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**UC2010**

**Real Time Information** — Currency of the New Decade

Hilton San Francisco Union Square | San Francisco, CA

**April 26-28, 2010**



# Securing your PI System

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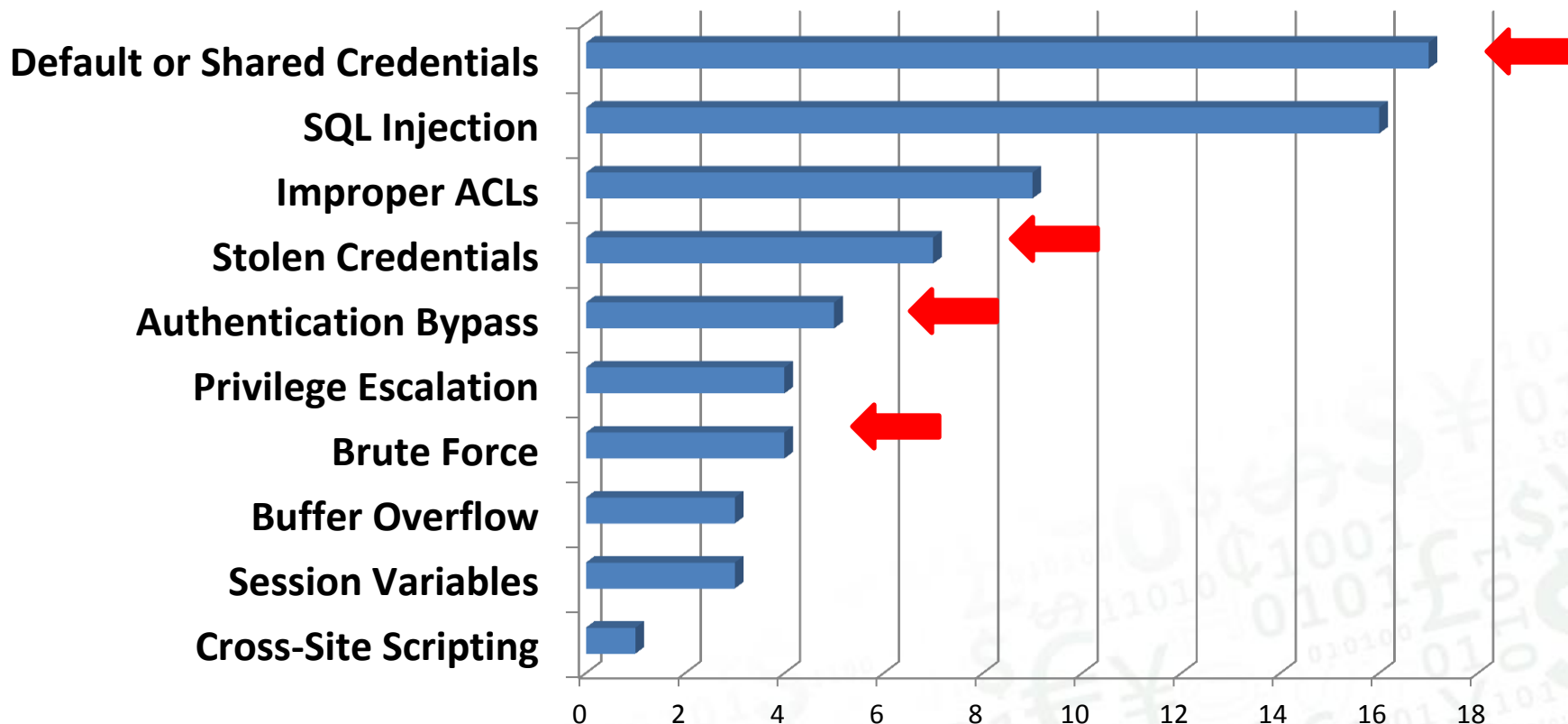
Greg Wright  
Énergie NB Power

# Agenda

- PI with Windows Security
  - Demo
  - Recommendations
- Waterfall™ and New Brunswick Power
- FAQs about Security

# Authentication – The Weakest Link

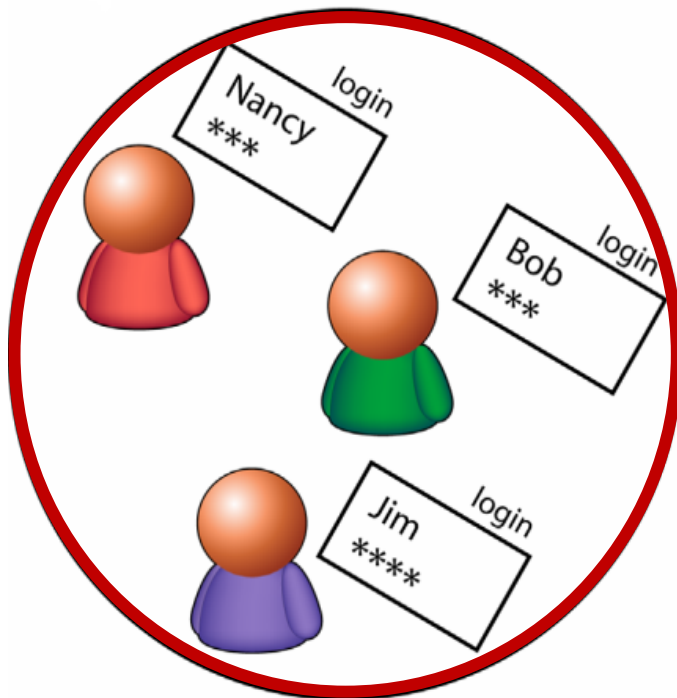
## Hacking Breach by Type



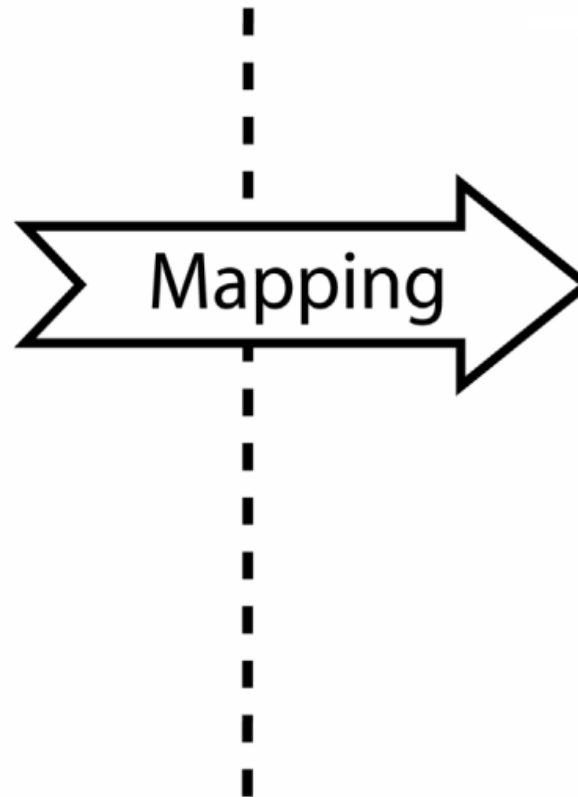
Source: 2009 Verizon Data Breach Report

# Windows Security

Windows



AD GROUP



PI Server



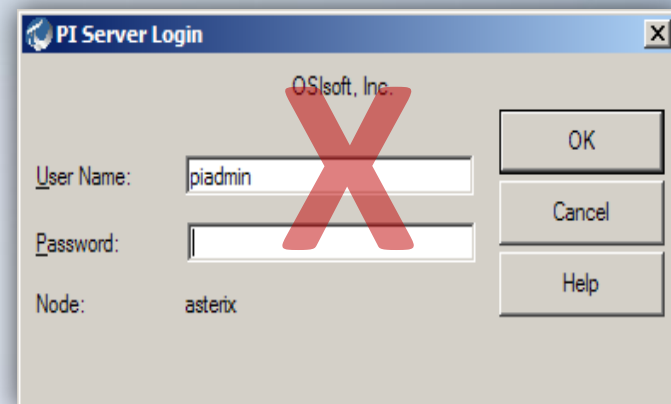
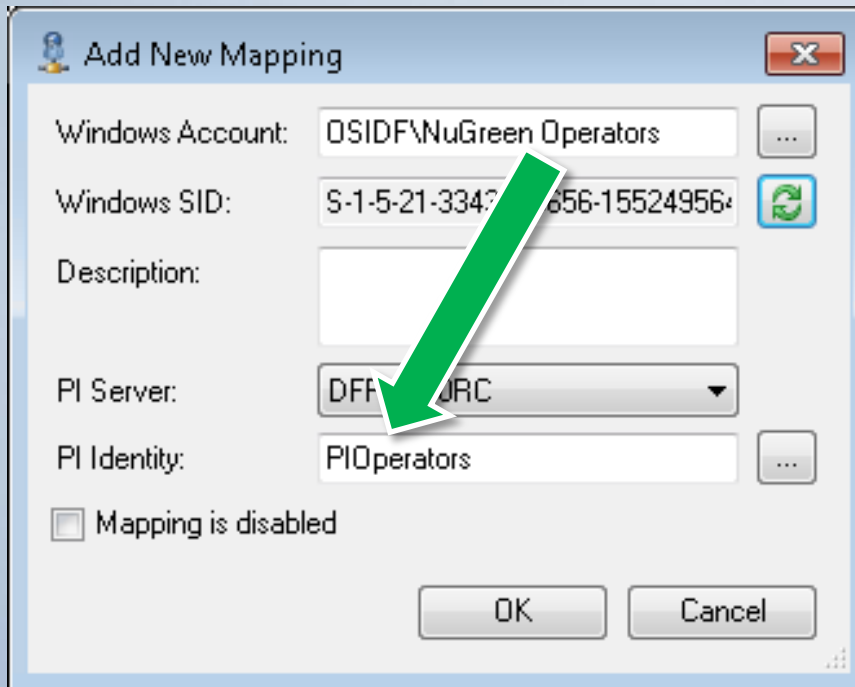
PI Identity

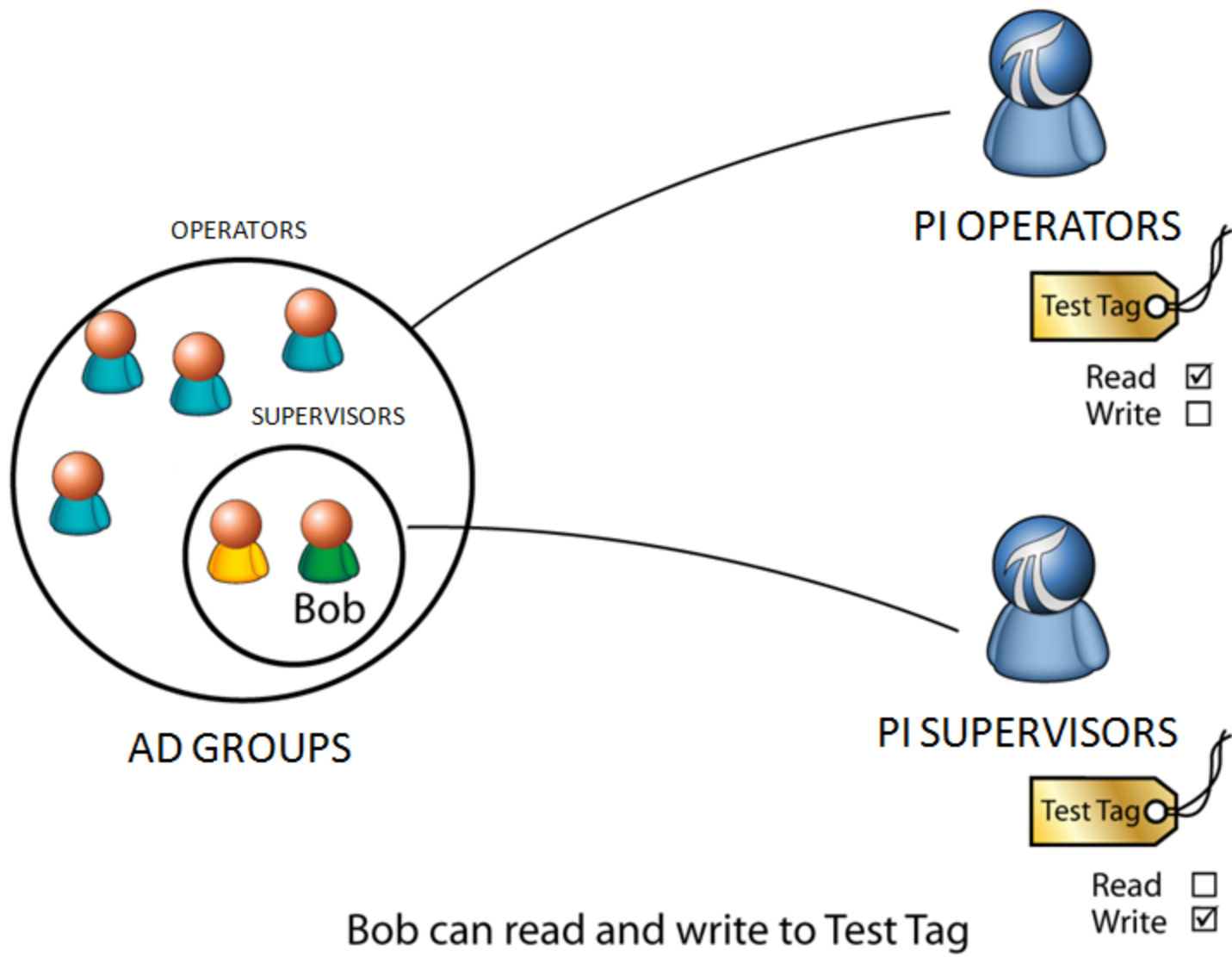


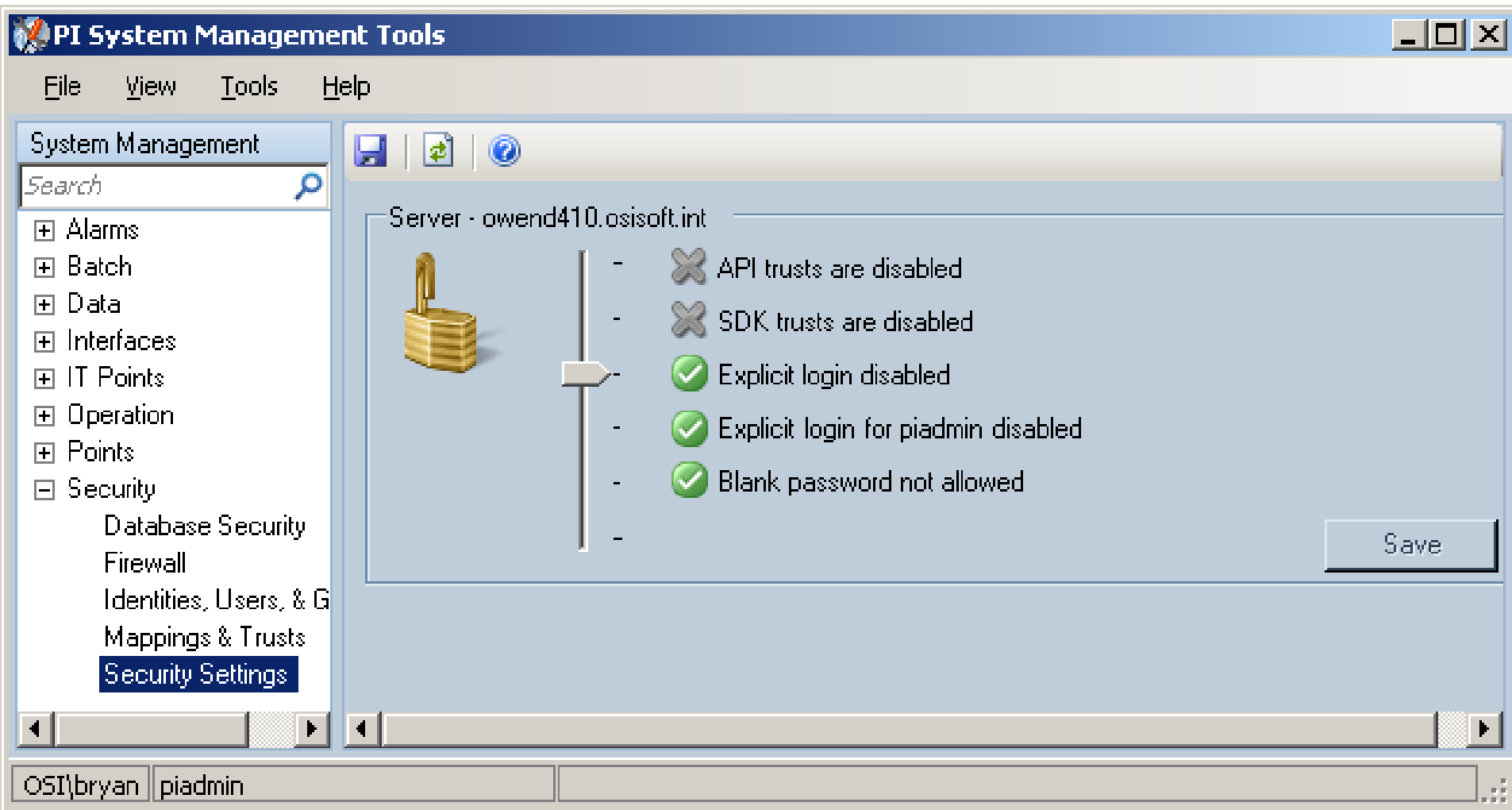


# Single Sign On

- One-time mapping for Active Directory groups









# Demo

- Ease of Administration



File View Tools Help

Collectives and Servers

Search


Servers

☒ DFPI2010RC


☐ dfpiserver1

System Management Tools


Search




Database Security




Firewall



Identities, Users, ...



Mappings & Trusts



Security Settings

Session Record

# Demo

- Single Sign On



- News
- Offices
- Departments
- Search
- Help
- Manufacturing
  - Houston Plant
  - Little Rock Plant
  - Tucson Plant
  - Wichita Plant
- Engineering
  - Cracking Process
  - Extruding Process
  - Milling Process
- Recycle Bin
- All Site Content

### Corporate Portal



As one of the premier manufacturing and process companies, NuGreen is uniquely suited to meeting the needs of our customers in rapidly changing market conditions. Our goal is to provide world-class products and services, while maintaining our own core values of excellence, safety, and innovation.

### Event

| <input type="checkbox"/> | Title  | Start Time         | End Time           | All Day Event |
|--------------------------|--|--------------------|--------------------|---------------|
| <input type="checkbox"/> | <a href="#">FY10 First Quarter Financial Results</a> | 4/6/2010 5:00 PM   | 4/6/2010 6:00 PM   |               |
| <input type="checkbox"/> | <a href="#">Executive</a>                            | 4/10/2010 12:00 AM | 4/11/2010 11:59 PM | Yes           |

I need to...

Employee Lookup

### Top Sites

| <input type="checkbox"/> | Type | Edit | URL                             |
|--------------------------|------|------|---------------------------------|
| <input type="checkbox"/> |      |      | <a href="#">Human Resources</a> |
| <input type="checkbox"/> |      |      | <a href="#">Marketing</a>       |
| <input type="checkbox"/> |      |      | <a href="#">Engineering</a>     |
| <input type="checkbox"/> |      |      | <a href="#">Manufacturing</a>   |
| <input type="checkbox"/> |      |      | <a href="#">Operations</a>      |
| <input type="checkbox"/> |      |      | <a href="#">Sales</a>           |

+ Add new link

# How can I use Windows security?

- Install PI Server 3.4.380 or 2010
- Map from Active Directory to PI Identities
- Use client or data access application with PI SDK 1.3.6 or higher. Examples:
  - PI ProcessBook 3.1 or higher
  - PI DataLink 4.0 or higher
  - PI WebParts 2.2 or higher
- See *Configuring PI Server Security* manual

# PI with Windows Security

- Enhanced Security
- Better Manageability
- More Control
- Less Maintenance
- Lifecycle Support



\*\*\* Add info on AF Security





The slide features a decorative header at the top with a blue and red gradient bar. The background is white with faint, diagonal patterns of binary code (0s and 1s) and various currency symbols (\$, £, €, ¥, ¢) in the lower right quadrant.

Securing your PI System

# CASE STUDY

# *Innovative Waterfall Implementation at NB Power*

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IT Specialist, NB Power Generation

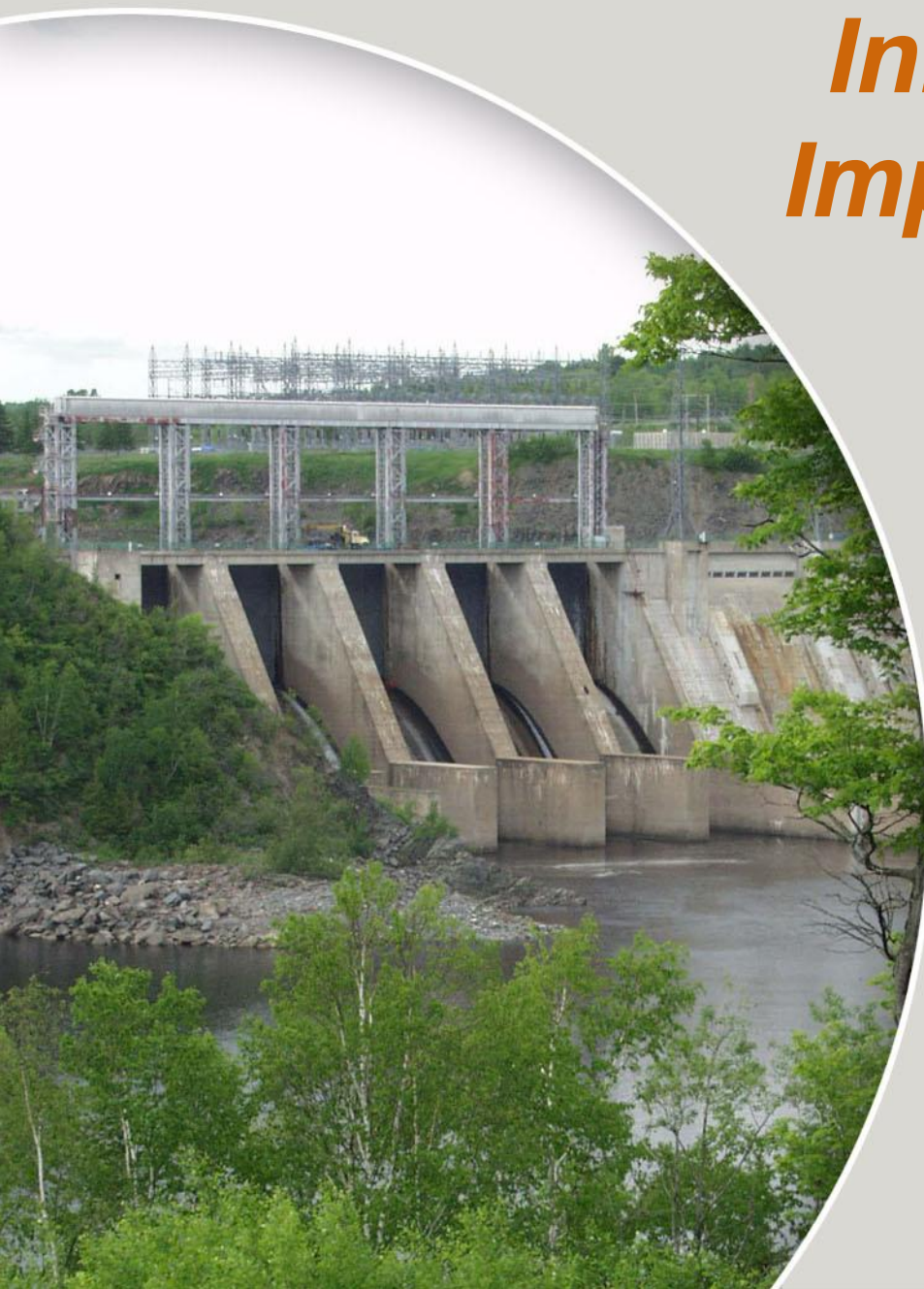
2010/03/30



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Production   Generation



# About NB Power

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



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# *The Challenge*

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- 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*

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- 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.



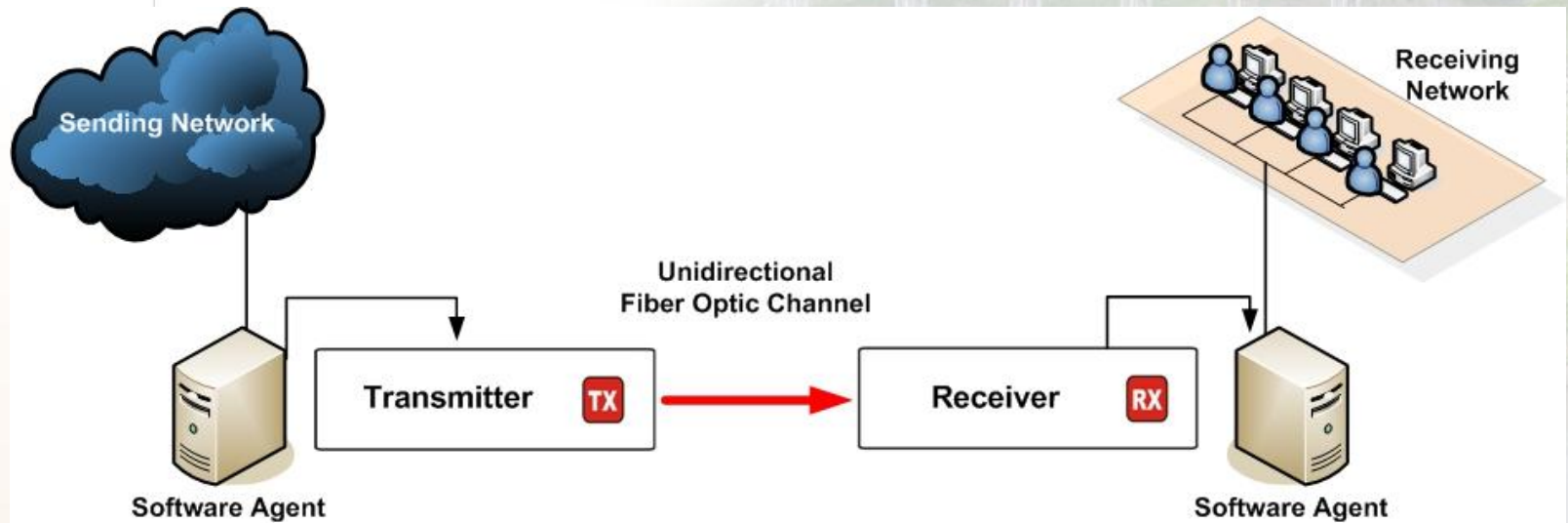
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# What is Waterfall?...*(cont'd)*

- 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*



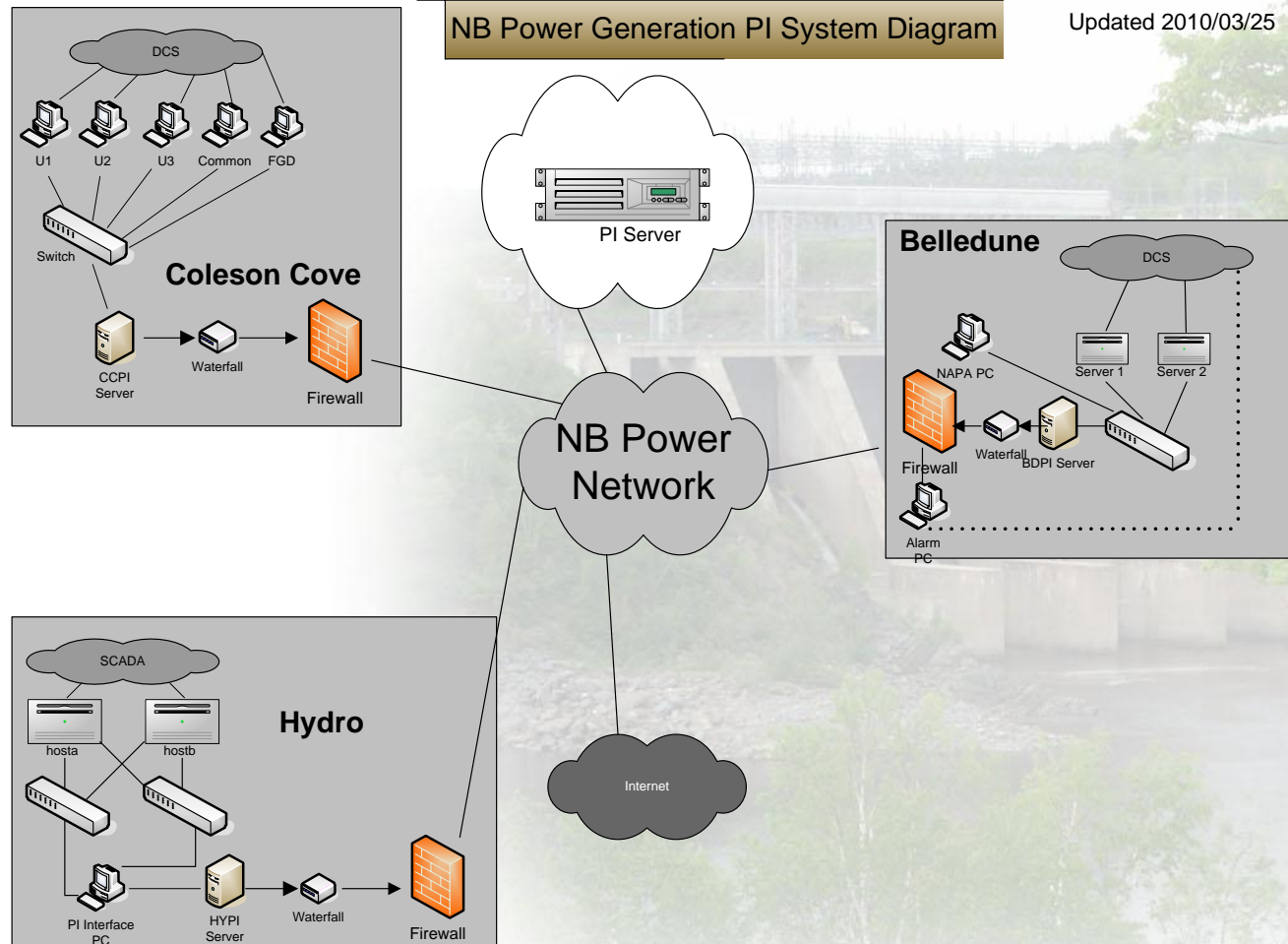
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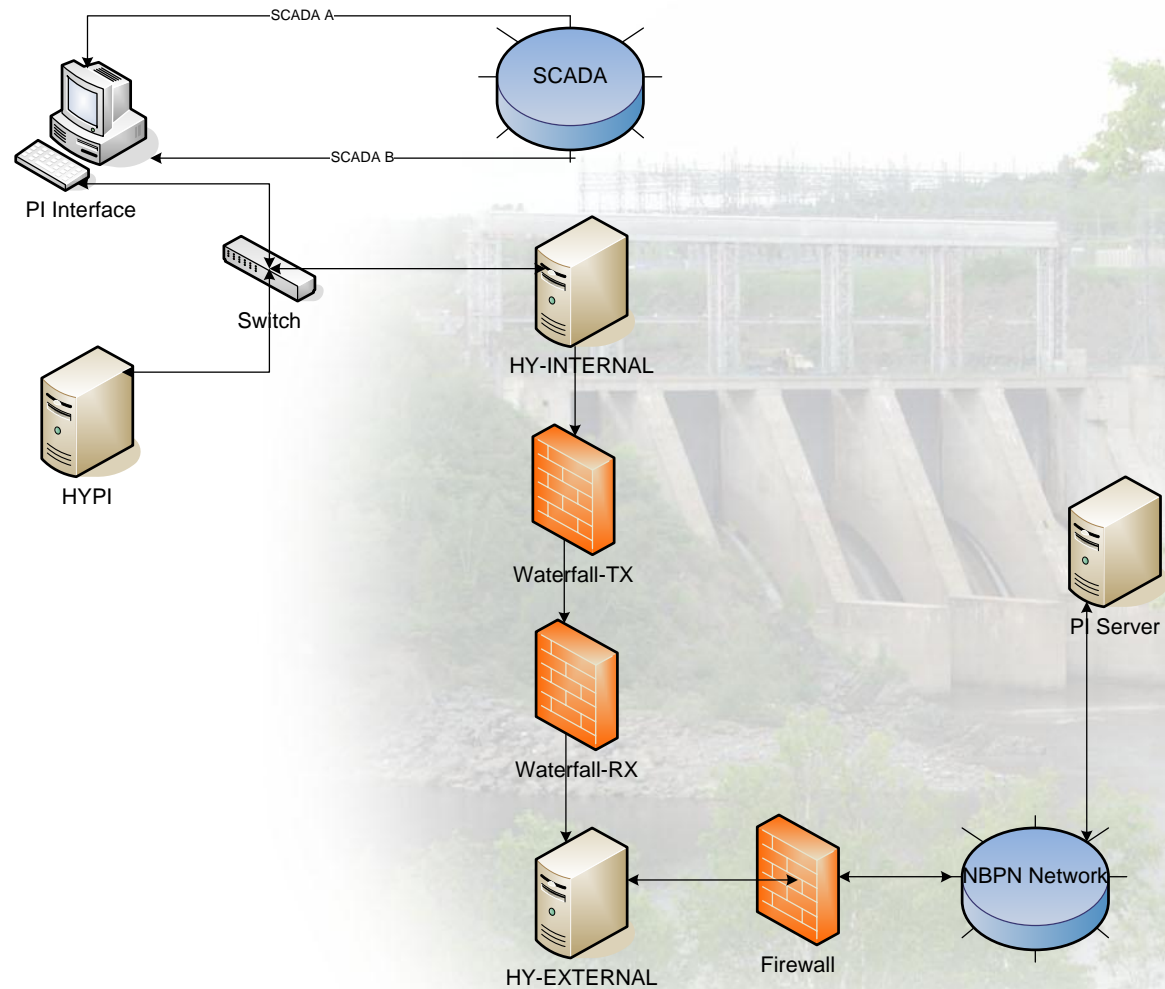
# The Implementation

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.



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# ***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 them.



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# *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

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- 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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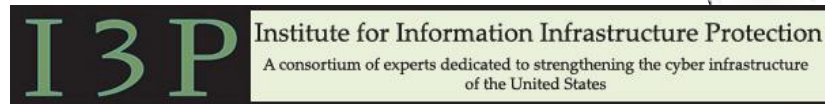
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## Associations



## Research

Digital Bond: SECURING THE CRITICAL INFRASTRUCTURE



UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

## Government



## Commercial

Microsoft

ABB



TELVENT

Rockwell Automation



# How can I do a Cyber Security Audit?

- “Bandolier”
  - Nessus scanner for PI
  - Audit security settings
- “PortalEdge”
  - Detect cyber attacks
  - IT Monitor + PI ACE



Funded by U.S. Department of Energy

See [www.digitalbond.com](http://www.digitalbond.com)

# Security is more than Compliance

- 2009 Certificate of Networthiness (CoN)
  - US Army Network Command
- 2009 Windows 2008 R2 Logo Certification
- 2008 Windows 2008 Logo Certification
  - Microsoft 'Server Core'
- 2006 National SCADA Test Bed
- 2004 EPRI and Utility Partner



# Our Commitment to You

- Leverage security infrastructure
- Minimize risk to critical infrastructure
- Promote safe defaults and user experience
- Maintain vetted and highly skilled support staff
- Collaborate on effective security solutions





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Thank you

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# FAQs on Security

- What if PI Server is not part of a domain?
- Can we use more than one AD domain?
- How do we grant access to users outside the organization?
- What if there is a firewall between users and the PI Server – is there a list of ports required to be open?

# More FAQs on Security

- We are using pidemo with no password for read only access – what are the risks?
- How do I audit user access – are there alerts for unauthorized access?
- Is data encrypted in the PI System?
- Is the PI Server NERC CIP compliant?