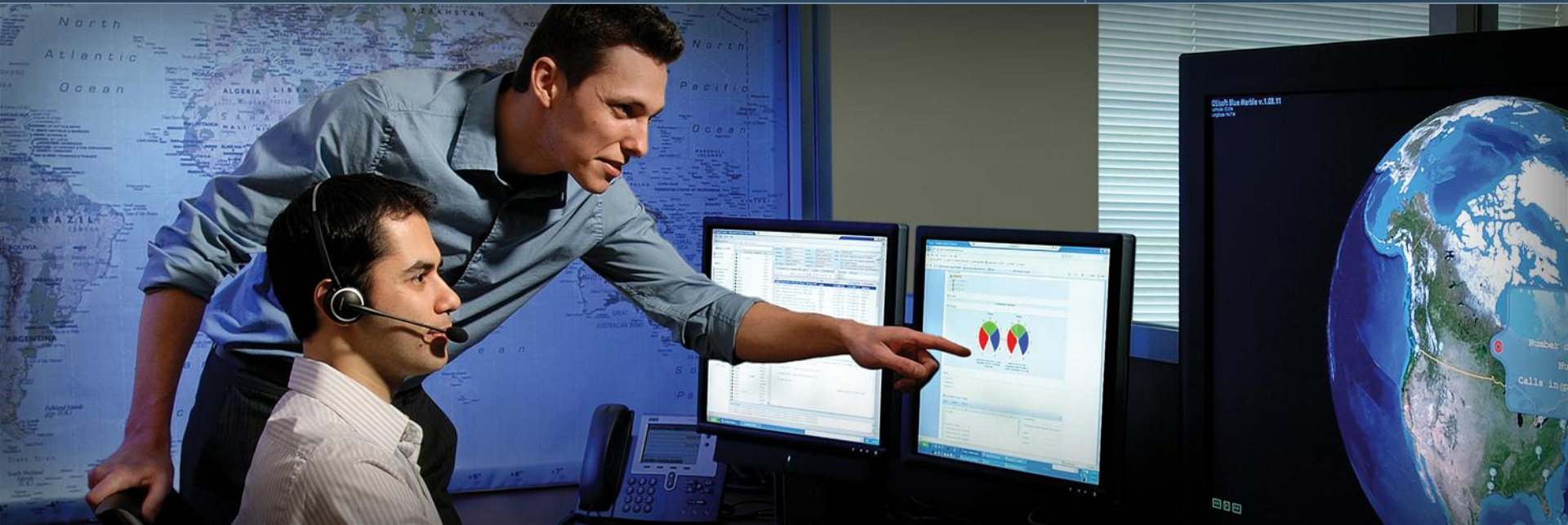**OSIsoft**®

Regional Seminar Series

São Paulo, Brazil

Interfaces
The Past... The Present... And The Future

28/10/2010

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OSIsoft, LLC.

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Petrobras

The Past…
The Present…
And The Future…

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What are Interfaces?

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25 developers and QA engineers

> 425 years of development experience

> 225 years of PI System experience

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With developers in...

Czech Republic

Johnson City

Philadelphia

Phoenix

San Leandro

Savannah

New Zealand

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About Petrobras

- **4th biggest energy company in the world**
  Source: PFC Energy (January/2010)
- **8th biggest global company in market value and the biggest in Brazil: $164.8 billion**
  Source: Ernst & Young (July/2009)
- **Value of the Petrobras brand: $1.2 billion**
  Source: BrandAnalytics (2008)
- **Brazil's most socially responsible company**
  Source: Ibope Inteligência (July/2009)
- **The company recalled the most in the fuel category**
  Source: Folha Top of Mind Award (October/2009)
- **4th place among the world's most respected companies**
  Source: Reputation Institute (May/2009)

Empowering Business in Real Time.

Petrobras

- **Activities**
  - Oil and Gas Exploration and Production
  - Oil and Natural Gas Refining
  - Distribution
  - Petrochemicals
  - Generation of Electric Energy
  - Biofuel Production
  - Transportation and Trade

- **Where PETROBRAS is**
  - AFRICA - Angola, Libya, Namibia, Nigeria, Tanzania
  - ASIA – China, India, Iran, Japan, Singapore
  - CENTRAL AMERICA - Cuba
  - EUROPE - Portugal, Turkey, United Kingdom
  - NORTH AMERICA – Mexico, U.S.A.
  - OCEANIA – Australia, New Zealand
  - SOUTH AMERICA – Argentina, Bolivia, Brasil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela

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- One of the first installations of PI System in Brazil

- Metso Max-1 DCS (Leeds & Northrup)

- The OSIsoft interface at the time couldn't handle data from the snapshot, only from the DCS history (trend) – a major issue

- New interface developed by Julie using an API from Petrobras (TCP/IP) to collect snapshot data

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First DCS Upgrade

- Metso Max-1 to Max-1000

- Different interface

- Installation of the PI-IN-LN-1000-VAX for Petrobras using the API

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Platform Upgrade

- Moved from Vax to Alpha

- New interface from OSIsoft: PI-IN-LN-1000-AXP for Petrobras using the same API

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- Most of the current DCS's connections are slow

- REVAP's DCS was being upgraded

- Result was too much load on DCS resources

- Project canceled

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- Need was to move from OpenVMS to Windows

- OSIsoft interface PI-IN-MCS-PLUS-NTI with new API

- New way to read data from DCS using maxDNA resources

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New Platform Upgrade

- To move from AXP to Windows

- New interface developed by Julie's team (Ryan) with the same API

- Running now for testing purposes

- Collecting almost 1000 points

- Some issues – some tags with zeroed values and digital states with raw values

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In Summary...

- OSIsoft has continued to meet REVAP's needs since 1995

- Data collection was not stopped because of DCS upgrades or different machine architectures

- New interfaces were developed when the need arose

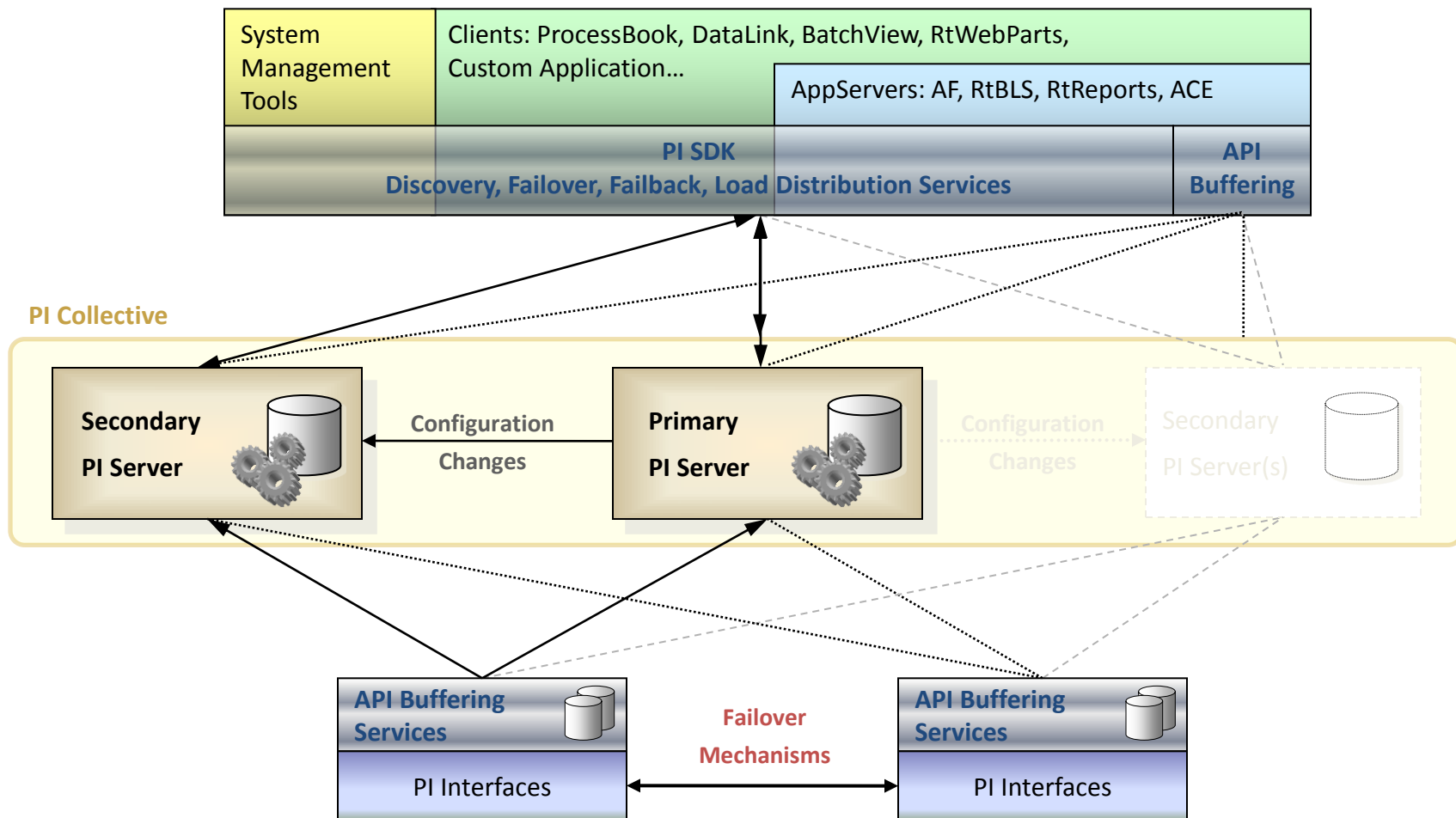Value now. Value over time.

The Present

- Almost all of our interfaces only collect real time data

- Almost all interfaces built using the Universal Interface Template (uniint)

- Consistent behavior for our interfaces

    - Exchange of information with the PI Server

    - Messaging

    - Ability to start up disconnected from the PI Server

    - Monitoring the health of an interface for mPI

    - Single interface buffers data to multiple PI Server home nodes
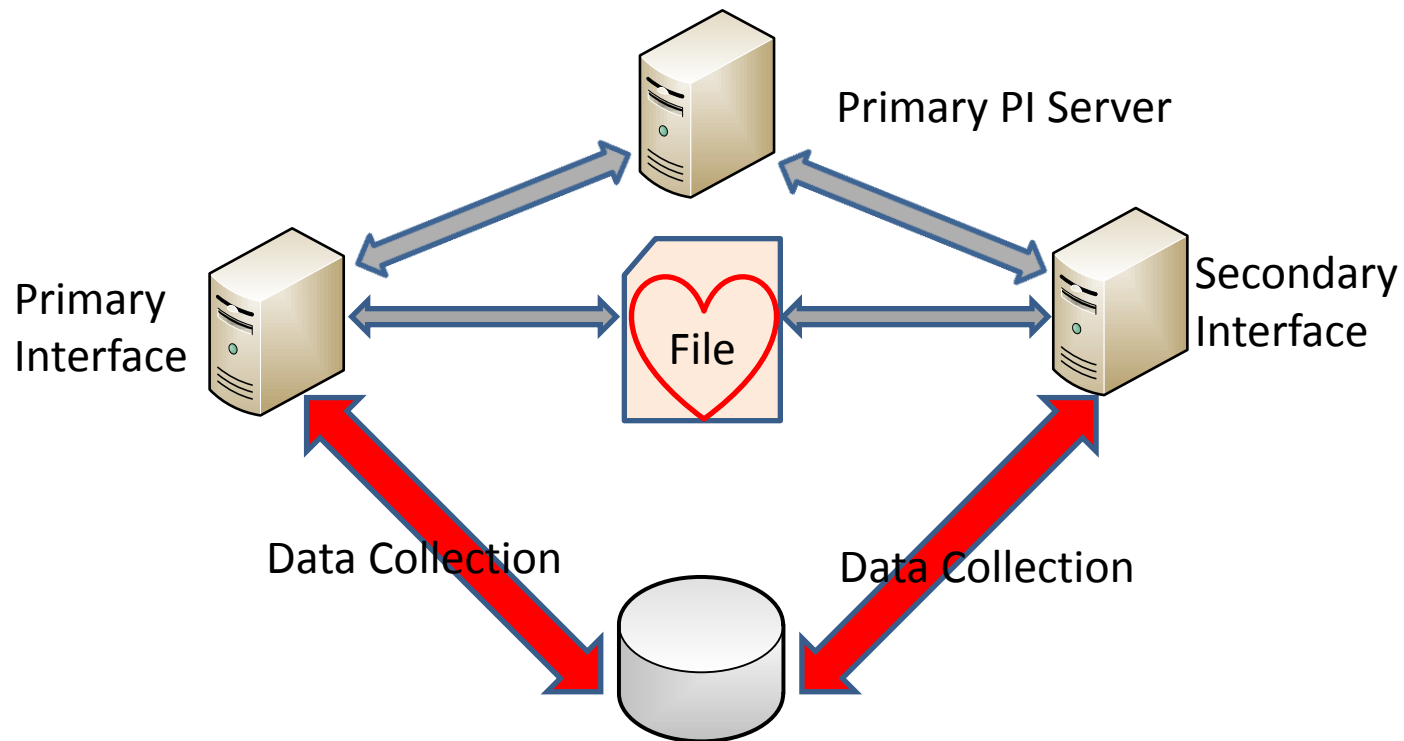
    - Interface failover in a consistent manner

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PI HA Architecture

System Management Tools	Clients: ProcessBook, DataLink, BatchView, RtWebParts, Custom Application...	
		AppServers: AF, RtBLS, RtReports, ACE
	PI SDK **Discovery, Failover, Failback, Load Distribution Services**	**API Buffering**

PI Collective

Secondary PI Server

Configuration Changes

Primary PI Server

Configuration Changes

Secondary PI Server(s)

API Buffering Services

PI Interfaces

Failover Mechanisms

API Buffering Services

PI Interfaces

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- **Phase 1**

  - Communicate via heartbeat to source data system

  - Only available for selected interfaces

- **Phase 2**

  - Communicate via heartbeat to shared file and to primary PI Server

  - All interfaces now support Phase II failover when they are released
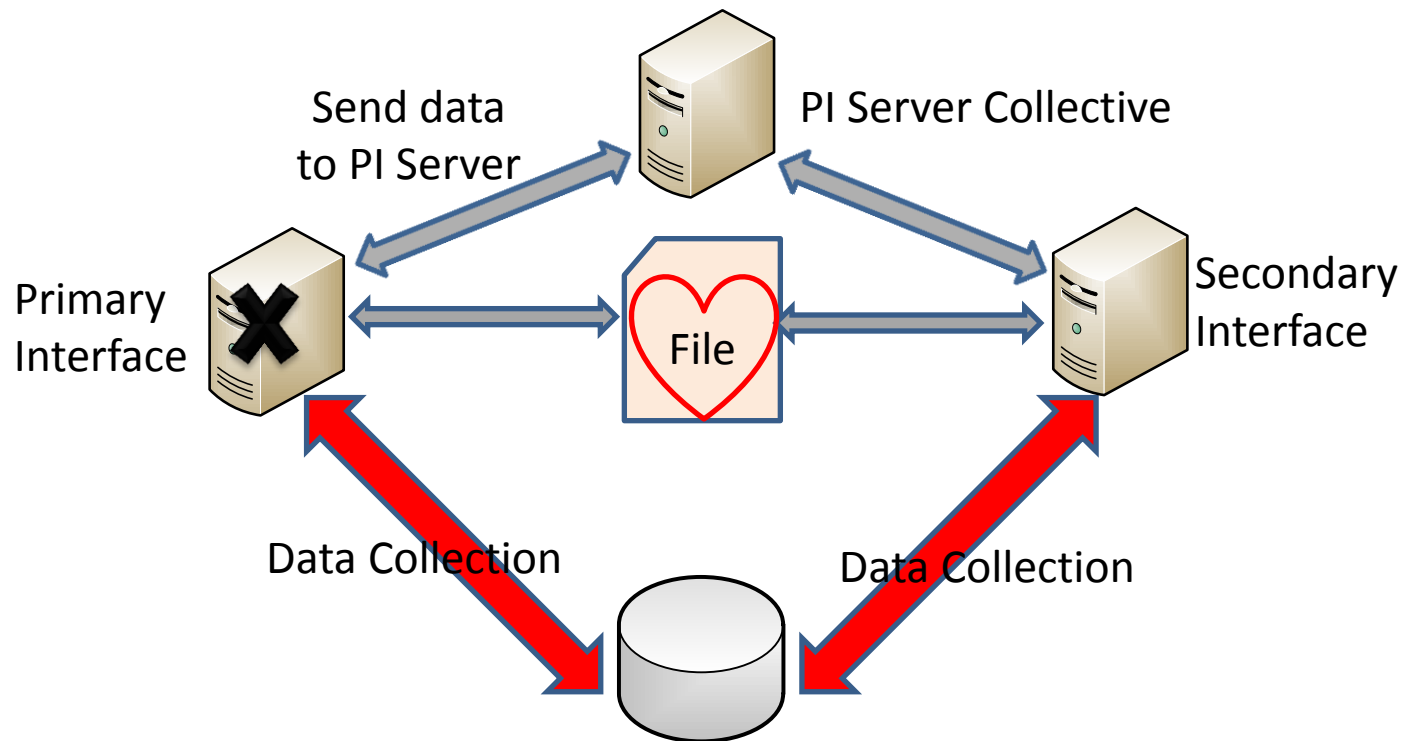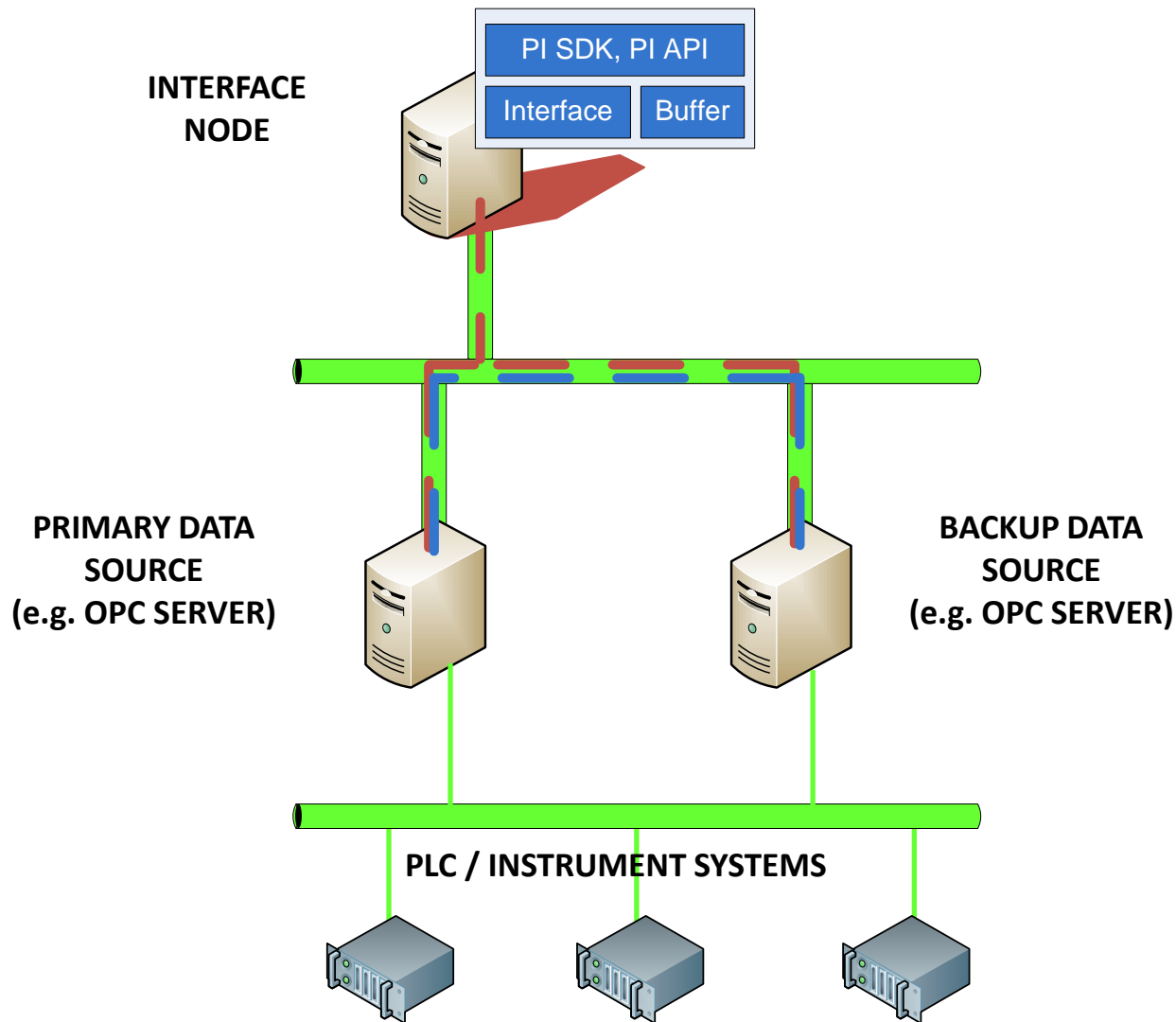
  - OSIsoft recommended type of failover

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PI Interface Phase II Failover

- Two interfaces collect the same data from the data source or mirrored data sources

- Interfaces send a "heartbeat" to each other through a shared file and through the primary PI Server

- Only the primary interface sends data to PI Server

- If Primary interface fails the secondary interface realizes this and starts sending data to PI Server

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(recommended) Both primary and secondary interfaces collect data. Primary interface sends the data to PI Server. There is no data loss when secondary interface assumes control.
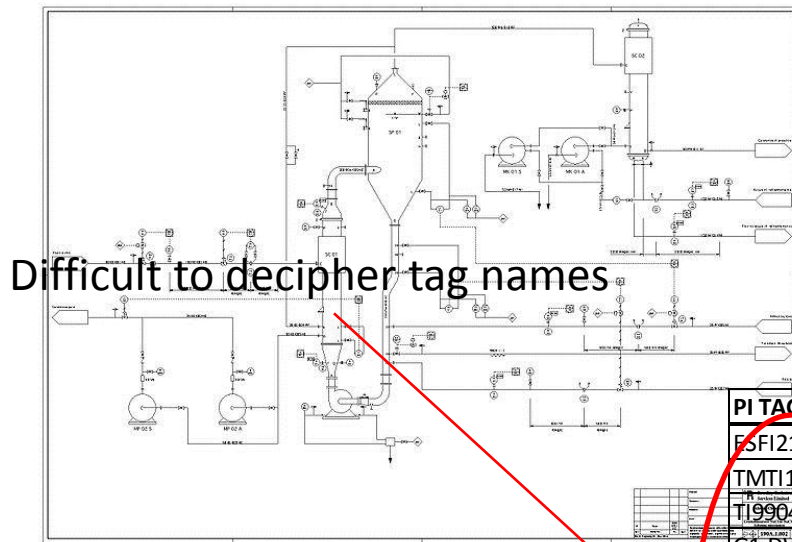

Send data to PI Server

PI Server Collective

Primary Interface

File

Secondary Interface

Data Collection

Data Collection

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OSIsoft.

- Uniint can no long meet the throughput and data rates that many new systems require.

- Configuration and management of interfaces is sometimes not easy

- No Automatic Point creation for most interfaces except using APS

- **Uniint does not have an easy way to communicate with PI AF**

  - Provide context to go along with the real time data

  - Find and view your data in terms of our equipment/asset name, not the name of a PI Tag

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What's Missing?

Difficult to decipher tag names

P&ID

PI TAG	ENG UNITS	DESCRIPTION	MIN	MAX
ESFI21A2	KPPH	STEAM TURBINE UNCONTROLLED (IND FLOW)	0	100
TMTI132A	DEGF	ST-100 METAL TEMP (BEARING2)	0	400
TI99047	??	??		
G1:DWATT		Generator MW Output		
TMZ120A1	%	ST-100 AXIAL POSITION (PROBE #1)	-100	100
TMZ120A2	%	ST-100 AXIAL POSITION (PROBE #2)	-100	100
GT2PEAK.PV		GT2 Peakload Signal	0	1
FE_PUMP		Fire Extinguisher Pump Status		
ESFI33A	KPPH		0	425
ESTI34A	DEGF	LETDOWN TEMP TYPE E (HP STEAM)	0	1000
HPPI30B1	PSI	HP STEAM PRESSURE 1 (HP STM P)	-1	1550
ESFI21A1	KPPH	STEAM TURBINE UNCONTROLLED (EXTR FLO)	0	210

Missing or incomplete data –
difficult to find what you need

Data

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PI Asset Framework

The Future is Here

- PI System 2010

- The PI System consists of a PI Server and a PI AF Server

- Examples of interfaces that automatically store information into PI AF are:

    - AMI Head End Interfaces

    - DeltaV Asset Connector

- More PI AF aware interfaces to come

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Vision for Interfaces

- Exchange of asset information with PI AF

- Real time data scalability

- Built in point creation

- Much simplified management, installation, and configuration

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- Silver Spring Networks UtilityIQ Interface (AMI - new)

- Modbus Ethernet and Serial Interfaces (rewrite)

- UFL – replacement for Batch File

- BACnet Interface – many improvements to the BACnet Query Tool

- Siemens SIMATIC Batch Interface (new)

- GE iBatch Batch Interface (new)

- Honeywell TotalPlant Batch Interface (new)

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- Uniint functionality for mPI

  - All messages written to the local PI Message Log

  - Interface health information also written to performance counters

  - OPC 4Q 2010, OPC HDA 4Q 2010 , PIToPI, RDBMS, and others to follow

- IEC 61850 connectivity

- OPC Xi Interface

- UFL – GUI for XML file parsing

- Web Services Interface

- WITSML Interface

- Much more including additional AMI development....

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OSIsoft will continue to develop the interfaces that you need to provide you with the critical information that is required to run your business

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Thank you