

Innovative Waterfall Implementation at NB Power



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2010/03/30



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About NB Power

- Located in New Brunswick, Canada
- Approximately 2700 employees
- Diverse Generation (Nuclear, Hydro, Thermal and Wind)



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The Challenge

- Complying with NERC Critical Infrastructure Protection (CIP) standards (CIP-002 to CIP-009)
- Ensuring that assets are protected from external threats



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The Solution

- To address this, we used Waterfall from Waterfall Security Solutions Ltd



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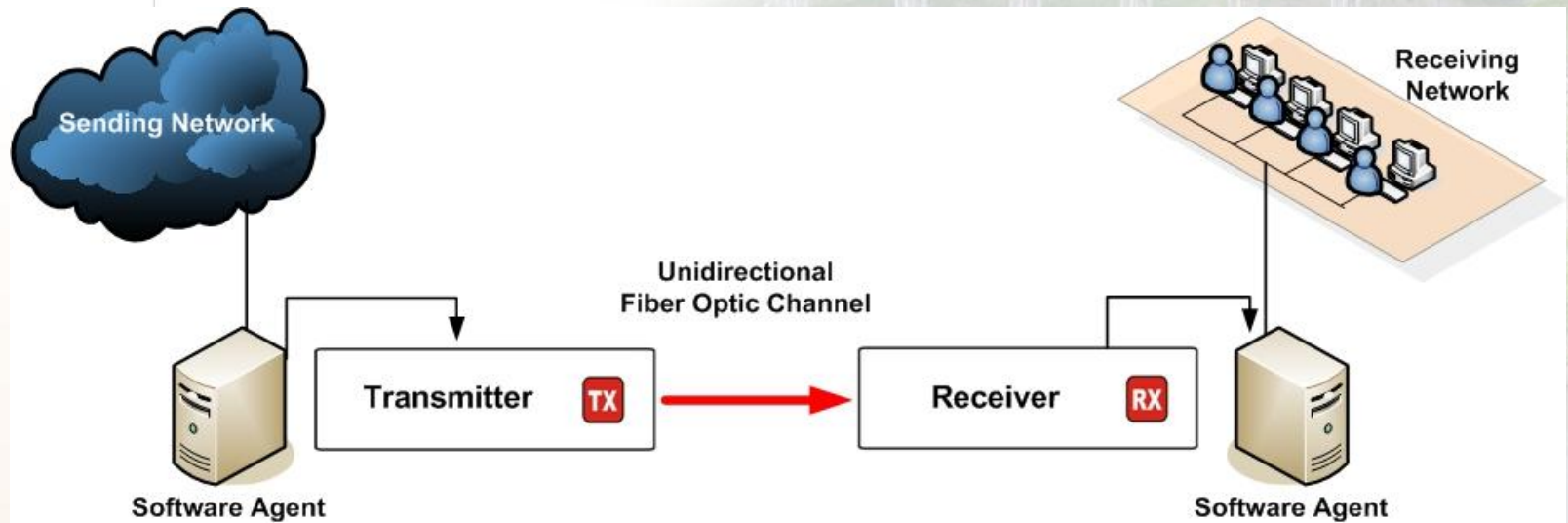
What is Waterfall?

- A one-way (or uni-directional) Security Gateway.
- Because the information can only travel one way, it is impenetrable to external cyber security threats
- This is ensured by using Waterfall hardware.
- The software is customizable to any protocol.



What is Waterfall?...*(cont'd)*

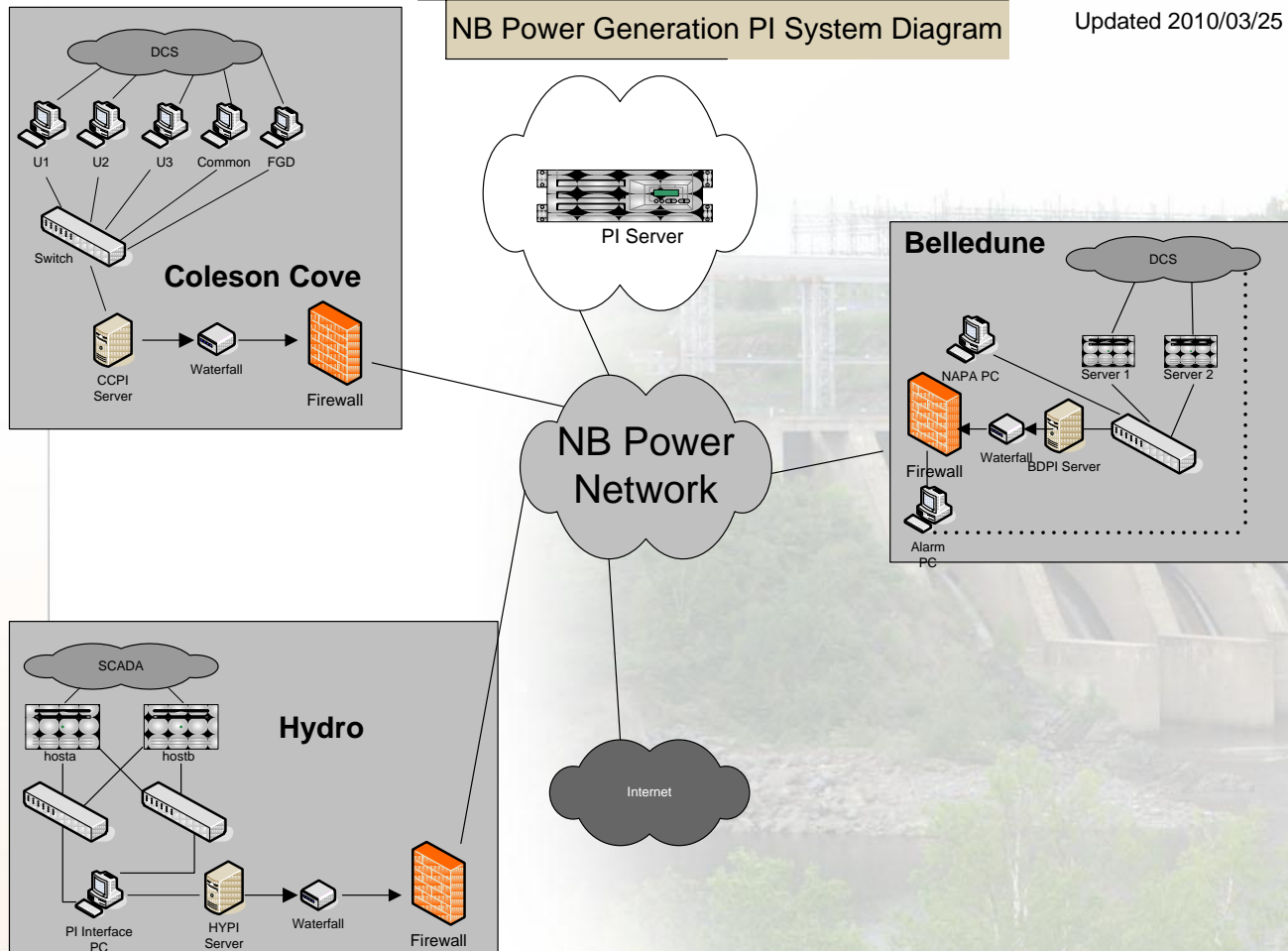
- Software agents deployed on both side of the H/W core
- Mediate the integrated solution with the surrounding *network*
- Mediate the integrated solution with the surrounding *applications*



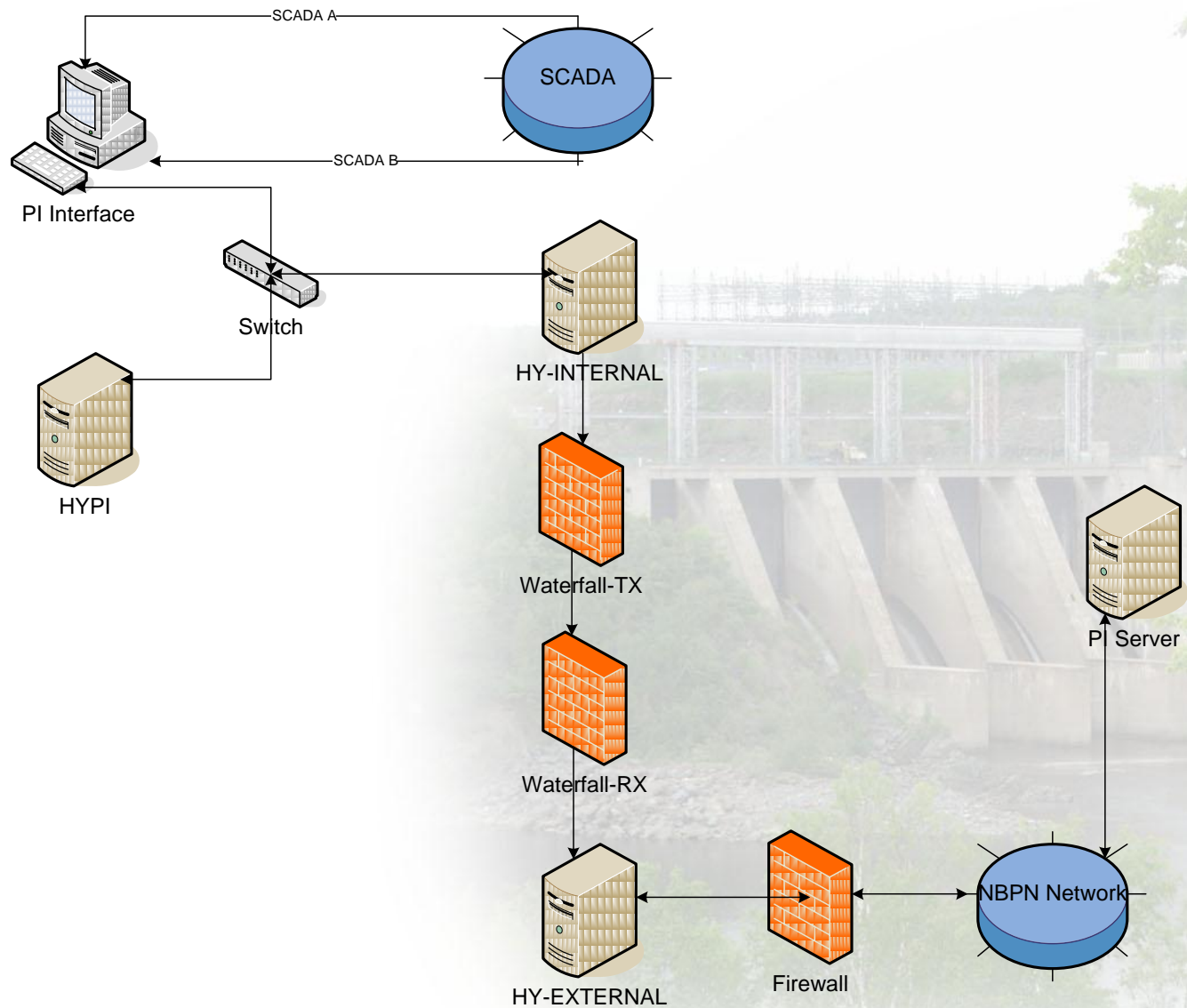
The Implementation

NB Power Generation PI System Diagram

Updated 2010/03/25



The Implementation...(cont'd)



Lessons Learned

- Take time to ensure how the data is transferred between your DCS and PI.
 - Thermal Heat-rate calculations were designed to be written to the DCS from PI
 - This was beneficial because all information was on the DCS while still keeping the same look and feel for the operators
 - By adding Waterfall, the data being written to the DCS was no longer possible.
 - The solution was to add a kiosk type pc to display PI readings from the centralized PI server.



Lessons Learned (cont'd)

- Use PI Performance Monitor with Waterfall
 - Since you cannot directly control servers behind a waterfall (unless you are on the protected side of the network) use PI Perfmon
 - Since PI works with Waterfall, the information related to the servers will still be sent to the centralized server for monitoring.
 - It is helpful to understand the state of the systems while at the same time having no access to it.



Lessons Learned (cont'd)

- Have procedures to document when and why Waterfall has to be bypassed.
 - Sometimes a system needs to be need accessed for various reasons (maintenance, troubleshooting, etc) but with Waterfall, this is not possibly if you are external to the protected network.
 - Have procedures to identify who can make a change to the configuration as well as;
 - Anticipated length of time for by-pass
 - Informing appropriate people so that the change is not forgotten
 - Use Waterfall Secure Manual Uplink (WF-SMU) to provide a secure temporary bi-directional connection



Conclusion

- The Waterfall solution is a very innovative solution to address external cyber security concerns.
- NB Power Generation is now in compliance with NERC CIP standards
- With a little bit of planning, a Waterfall implementation can be achieved with virtually no impact to users.



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