OSIsoft High Availability PI Replication

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Introduction

- High Availability (HA)

  "Ability of a system to tolerate faults and continue to provide service according to its specifications"

  Dr. Kalinsky "Design Patterns for High Availability"

- For mission-critical applications, this means:
  1. Data availability
  2. No unplanned downtime
  3. Acceptable performance under load

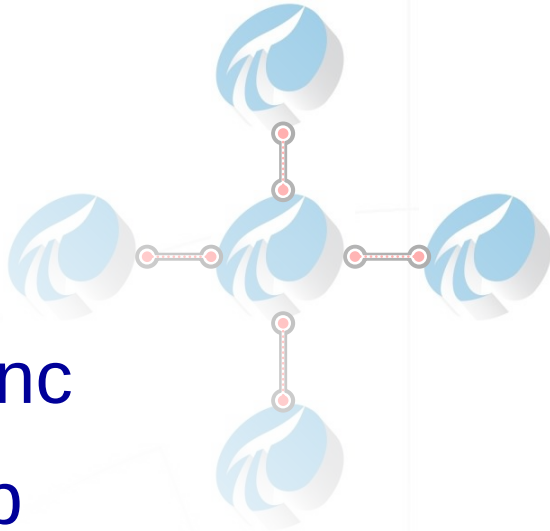
- The PI System has High Availability features today
  - Already a robust platform, but single points of failure exist
  - Can you really afford any downtime?

Agenda

1. The PI System Today
2. PI Replication Overview
3. Setup, Configuration, Administration
4. User Experience
   - Seamless Connection
   - Automatic Fail-over
5. PI Replication Future
6. Bigger Picture: High Availability PI System
7. Platform Release 1

Existing HA Features

- Distributed Data Collection, Storage & Computation
- PI to PI Interface + PI Auto Point Sync
- Support for Online PI Server Backup
- Support for Microsoft Cluster Technology
- Integration with 3rd party Fault Tolerant/HA solutions



PI Server Replication

What you asked us to provide:

1. Ability for Clients (ProcessBook) to select among Replicated Servers

2. Changes to Configuration Data (points, modules) regularly synchronized between Replicated Servers

3. Near-Identical Time-series Data between Replicated Archives (within compression specs)

PI Server Replication

What you will get:

1. Ability for Clients (~~ProcessBook~~) to select among Replicated Servers
   + load balancing
2. Changes to Configuration Data (points, modules) regularly synchronized between Replicated Servers
3. ~~Near~~-Identical Time-series Data between Replicated Archives ~~(within compression specs)~~

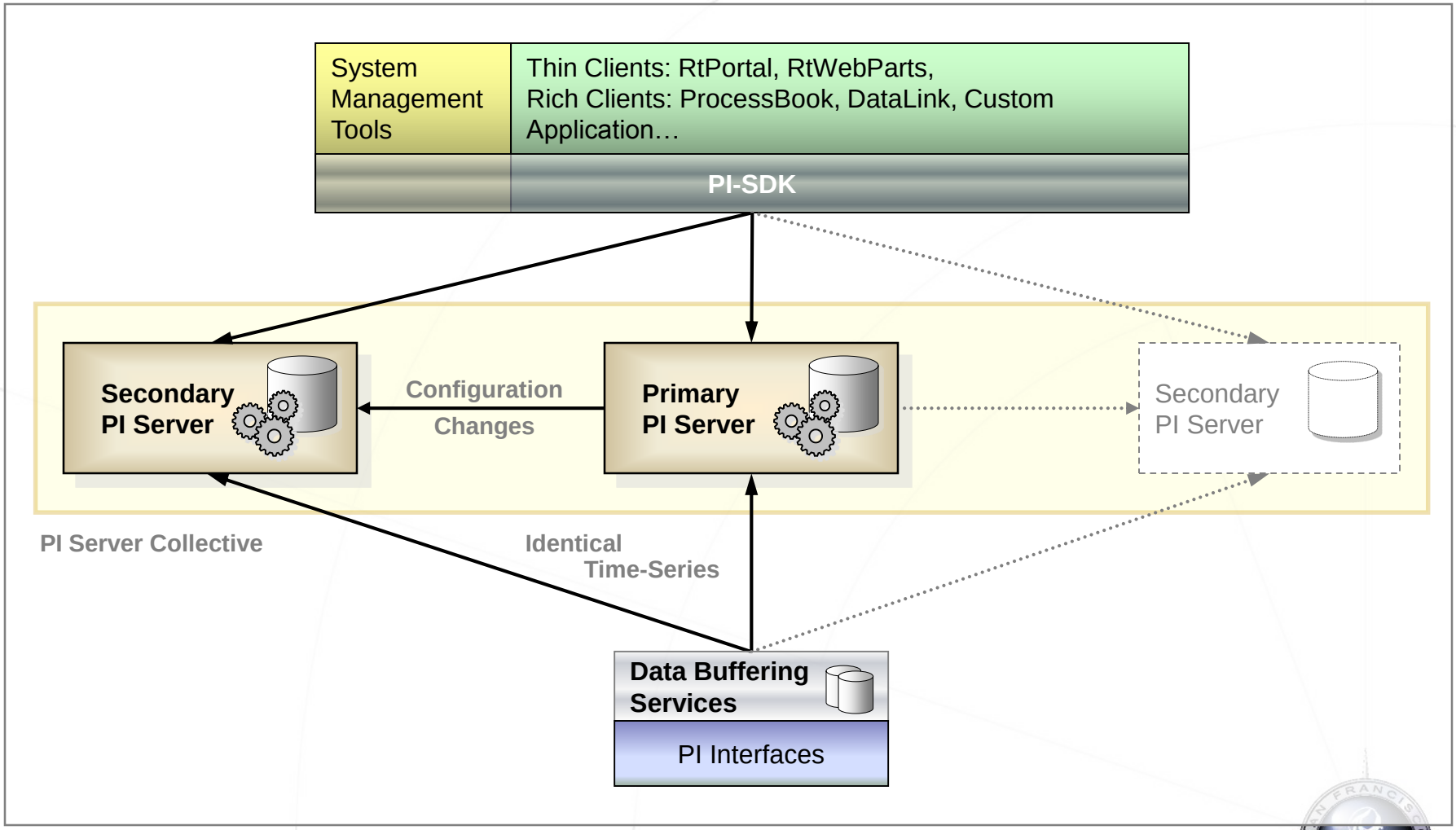
automatically

any PI SDK based

or in real-time

(+ no changes to your displays!)

PI Replication Architecture



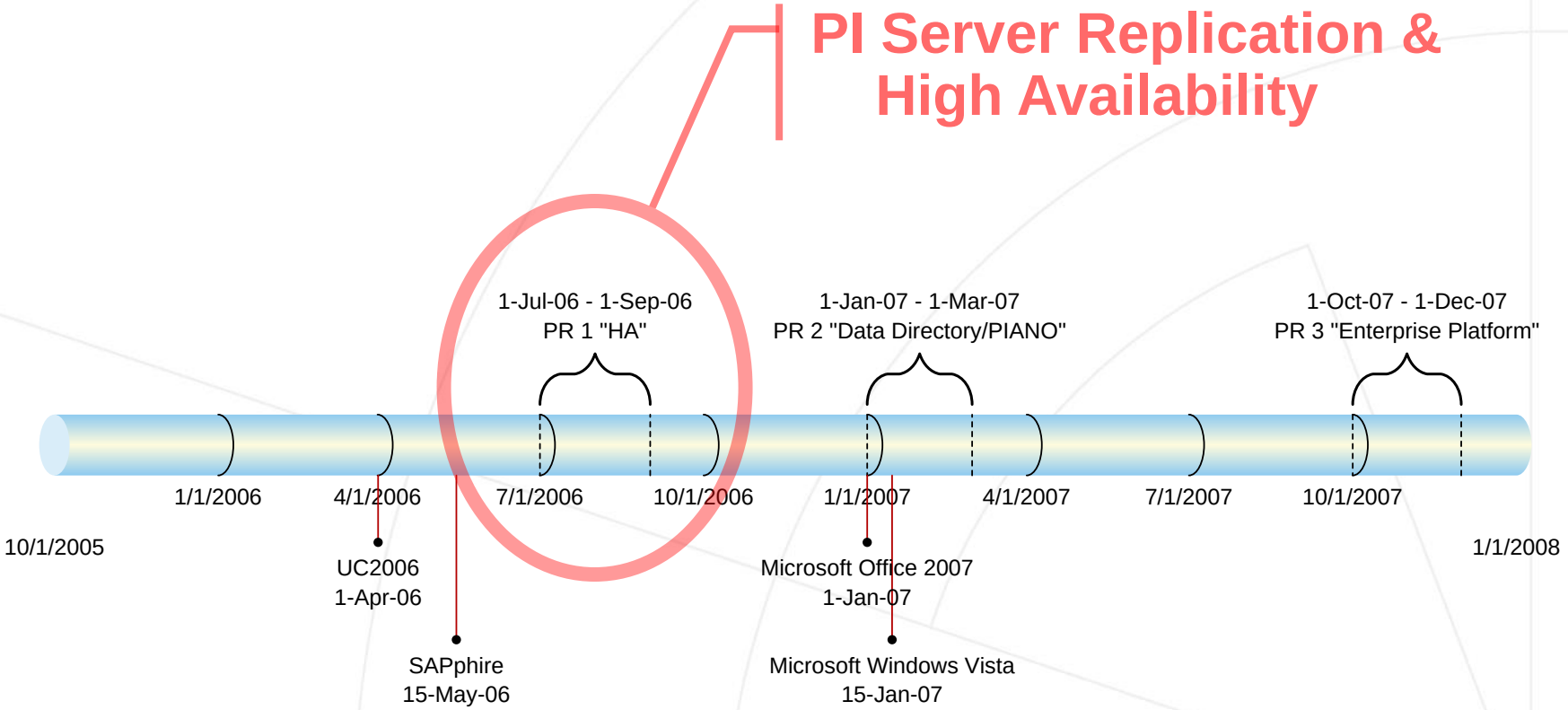
PI Replication Architecture

- PI Server
  - Collection of identical PI Servers exposed as one (Collective)
  - One Primary Server accepts configuration changes (e.g. points, modules) and produces a change log
  - Secondary Servers automatically synchronize with the Primary change log
- Interface Nodes
  - Identical time-series data distributed to all PI Servers by new buffering services
- Client Access Layer
  - Transparent PI-SDK connection management
  - Existing and new Clients benefit from High Availability

PI Replication Benefits

- Core component of High Availability Platform
- Seamless connection to replicated servers from any PI-SDK client
- No change to your displays, spreadsheets, and portal pages
- Support for systems of all sizes
- No specialized hardware requirement
- Geographic availability, e.g. disaster recovery
- Administration comparable to a single PI Server

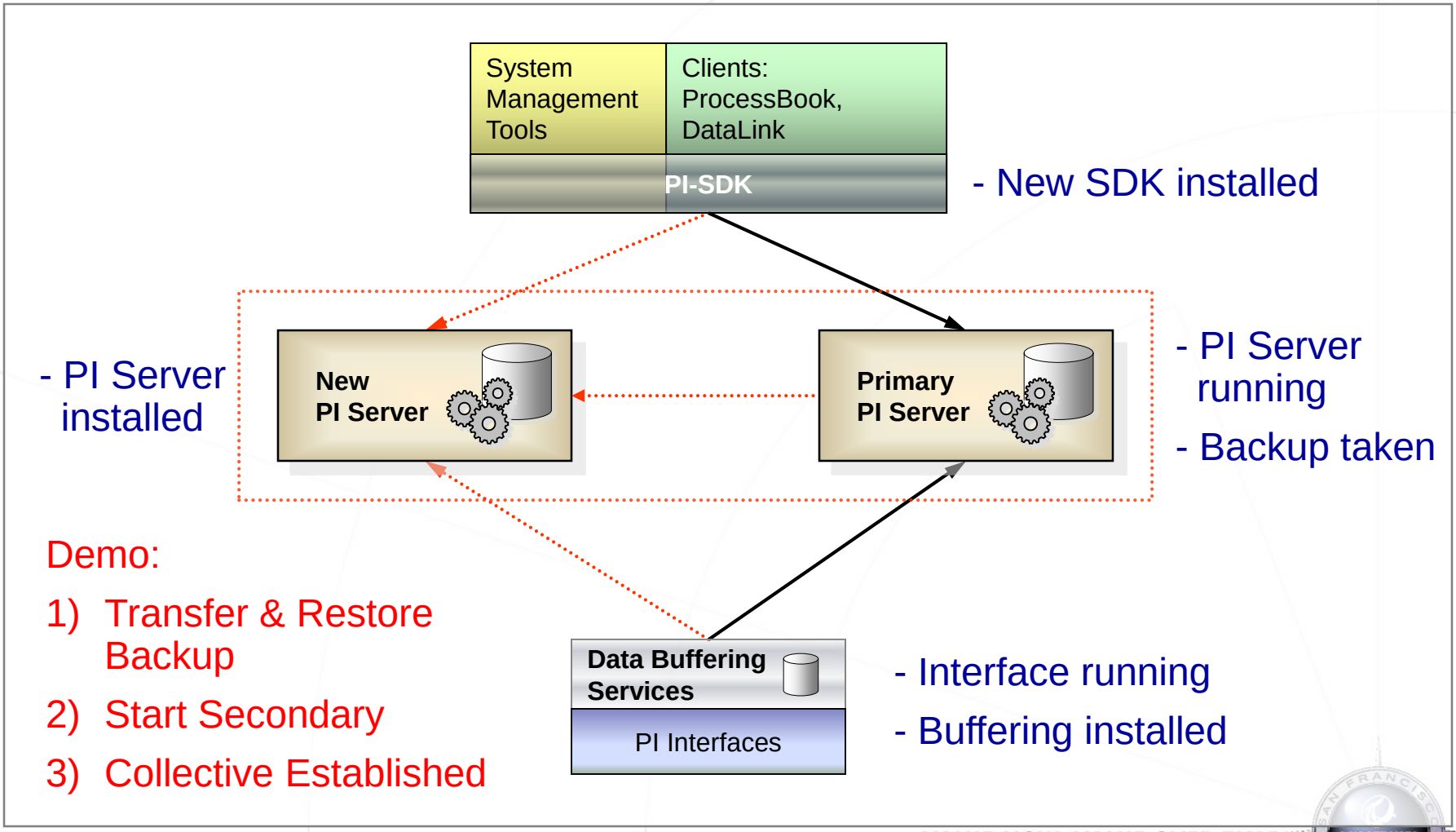
Platform Release Timeline



Setting up PI Replication

1. Install new buffering service on interface computers
2. Create server collective
   a. Upgrade and configure PI on the Primary Server
   b. Install PI Server on secondary computers
   c. Create a backup of the Primary Server
   d. Restore backup on secondary computers
   e. Start secondary PI Servers
3. Deploy new PI-SDK on client computers

Demo – Setting up PI Replication



Demo – Setting up PI Replication

Switch to Demo Screen

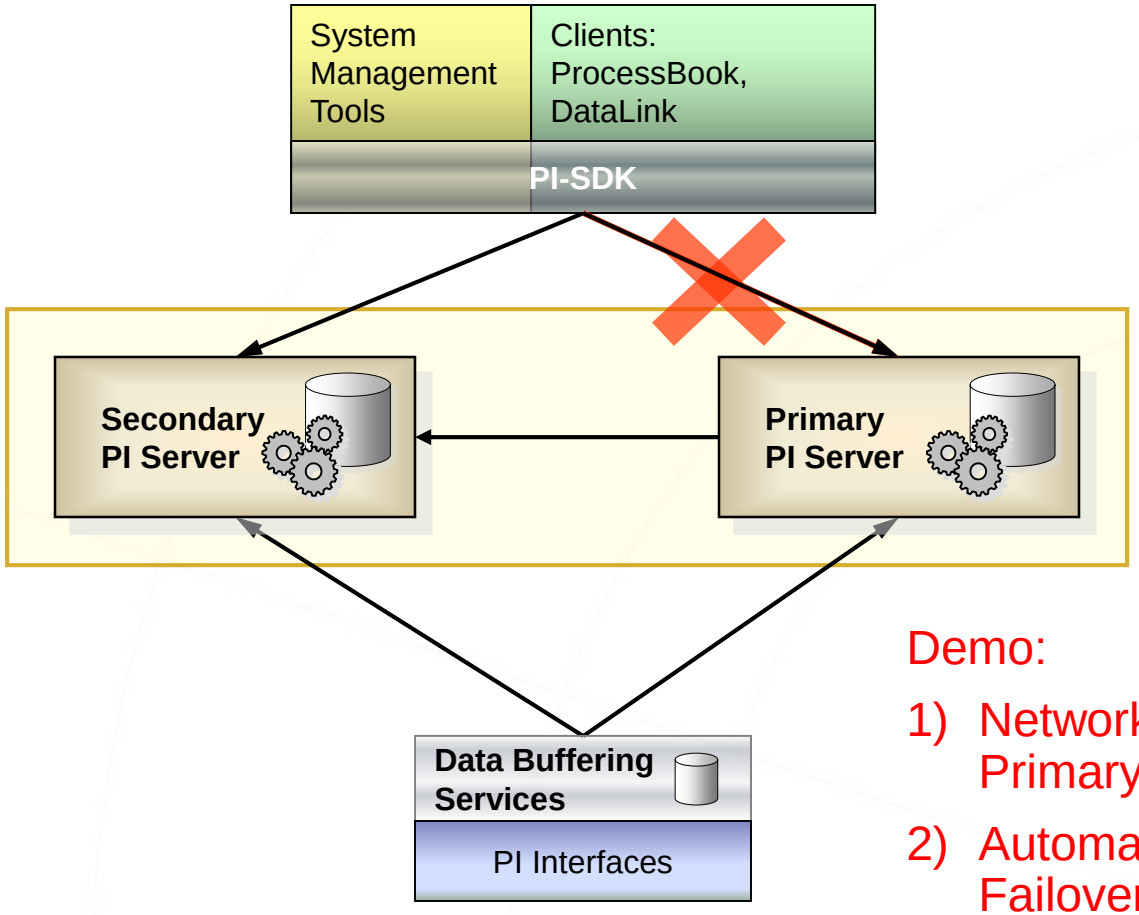
User Experience

- End Users
  - PI Client connects to the appropriate PI Server
  - PI Client automatically switches connection on disconnection
  - No change to existing displays (PB, DataLink, WebParts)
- Administrators
  - Configuration changes to primary server, replicated to secondary servers
  - SMT used to manage collective and individual PI Servers

Scenario 1: Unexpected Failure

- Availability across Uncontrollable Faults
  - Network outage, hardware failure, software defect
- Sequence of Events
  1. Failure of one PI Server
  2. Timely failover of connected clients to another PI Server
  3. Data is buffered on Interface nodes
  4. Problem resolved, PI Server back online
  5. Buffered data is automatically recovered

Demo 1 – Unexpected Failure



Demo:

1) Network Failure on Primary Server
2) Automatic Client Failover

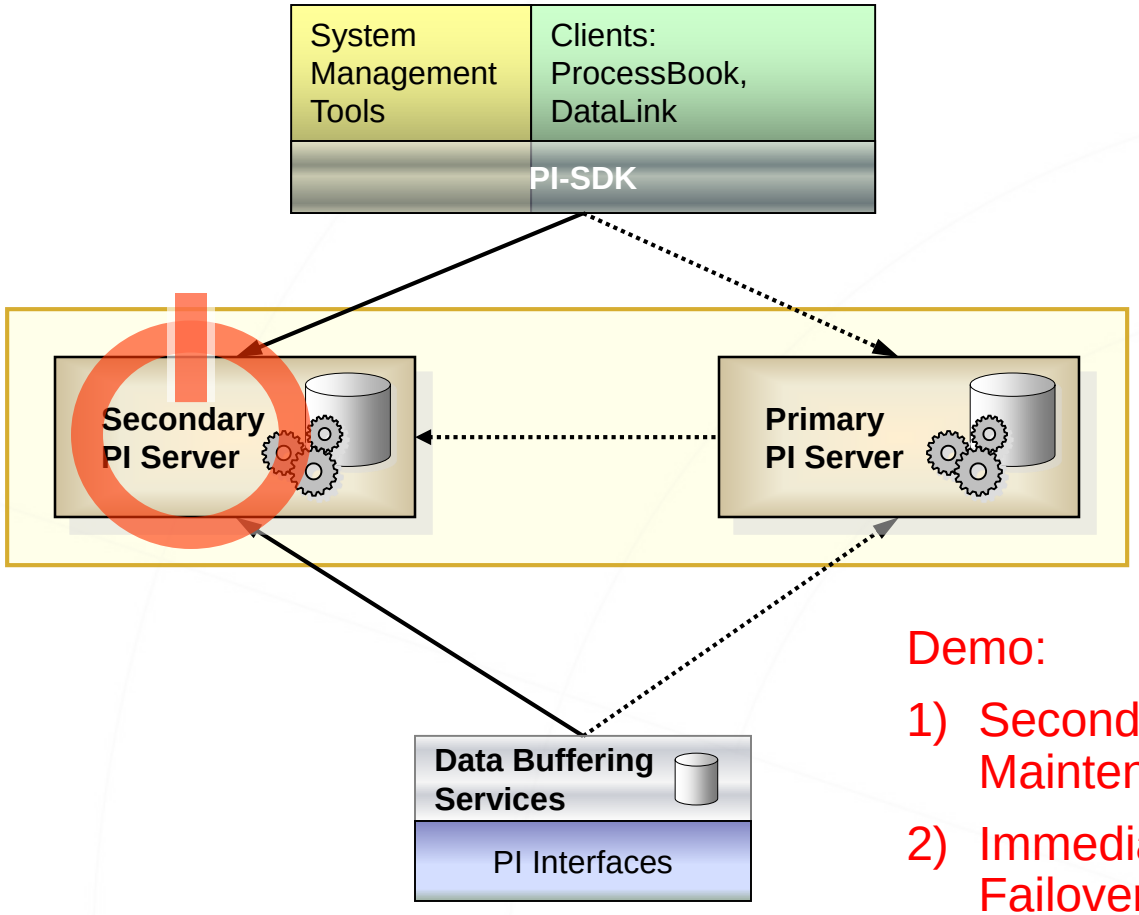
Demo 1 – Unexpected Failure

Switch to Demo Screen

Scenario 2: Planned Maintenance

- No Downtime for Routine Maintenance
  - OS/Security Patch, PI Software Update, Hardware Upgrade
- Sequence of Events
  1. Shut down one PI Server
  2. Immediate fail over of connected clients to another PI Server
  3. Data is buffered on Interface nodes
  4. When maintenance is complete, restart PI Server
  5. Buffered data is automatically recovered

Demo 2 – Planned Maintenance



Demo:

1) Secondary Server Maintenance
2) Immediate Client Failover

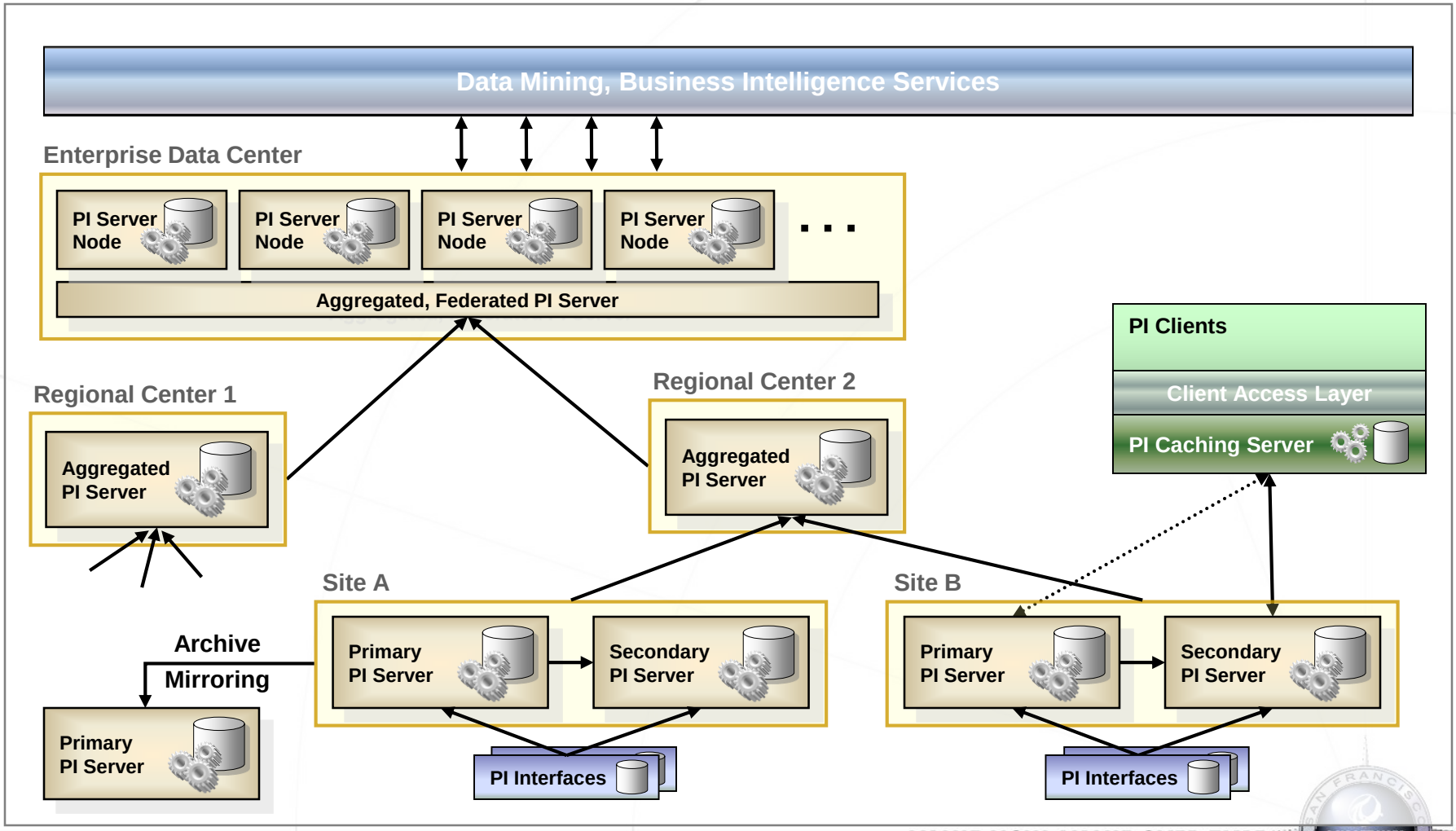
Demo 2 – Planned Maintenance

Switch to Demo Screen

PI Replication Summary

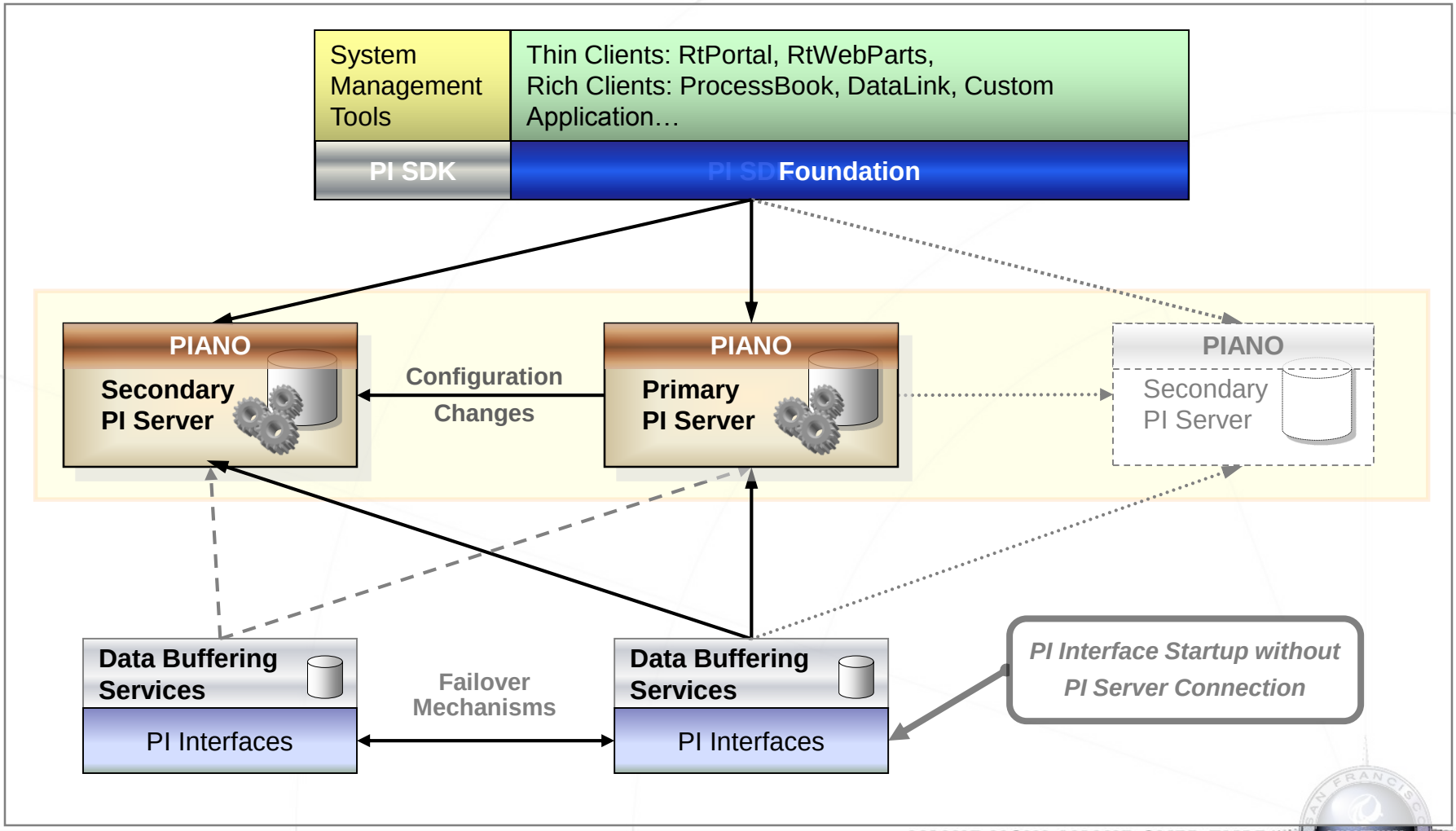
- Technology
  - Synchronization of PI Server configuration
  - Transparent PI-SDK failover, simple load balancing
  - Identical real-time data distribution
- Value
  - High Availability to your PI System
  - Peace of mind for Administrators
  - Direct support for existing PI Clients
  - Simple, scalable and flexible architecture

PI Replication Future



VALUE NOW, VALUE OVER TIME

Concurrent HA Developments



High Availability Platform Release 1

Q3 2006

- PI Server 3.4.375 release
- PI SDK 1.3.4 release
- Standard PI Interface Fail-Over
- Standard PI Interface Disconnected Startup
- Enhanced Interface Buffering Services
- New System Management Tools
- PI Clients leveraging HA Services

Conclusion

- Replication is a natural extension of the PI System for High Availability
- Simple, Enterprise, Available (SEA)
  - **Simple** setup, configuration and operation
  - Leverage existing **Enterprise** infrastructure
  - System **Availability** on planned maintenance and unexpected failure

Thank You!

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