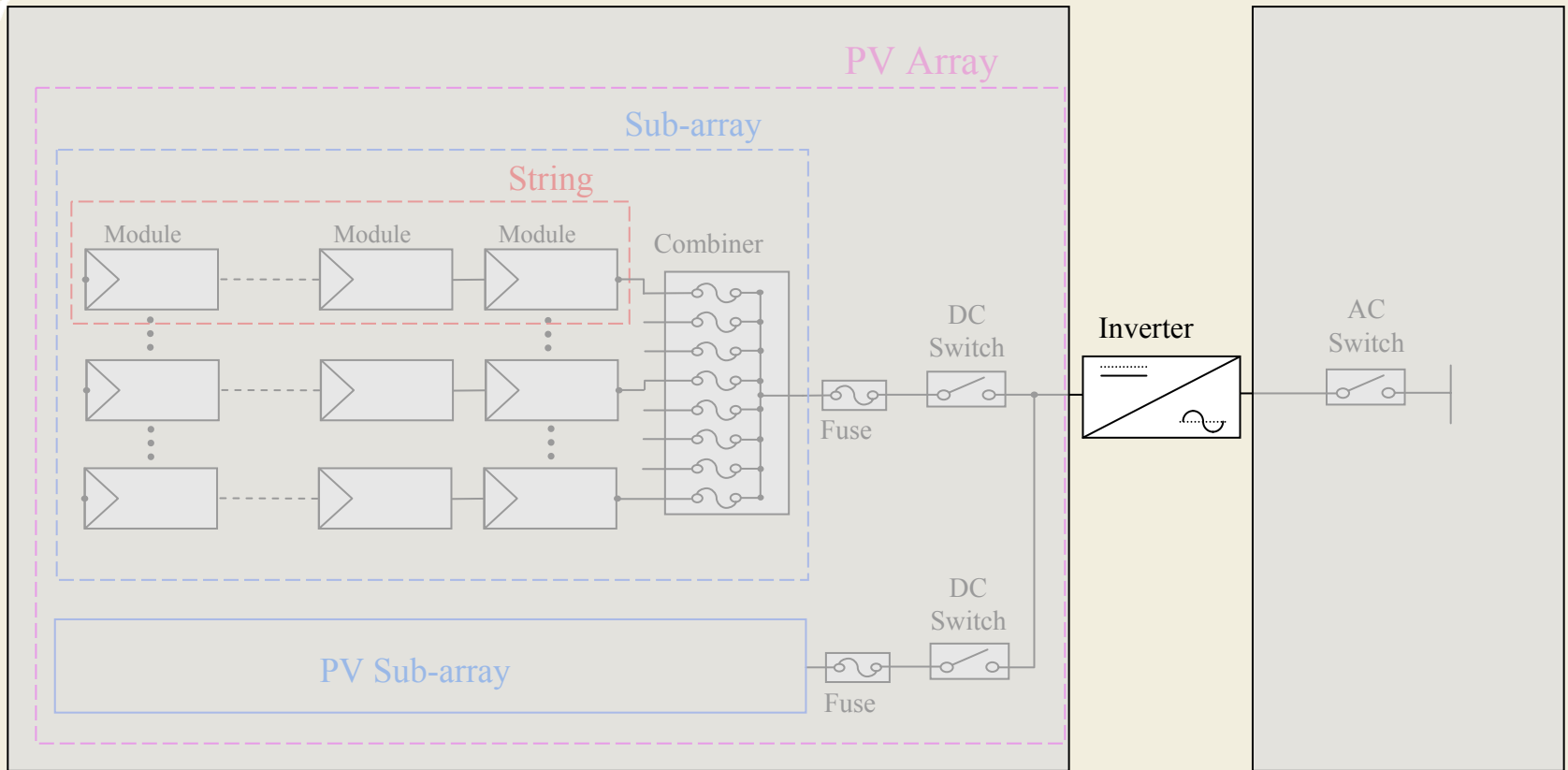
Principal DER LNs usable for PV

- Power conditioning unit
 - YINV – Inverter
 - YRCT - Rectifier
- Metering and monitoring
 - MMDC – DC measurements
 - MMET – Meteorological information
- Equipment
 - XFUS – Fuse





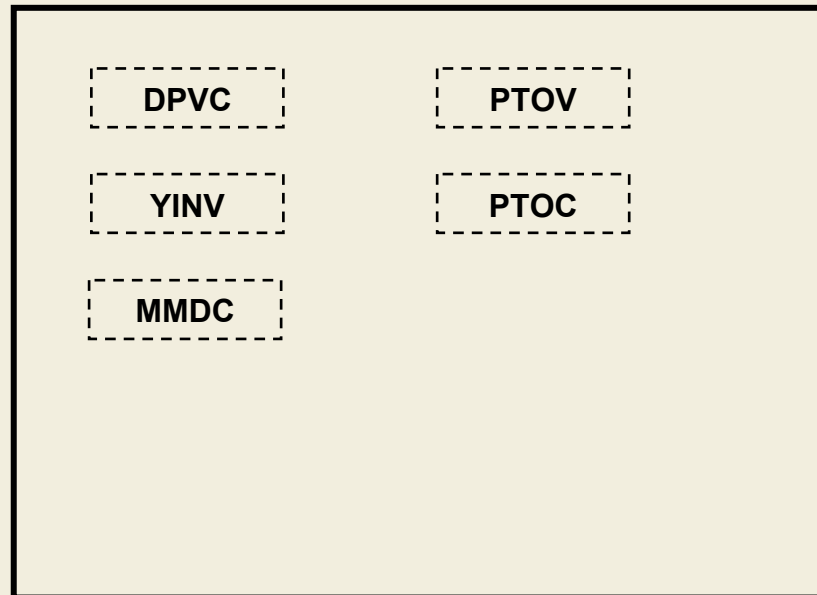
Simple view of a PV system

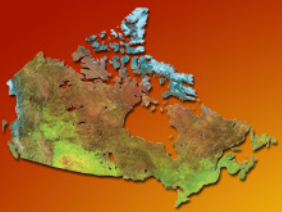




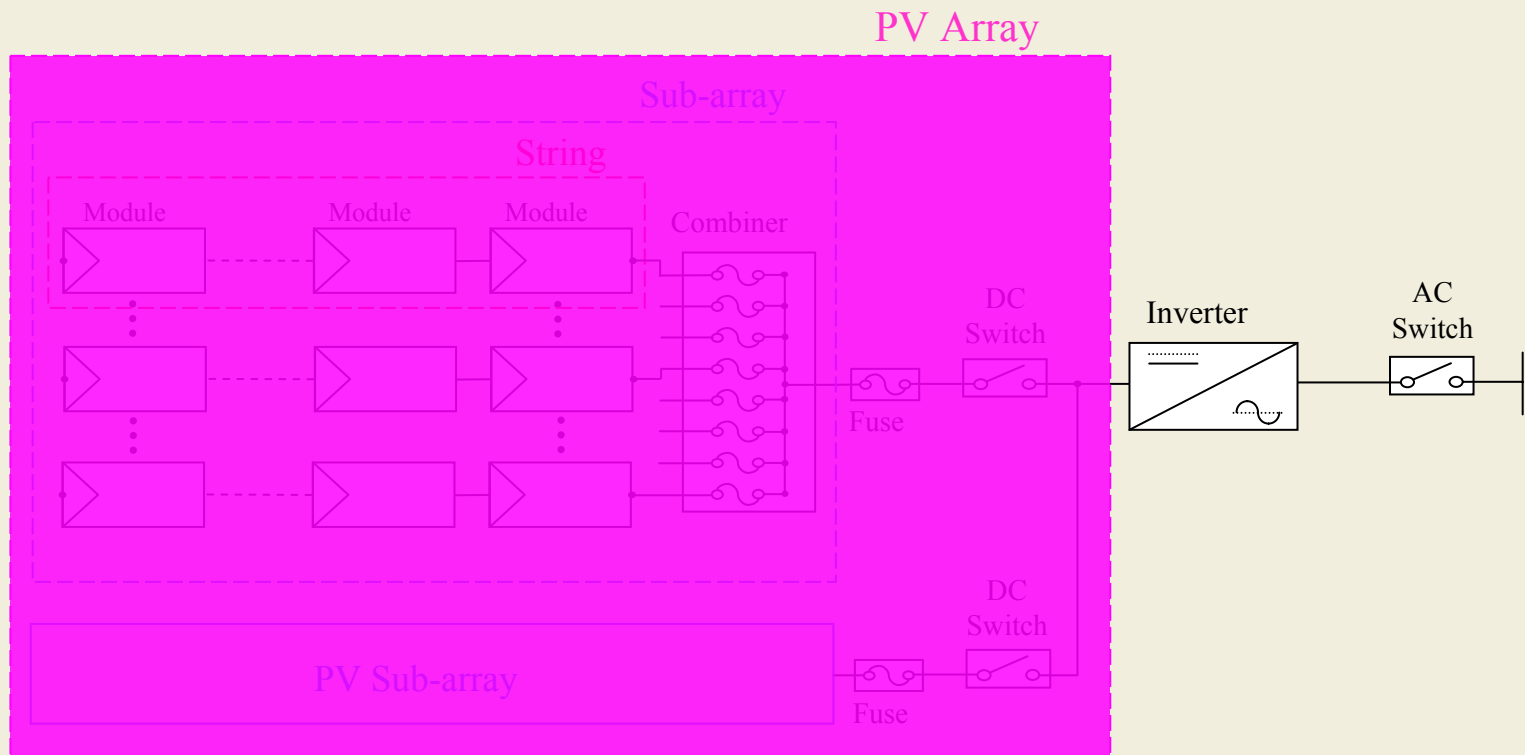
Virtual representation

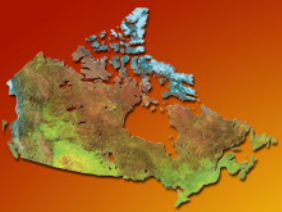
Inverter IED





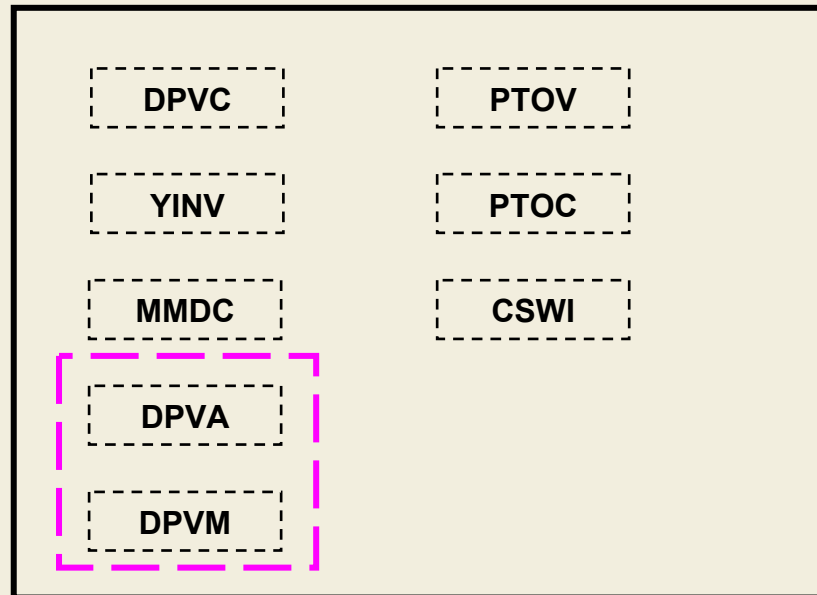
View with added detail





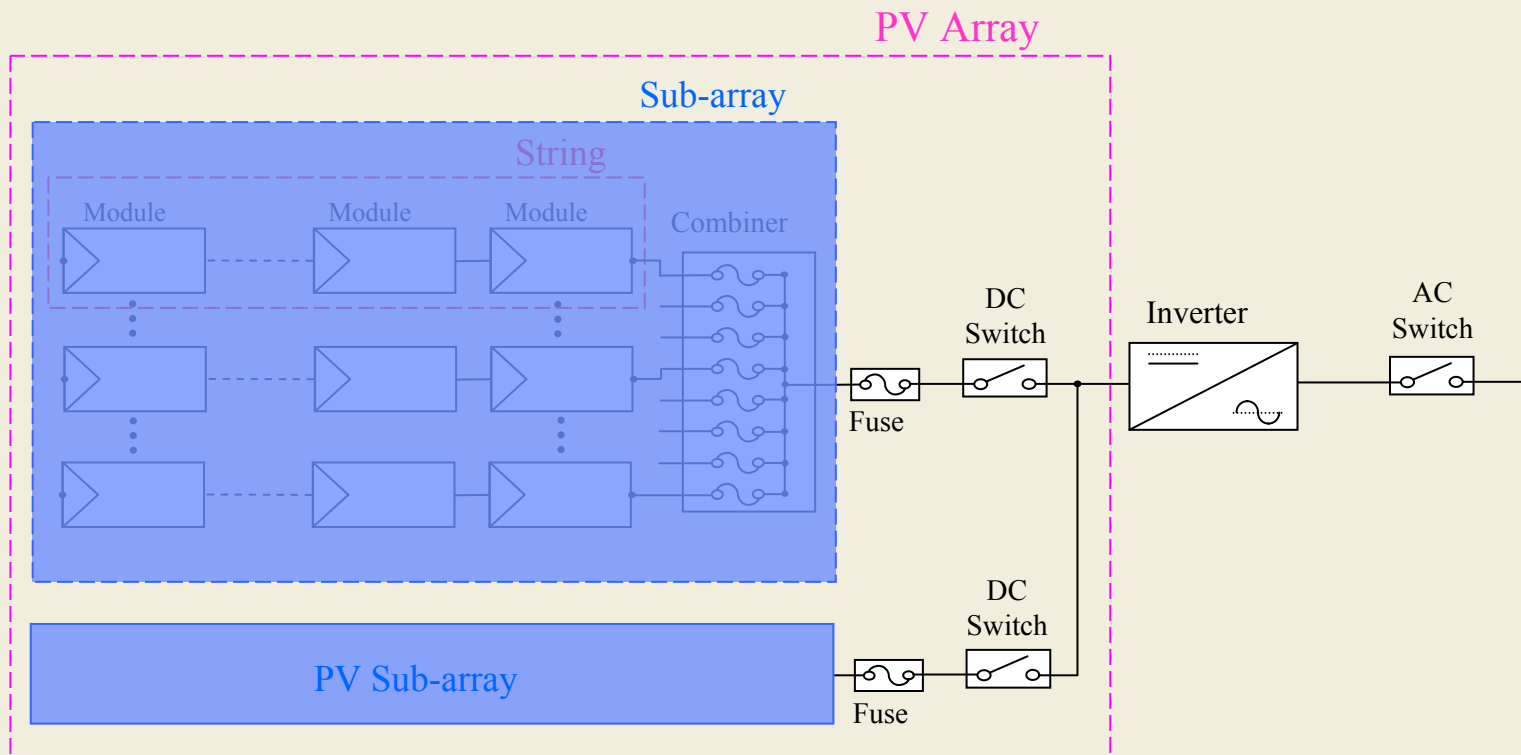
Virtual representation

Inverter IED





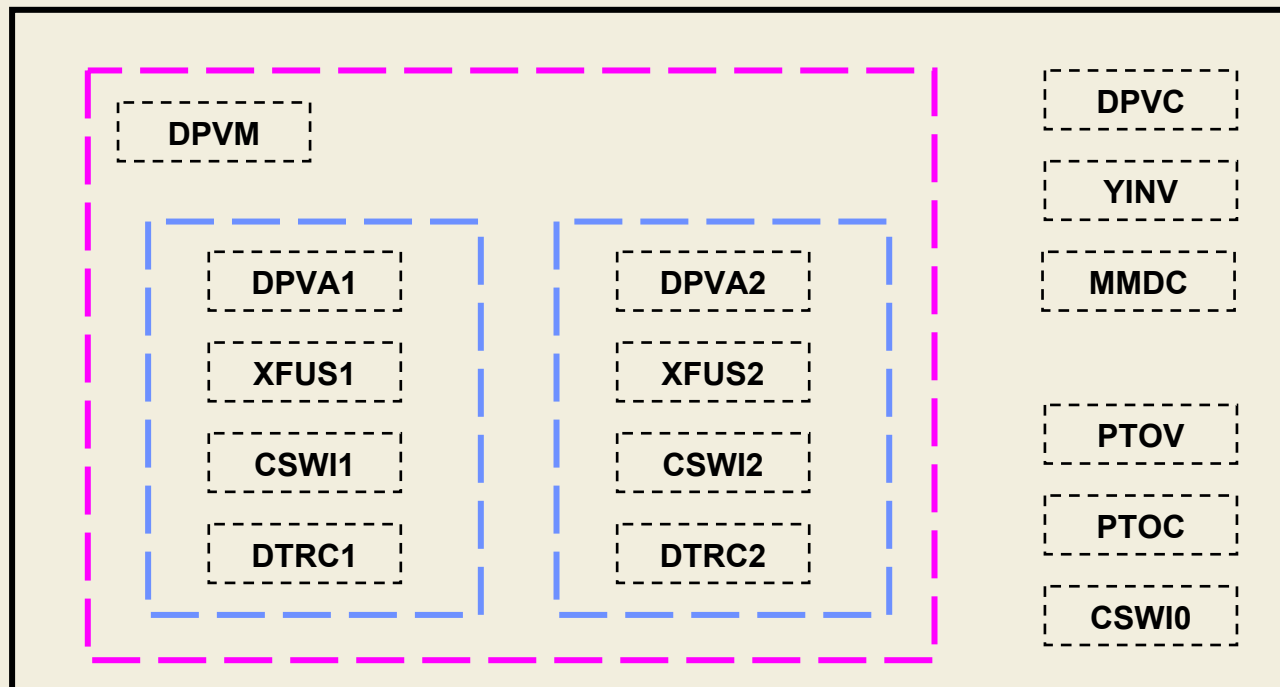
Still more detail





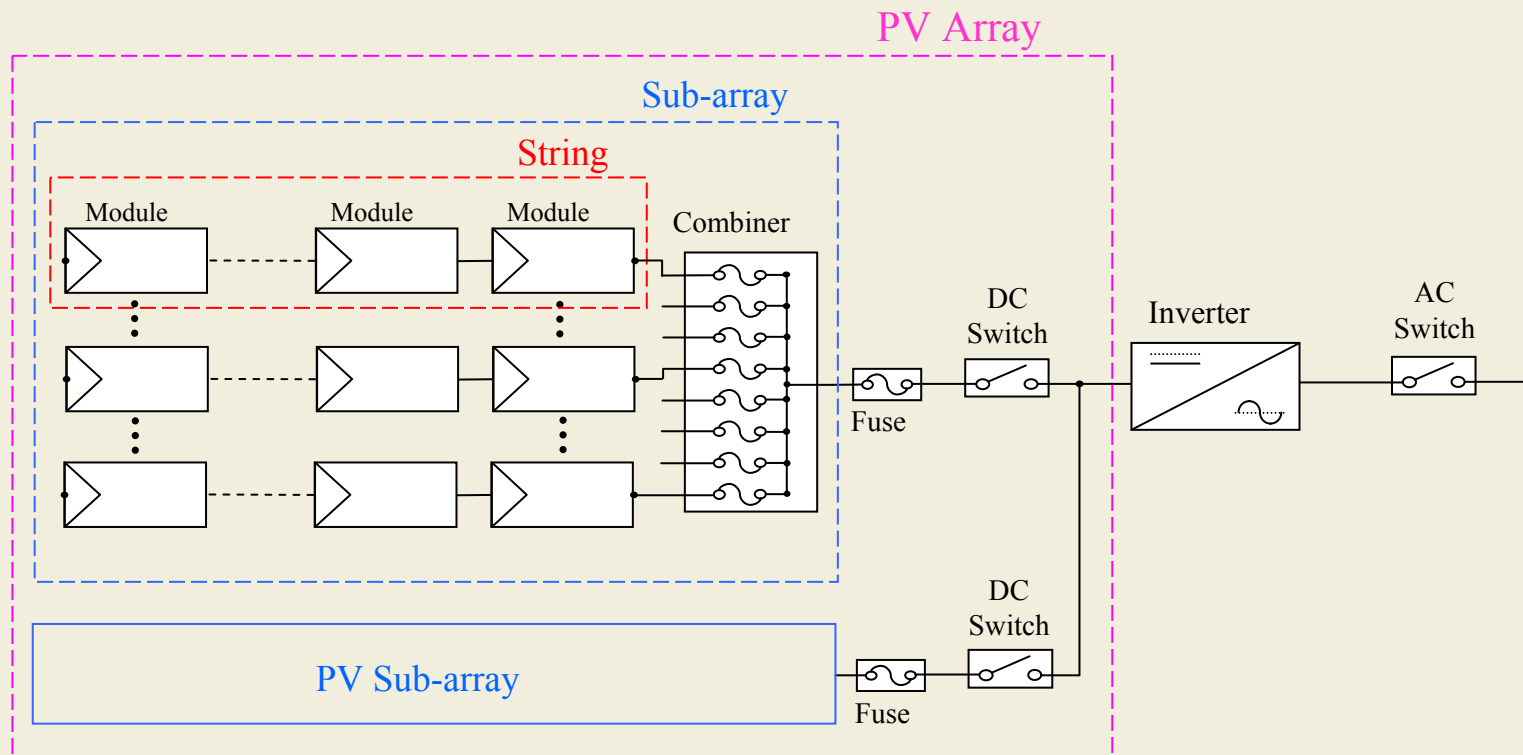
Virtual representation

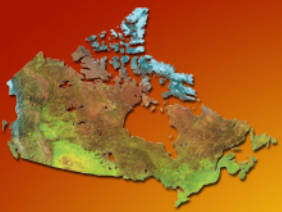
Inverter IED





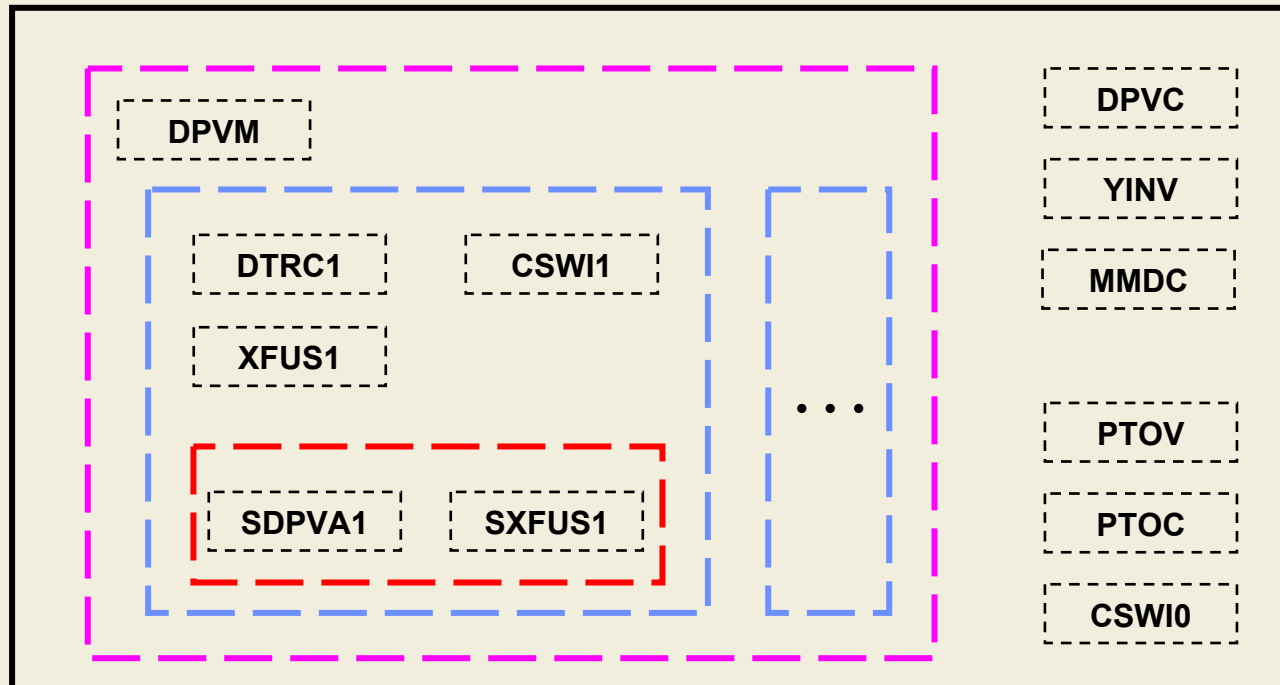
Complete representation





Virtual representation

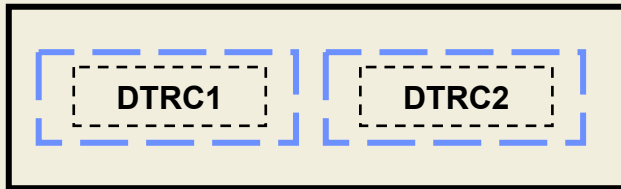
Inverter IED



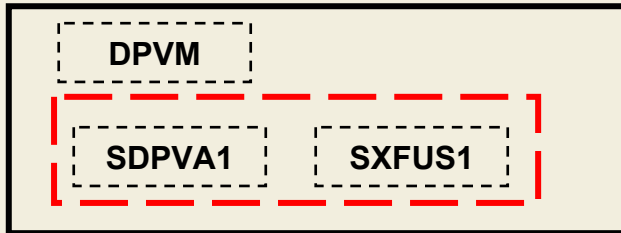


Multiple IEDs

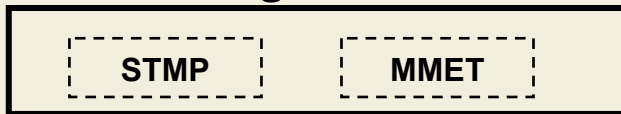
Tracking IED



Combiner IED



Meteorological IED



Inverter IED

