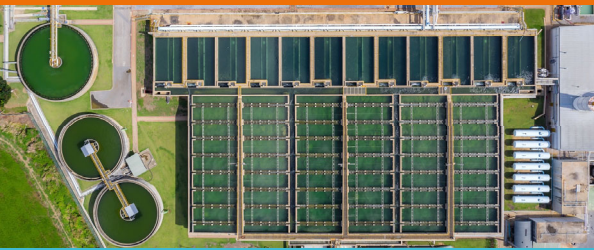


Australian Control  
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June 2022,  
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## *“Utility SCADA Communications”*

1. Modbus, Profibus, Ethernet IP etc.
2. DNP3 (main focus)
3. SCADA Network Design



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# Field Bus Protocols

- Modbus / Modbus TCP (Modicon)
- Profibus / Profinet (Siemens)
- Device Net (Koyo)
- Ethernet IP (Rockwell)

# DNP3

- Originally developed by Westronics (→ Harris → GE), Calgary, Canada, 1990
- IEEE st. 1815-2012: IEEE Standard for Electric Power Systems

Layer	OSI Model	DNP3 (3 or 4 layers)
7	Application	Application & Transport (Pseudo)
6	Presentation	
5	Session	
4	Transport	
3	Network	Link
2	Data Link	
1	Physical	Physical

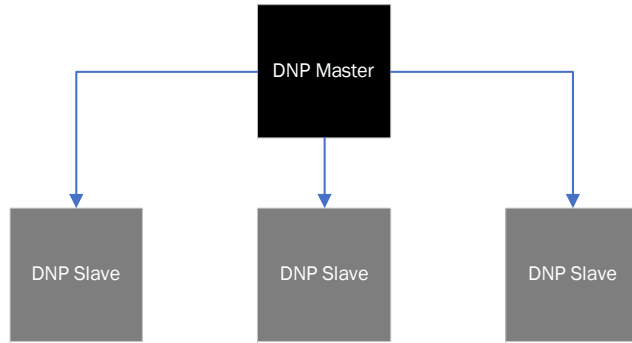
# Object Orientated

Object		Description
Group	Variation	
1	2	Binary Input (with flags)
2	1	Binary Input Event – Without <b>Time</b>
2	2	Binary Input Event – With time
10	2	Binary Output – Output status with flags
12	1	Binary Command – Control relay output block (CROB)
20	1	Counter – 32 bit with flag
20	2	Counter – 16 bit with flag
30	1	Analog Input – 32 bit with flag
30	2	Analog Input – 16 bit with flag
40	0	Analog Output Status – Any variation
41	2	Analog Output – 16 bit
50	1	Time and Date

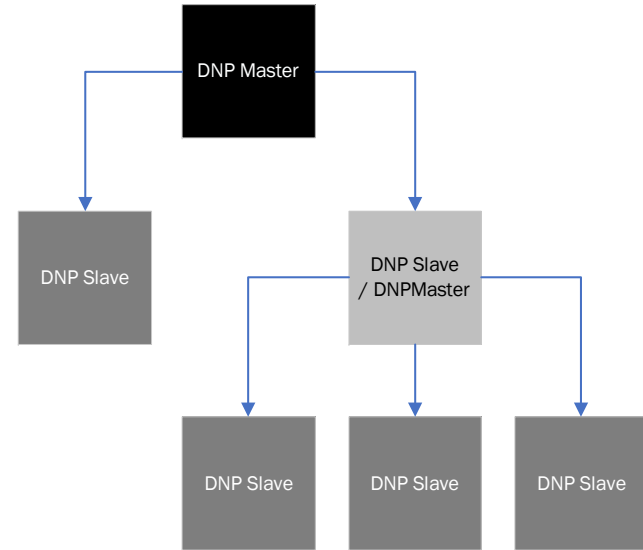
# Class and Event

Object		Description
Group	Variation	
60	1	Class Object - Class 0 data
60	2	Class Object - Class 1 data
60	3	Class Object - Class 3 data
80	1	Internal Indications
12	1	Binary Command – Control relay output block (CROB)

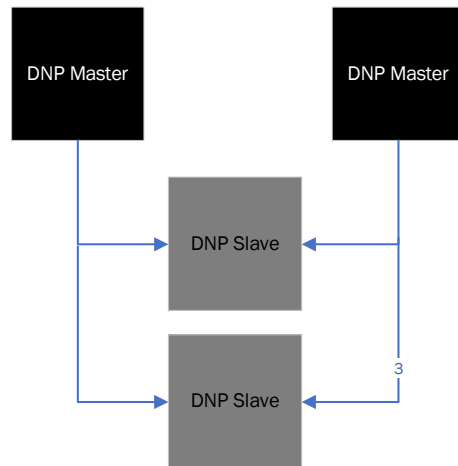
### Multidrop Configuration



### Hierarchical



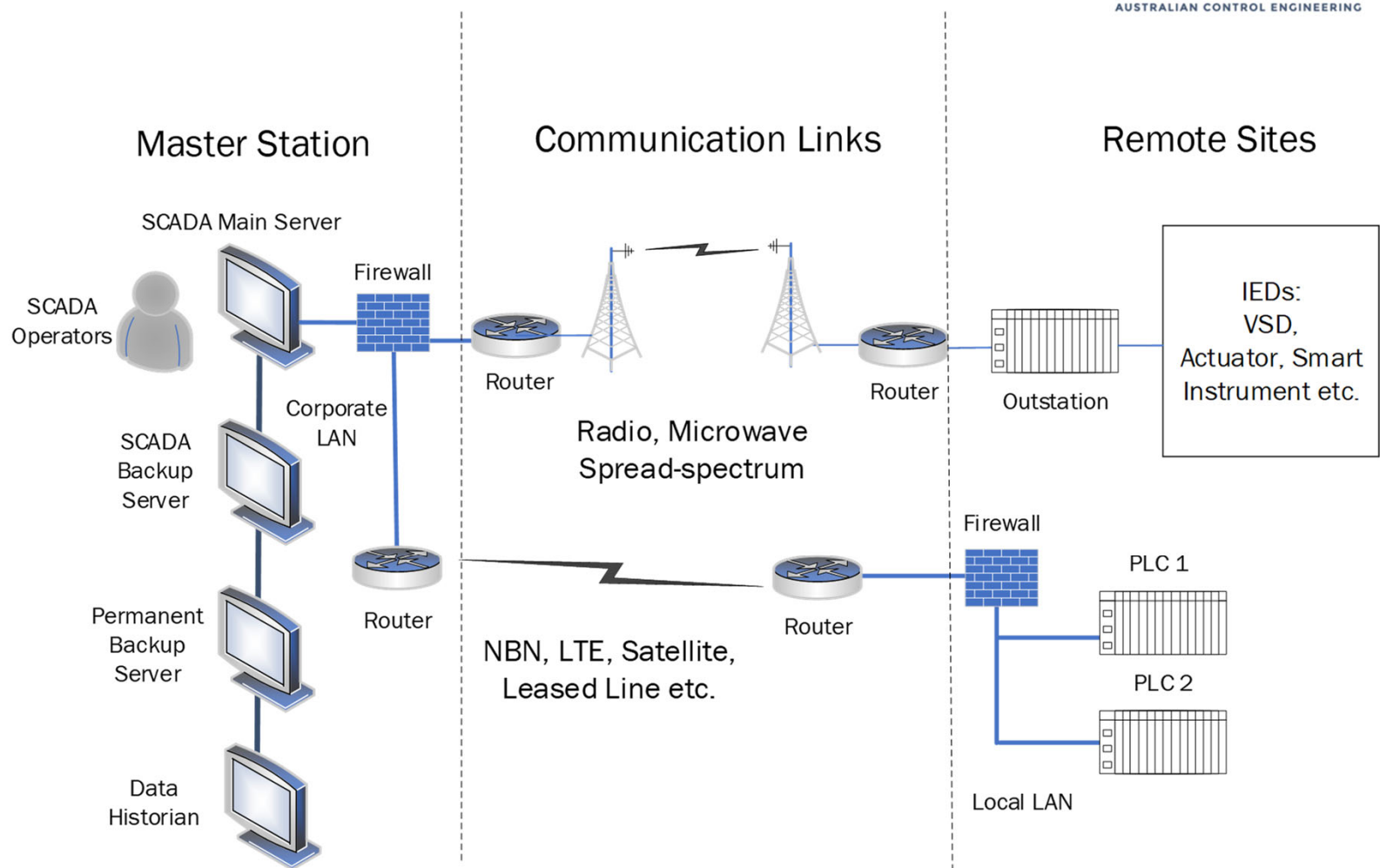
### Multimaster Configuration



### Peer to Peer Configuraiton

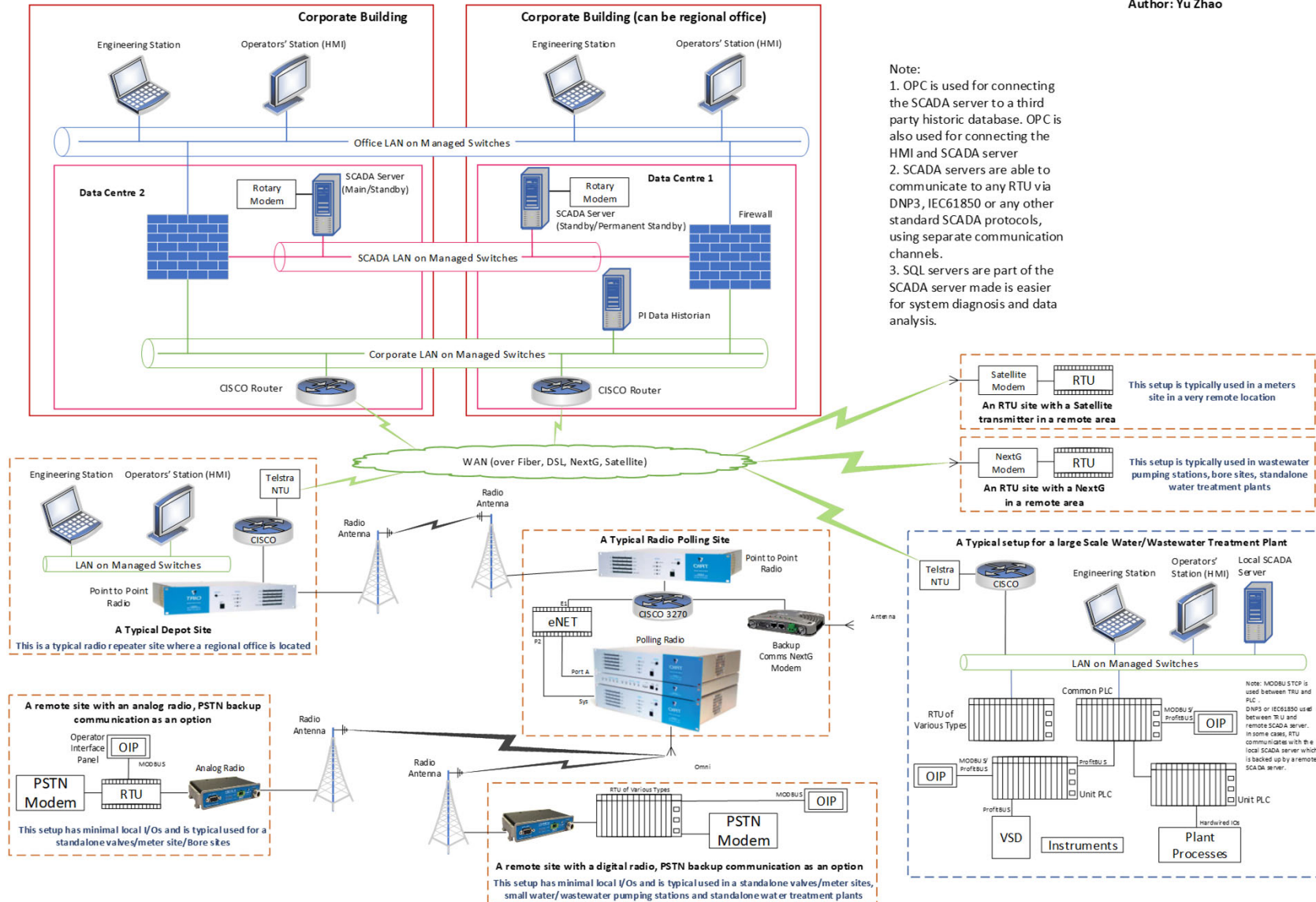


# SCADA Network Design



### Australia Water Industry Typical Corporate SCADA Architecture

Author: Yu Zhao



- Note:
1. OPC is used for connecting the SCADA server to a third party historic database. OPC is also used for connecting the HMI and SCADA server
  2. SCADA servers are able to communicate to any RTU via DNP3, IEC61850 or any other standard SCADA protocols, using separate communication channels.
  3. SQL servers are part of the SCADA server made is easier for system diagnosis and data analysis.





Q & A

