



Australia
AP B5
SEAPAC 2009

S31 Considering the Process Bus Rod Hughes

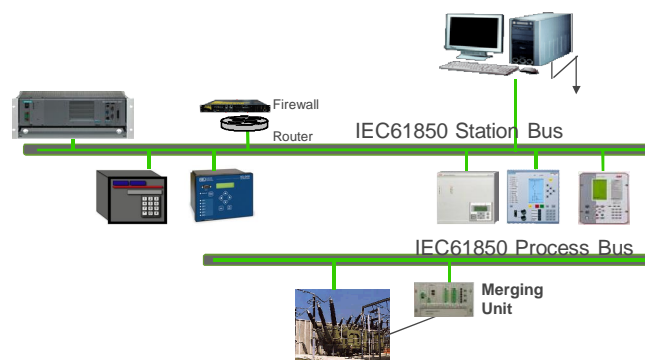
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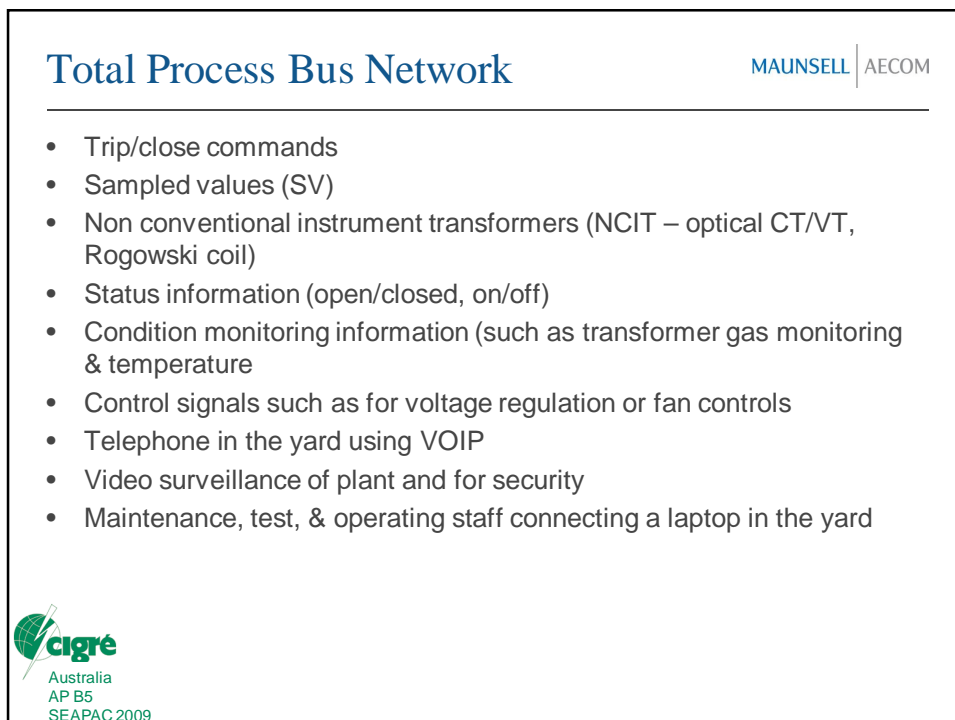
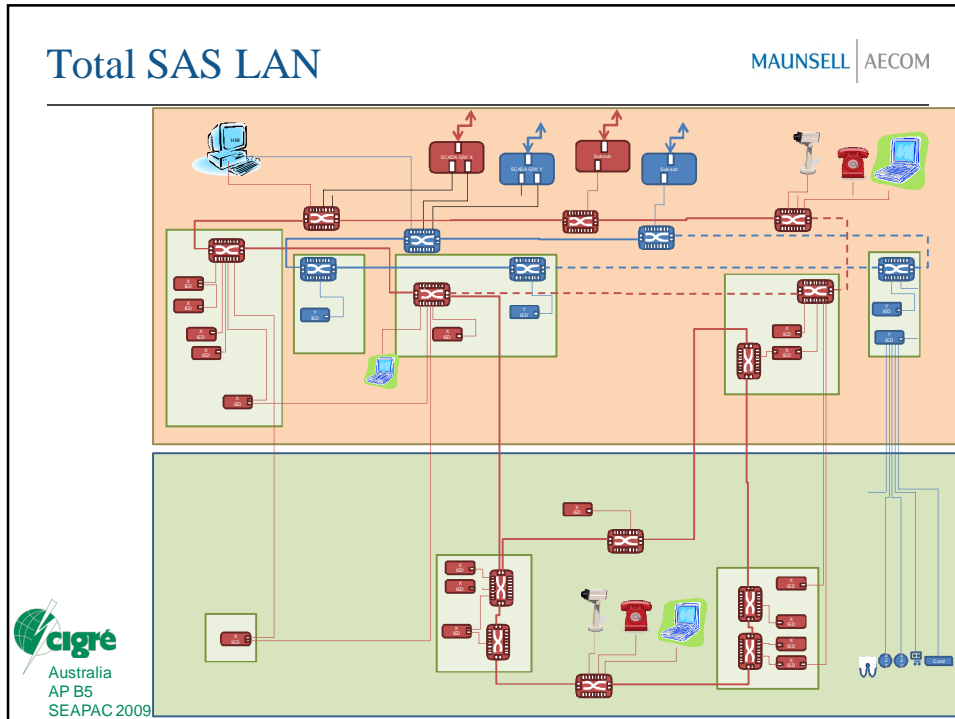
Considering the Process Bus



Substation Automation System

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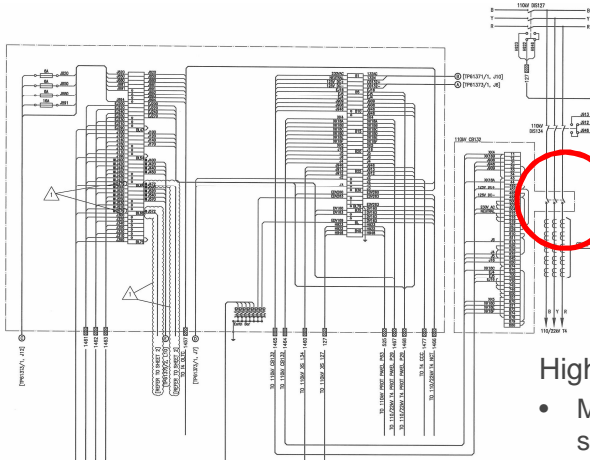




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Conventional CB wiring

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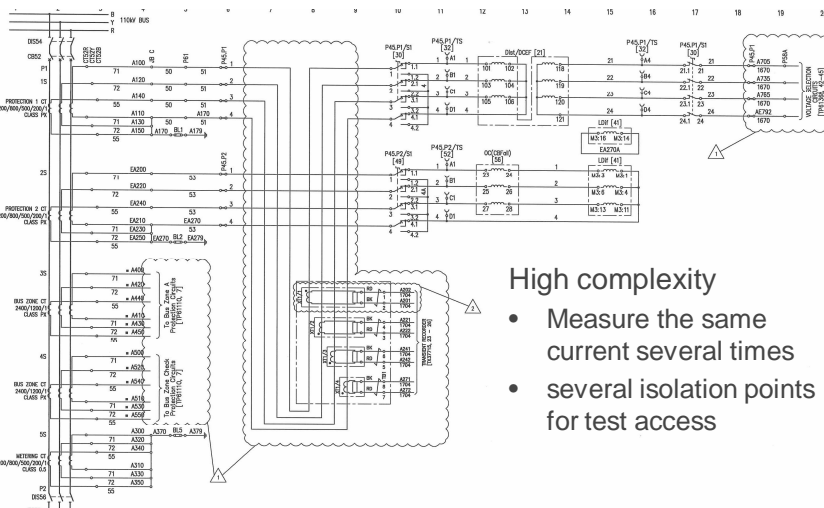
High complexity

- Measure the same status several times
- several isolation points for test access



Conventional CT circuit

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High complexity

- Measure the same current several times
- several isolation points for test access



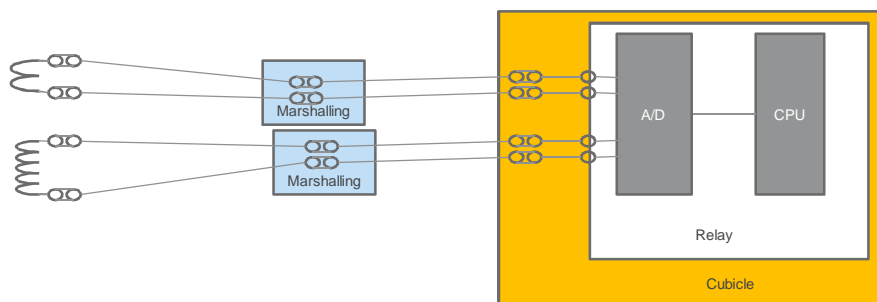
Current & Voltage Sensing Options

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- NCIT may or may not imply use of SV
- SV may or may not imply use of NCIT
- NCIT input, IEC 61850 SV output
- Conventional sensor input, IEC 61850 SV output
- NCIT input, analogue output (1A/110V, or 0-10V)
- Conventional sensor input, analogue output

Conventional Sensor & Relay

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IEC 61850 Merging Unit

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NCIT

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Non Conventional Instrument Transformers

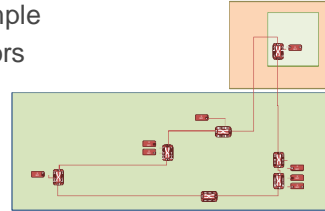
- open circuit CT explosions
- gassing
- CT saturation
- poor low end accuracy
- saturation problems
- multiple cores
 - metering, line protection, bus protection, circuit breaker failure
- CVT transient performance and frequency response
- lighter and smaller body mass
 - eliminate separate CT/VT stanchion for the sensors

Time Synchronisation

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Need to accurately time stamp samples

- Distance relay with a current and voltage sample
- Bus bar protection from several current sensors
 - Number of switches
 - Bandwidth
 - VLAN
- 1PPS well proven =>> IEC 61850 9-2 LE
 - Needs separate cabling
- IEEE 1588 uses same LAN



Traditional Questions

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Applying the process bus calls for some traditional protection engineering type questions.

- Different MU vendors?
- Installation of high accuracy electronics in yard?
- Different NCIT technologies?
- Installation on stanchions and bushing?



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- LAN in yard will exist – opportunity to utilize benefits
- CB Trip / Close must be applied with appropriate network engineering
- MUs and SV will eliminate significant wiring and sensor cores
- NCIT will eliminate CT/VT performance issues
- Time synchronization can be solved in different ways
- Traditional protection engineering questions apply



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