

# Making the Case for High Performing PMUs in Distribution Grids

**PRESENTED BY** 

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#### PMUs: What Are They, What Can They Do?





- 1547 compliance verification
- Distance to fault

High-rate streaming of phasor data

State estimation

Islanding detection

Fault "triangulation"

Phase identification

High-quality phasor, frequency measurements

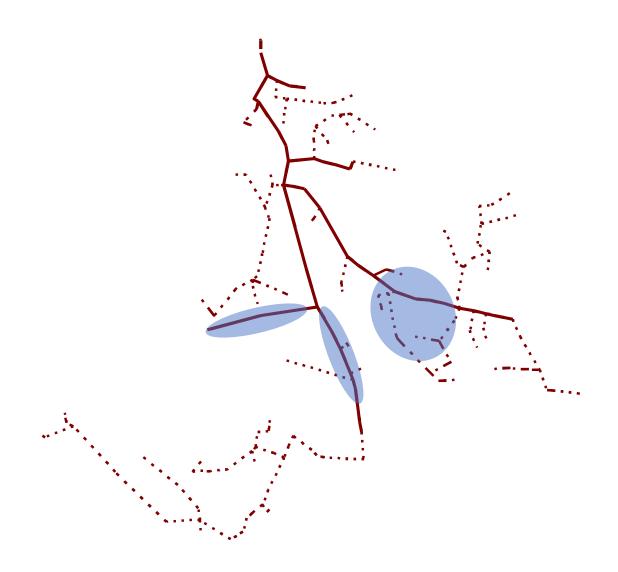
Synchronized measurements

Line model validation

## **Example Application – Fault Location**



**Fault location using SCADA** 



### **Example Application – Fault Location**



**Fault location using SCADA** 

Fault location using current & voltage phasors from a single device

(distance to fault)



#### **Example Application – Fault Location**



Fault location using SCADA

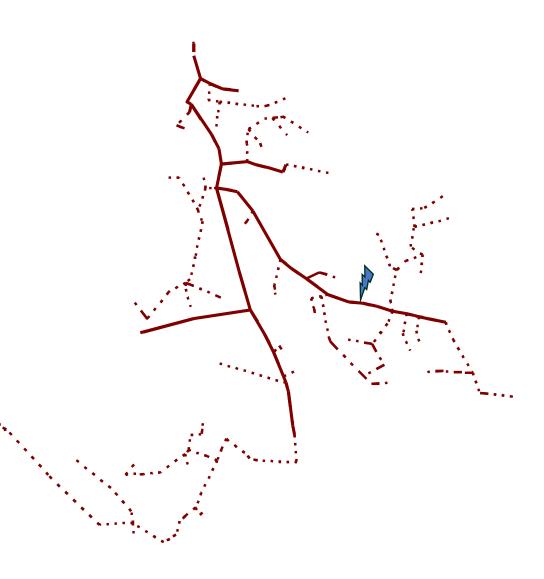
Fault location using current & voltage phasors from a single device

Fault location using synchrophasors from multiple devices

(fault triangulation)

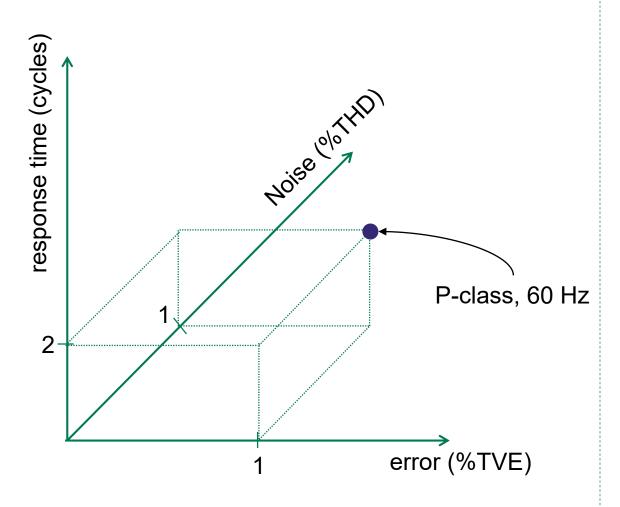
#### Benefits of fault location:

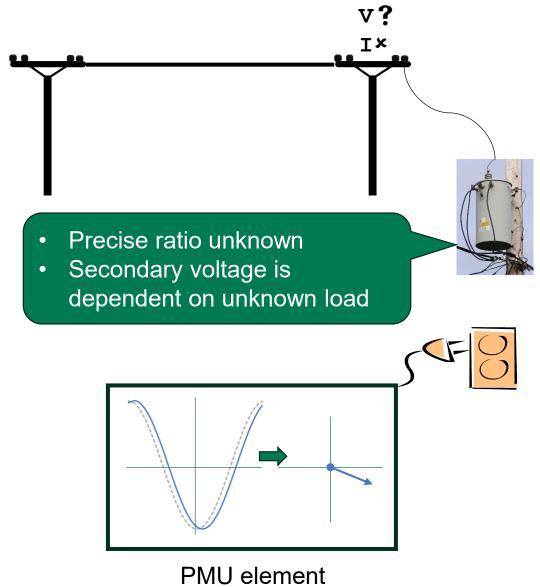
- Quicker restoration after permanent faults
  - Improved reliability
  - O&M saving
- Addressing momentary faults before they become permanent
  - Improved reliability
  - O&M saving



#### **Not All PMUs Are the Same**

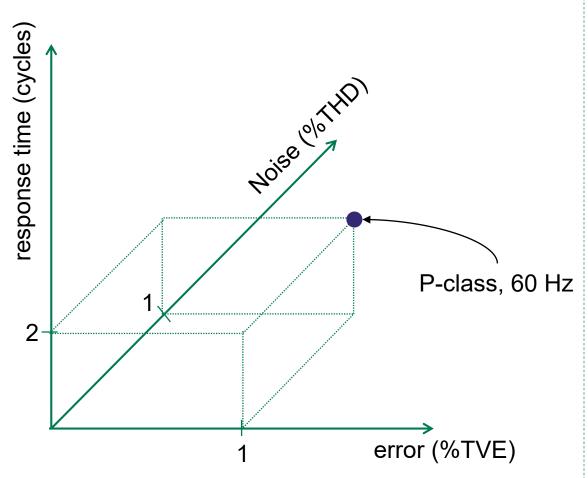


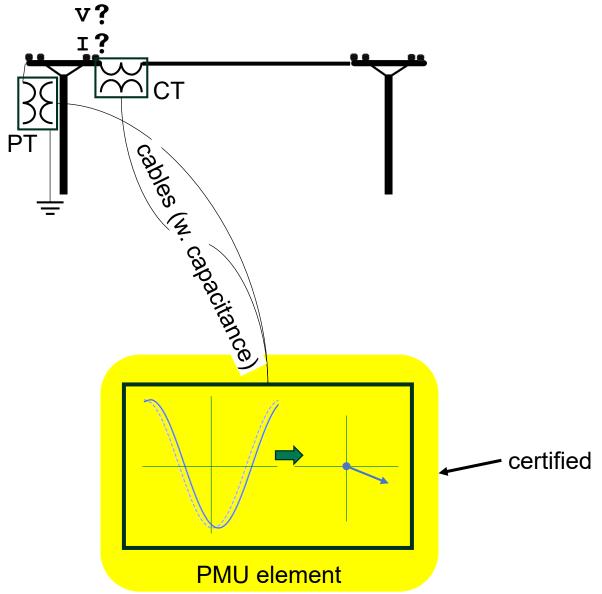




#### **Not All PMUs Are the Same**

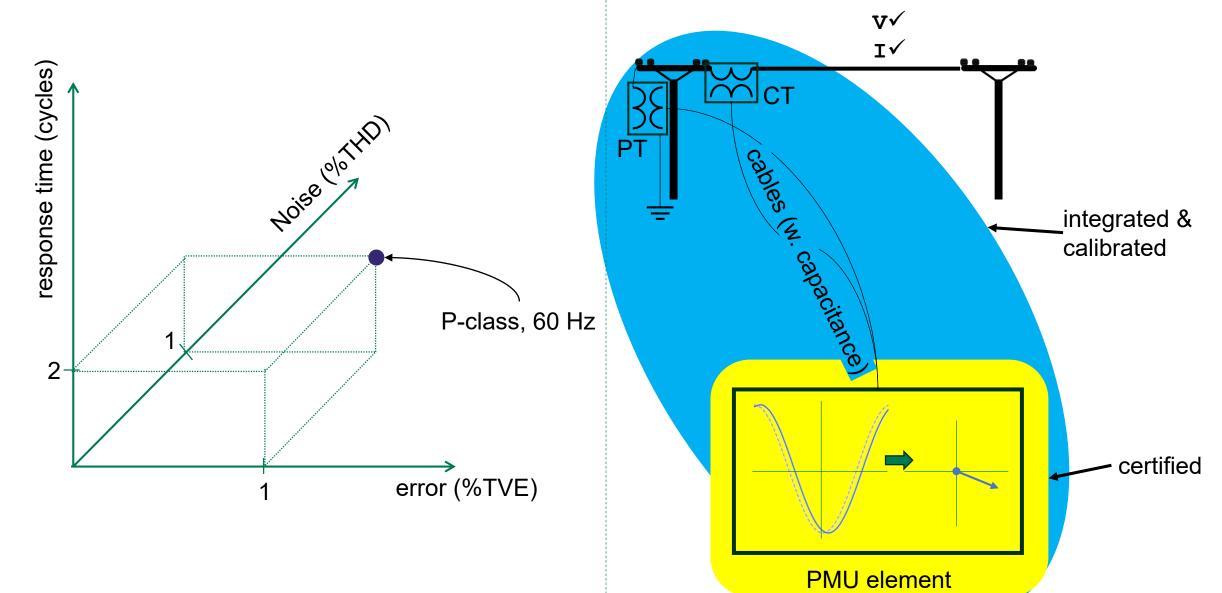






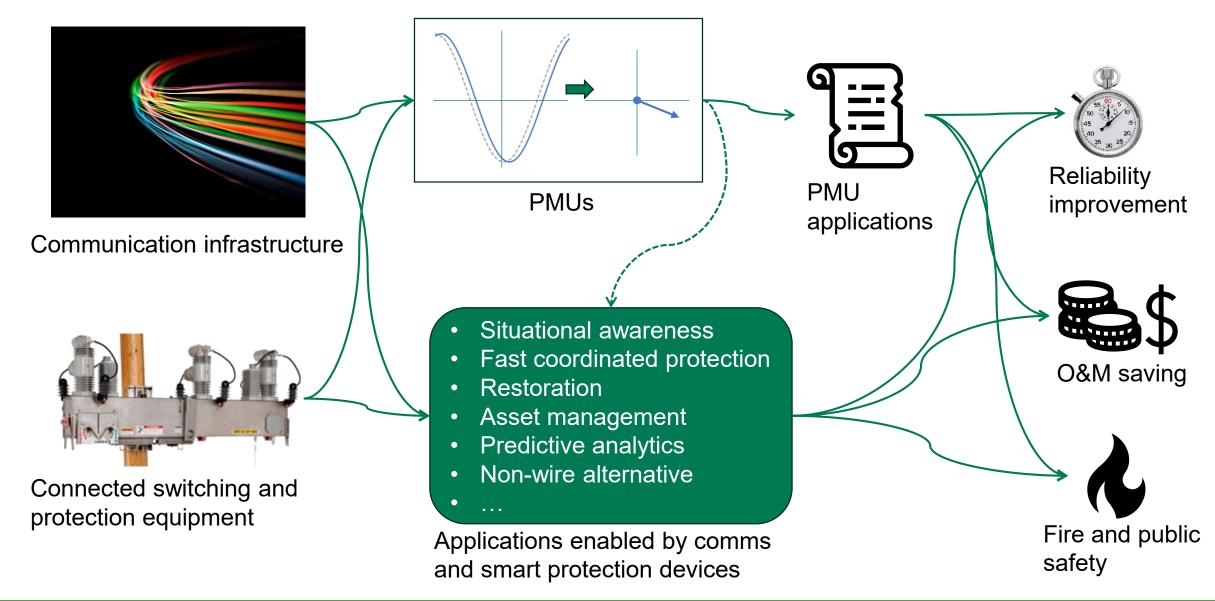
#### **Not All PMUs Are the Same**





#### The Business Case for PMUs





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