






# PI Server 2017

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# Data Archive: Recent Enhancements

Feature	2015	
Future/Predictive Data		
Batch to Event Frame Migration		
Transport security		

# What's new in Data Archive 2017?

# What's new in Data Archive 2017



Improved security between  
HA Collective Members



Enhancements to support  
other products, bug fixes



Added Health Incidents for  
the Future PI Health Tool

# How can I monitor the health of my PI System on a single dashboard? Health Incidents

What is a Health Incident?

What Health Incidents will the Data Archive support?

- Corrupted Archives
- Data loss scenarios
  - Examples
    - Value already exists at this time
    - Writing to an archive gap
    - Writing to a read only archive
    - Writing to a corrupt archive
- Backup failures

Where will I see these Health Incidents?

# Asset Framework

Major Features	2015	2016
Future Data support	✓	
Excluded and Hidden attributes	✓	
AF Identities and Mappings	✓	
Traits – Limits, Forecasts, Locations		✓
Annotations, Severity, Acknowledgements		✓
New notifications		✓
WSFC support for PI Analysis Service and PI Notifications Service		✓
Manual recalculation	✓	✓
Performance improvement, scalability	✓	✓
New analytic functions, SQC	✓	✓
Enhanced Search	✓	✓



# What's new in AF 2017

# New Enhancements in AF 2017



Search by Modify Date and Creation Date  
PI Point search by value/timestamp/status



Improved UOM handling

- Totalization
- Rollups



Event frames

- %Duration% substitution parameter
- Aggregation – summaries, grouping, binning

# New Enhancements in AF 2017



## Parallel backfill/recalculation

- Better utilization of resources
- Built in safeguard not to impact real time calculations



## Security

- Only authorized persons can perform recalculations



## Notifications delivery channel

- SOAP web services
- REST web services

# I want to find my data as quickly as possible ...

- More flexibility – filter based search
- Light weight search
  - Only gets requested fields
- Search by Modify Date and Creation Date
  - ***Find all elements modified in the last 5 minutes***
- PI Point search by value/timestamp/status
  - ***Find all the PI Points with values that haven't changed since yesterday***



# I want to do some aggregations with consistent UOM ...

- Improved UOM handling for totalization
  - *How many barrels of oil were produced from this well yesterday?*
- Rollup analyses
  - Handle different input UOMs
  - When possible, UOMs are converted prior to rollup
  - Keyed off output UOM



## I want to do more with event frames ...



- New substitution parameters for %Duration%
  - **Configure an EF attribute with duration of the EF**
- Aggregate event frames
  - Summaries such as min, max, avg, total, etc.
  - Group by discrete values
  - Bin on continuous values
  - **Average temperature when pump was running over the last year segregated by month**

# I have late arriving data and need to recalculate quickly ...

- Concurrent backfill/recalculation
  - Better utilization of resources
- Built in safe guard to minimize impact to real time calculations



Management

Choose a type
Analyses
Notification Rules

Analysis Searches

- All
Enabled
Disabled

- Elements
Event Frames
Library
Unit of Measure
Contacts
Management

Analyses

0 total analyses selected (0 on this page) 1 - 137 of 137

Table with columns: Status, Element, Name, Template, Backfilling. Rows include various alarm counts (Critical, Major, Minor) for different haul trucks and time periods.

Operations

Enable 0 selected analyses
Disable 0 selected analyses
Backfill/Recalculate 0 selected analyses

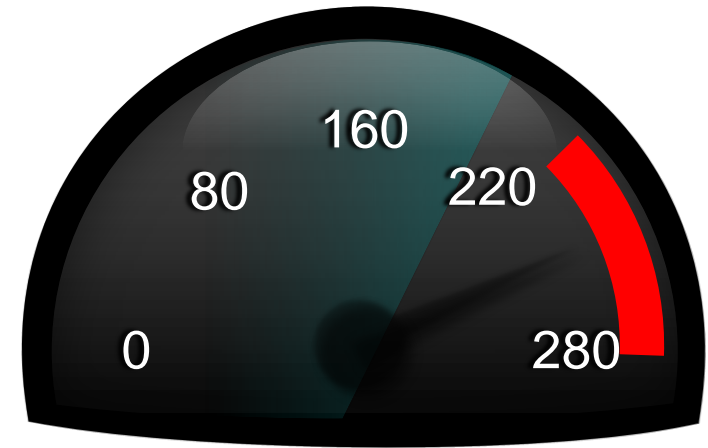
Pending Operations

No pending operations



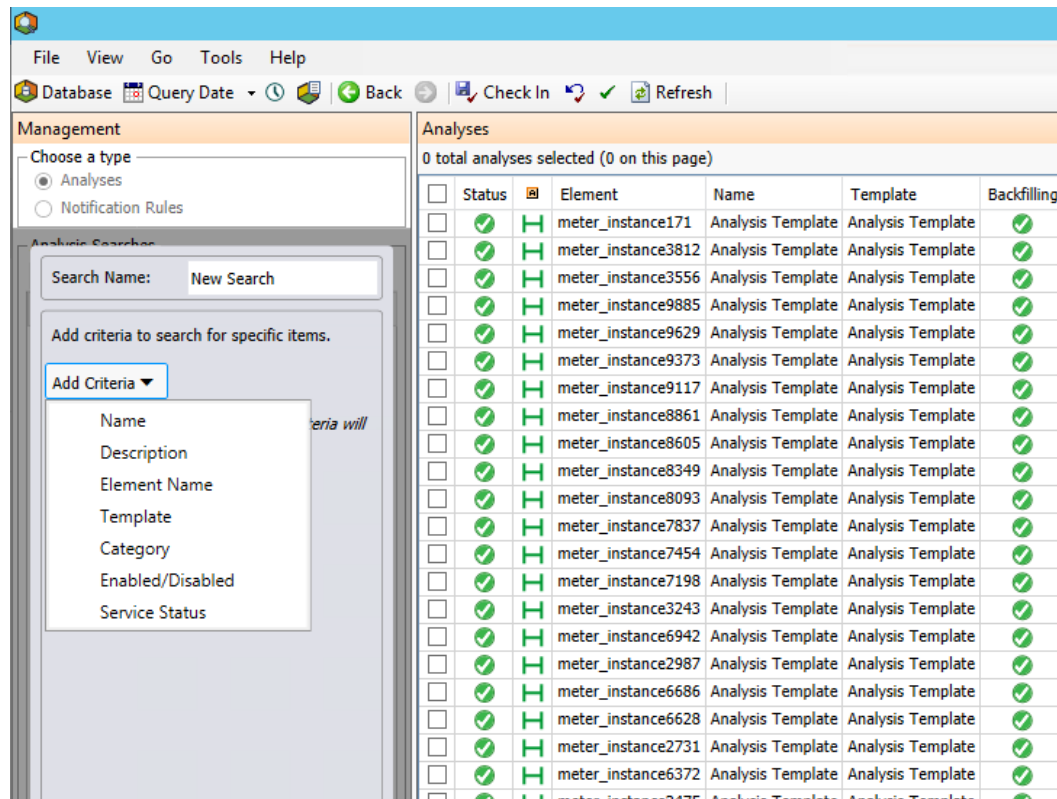
# I want to know the worst performing analyses ...

- Analyses are logically grouped for management
- Sorted by lag
- # of skipped calculations
- Time to complete calculation
- Triggering frequency



# How do I find analyses and notification rules when I have so many?

- Single UI for managing analyses and notification rules
- Customize searches
- Persisted searches










The screenshot displays a web-based management interface. On the left, a 'Management' sidebar has 'Analyses' selected. An 'Analysis Search' dialog is open, showing a search name 'New Search' and a dropdown menu for 'Add Criteria' with options: Name, Description, Element Name, Template, Category, Enabled/Disabled, and Service Status. The main area shows a table of analyses with columns: Status, Element, Name, Template, and Backfilling. The table contains 20 rows of data, all with a status of 'H' and a backfilling status of '✓'.

Status	Element	Name	Template	Backfilling
✓	meter_instance171	Analysis Template	Analysis Template	✓
✓	meter_instance3812	Analysis Template	Analysis Template	✓
✓	meter_instance3556	Analysis Template	Analysis Template	✓
✓	meter_instance9885	Analysis Template	Analysis Template	✓
✓	meter_instance9629	Analysis Template	Analysis Template	✓
✓	meter_instance9373	Analysis Template	Analysis Template	✓
✓	meter_instance9117	Analysis Template	Analysis Template	✓
✓	meter_instance8861	Analysis Template	Analysis Template	✓
✓	meter_instance8605	Analysis Template	Analysis Template	✓
✓	meter_instance8349	Analysis Template	Analysis Template	✓
✓	meter_instance8093	Analysis Template	Analysis Template	✓
✓	meter_instance7837	Analysis Template	Analysis Template	✓
✓	meter_instance7454	Analysis Template	Analysis Template	✓
✓	meter_instance7198	Analysis Template	Analysis Template	✓
✓	meter_instance3243	Analysis Template	Analysis Template	✓
✓	meter_instance6942	Analysis Template	Analysis Template	✓
✓	meter_instance2987	Analysis Template	Analysis Template	✓
✓	meter_instance6686	Analysis Template	Analysis Template	✓
✓	meter_instance6628	Analysis Template	Analysis Template	✓
✓	meter_instance2731	Analysis Template	Analysis Template	✓
✓	meter_instance6372	Analysis Template	Analysis Template	✓
✓	meter_instance2475	Analysis Template	Analysis Template	✓

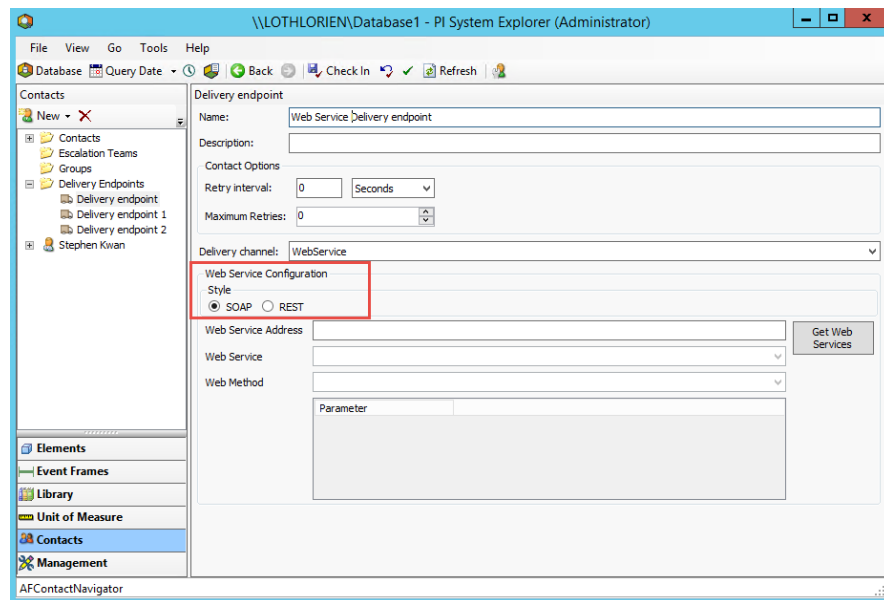
# Only authorized persons can perform recalculations ...

- AF Identity to allow users to backfill and recalculation

Name	Permission	Allow	Deny
 Administrators	All	<input type="checkbox"/>	<input type="checkbox"/>
 Engineers	Read	<input type="checkbox"/>	<input type="checkbox"/>
 World	Write	<input type="checkbox"/>	<input type="checkbox"/>
 Notifications	Read/Write	<input type="checkbox"/>	<input type="checkbox"/>
 Asset Analytics	Read Data	<input type="checkbox"/>	<input type="checkbox"/>
 Backfilling	Write Data	<input type="checkbox"/>	<input type="checkbox"/>
 Asset Analytics Recalculation	Read/Write Data	<input type="checkbox"/>	<input type="checkbox"/>
	Subscribe	<input type="checkbox"/>	<input type="checkbox"/>
	Subscribe Others	<input type="checkbox"/>	<input type="checkbox"/>
	Delete	<input type="checkbox"/>	<input type="checkbox"/>
	Execute	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Annotate	<input type="checkbox"/>	<input type="checkbox"/>
	Admin	<input type="checkbox"/>	<input type="checkbox"/>

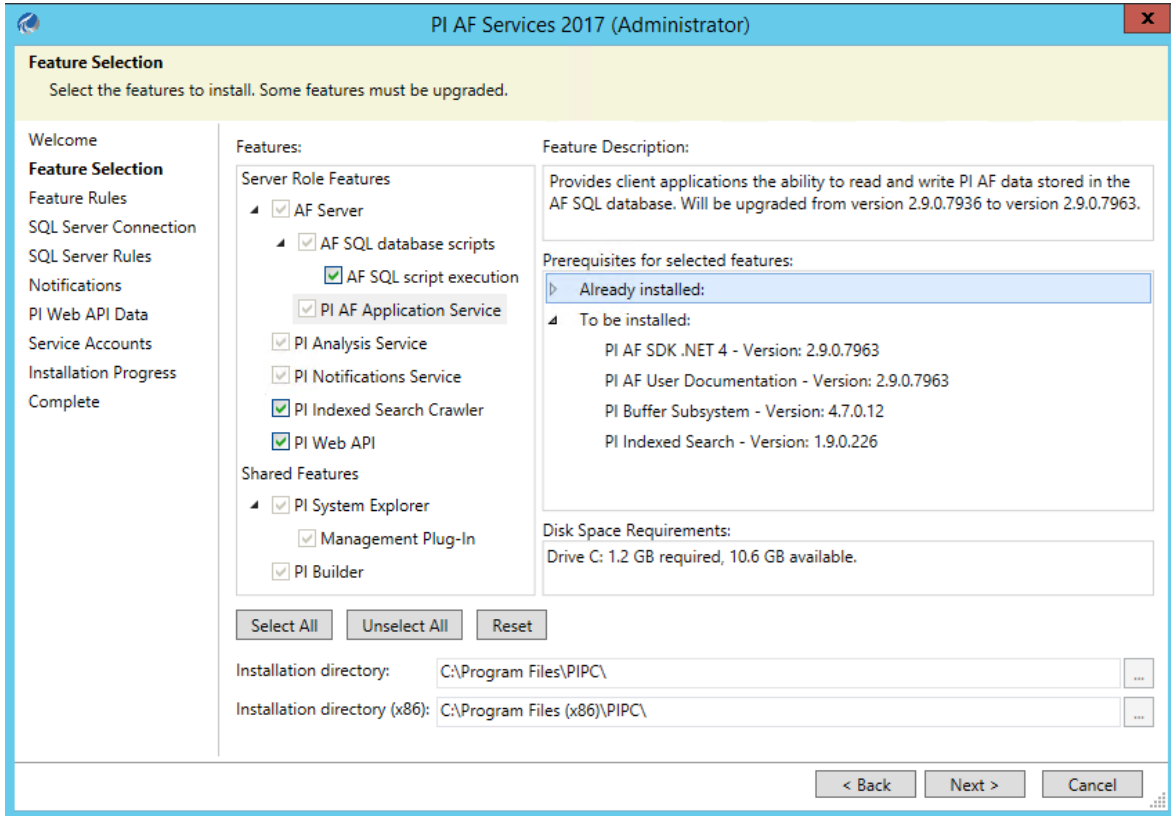
# I want to send information from my important events to a web service ...

- SOAP Web service delivery channel
  - Support for complex data type
  - E.g. ERP systems
- REST web service delivery channel
  - E.g. any modern web services



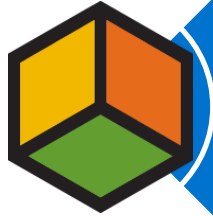
# I want a more streamlined installation experience ...

- Single integrated install for AF Services



# What's coming in AF 2017 R2

# Major Enhancements coming in AF 2017 R2



Hierarchical enumeration sets  
UOM groups  
Naming pattern using attribute values  
PI Directory Service



Automatic recalculation  
Output to event frame attributes  
New functions – Linear Regression, Covariance



Static trends in notification email  
Authentication to web services delivery channel  
Dynamic notification email delivery endpoints

# I want to use specific UOMs...

- Identify system provided UOM
- UOM Grouping
  - Default “Metric” and “US Customary” UOM groups
  - User defined groups
- Clients automatically convert value to mapped UOM

Unit of Measure Properties

General

Name: degree Celsius

Abbreviation: °C

Description:

Origin: System Defined

Canonical UOM: kelvin

Reference UOM: kelvin

Method: Type

Simple  Formula

Factor: 1

Offset: 273.15

$K = °C + 273.15, °C = K - 273.15$

UOM Group Mappings

Group	Mapping
Metric	
US Customary	degree Fahrenheit (°F)
My UOM group	kelvin (K)

OK Cancel Apply



# I want to calculate based on event frame attributes...

Event Frame Template:

[Add...](#) ↑ ↓ Evaluate

Name	Expression	True for	Severity	Value at Evaluation	Value at Last Trigg	Output Attribute	
<b>Start triggers</b>							
StartTrigger1	'Attribute1' > 0	Set (optional)	Information	True	True		⊗
StartTrigger2	'Attribute1' > 50	Set (optional)	Warning	False	False		⊗
StartTrigger3	'Attribute1' > 100	Set (optional)	Critical	False	False		⊗
<b>Outputs at close</b>							
Output1	Int(EventFrame("Duration"))			Use Preview	Use Preview	Downtime	⊗
Output2	EventFrame("StartTime")			Use Preview	Use Preview	Map	⊗
Output3	EventFrame("EndTime")			Use Preview	Use Preview	Map	⊗

Evaluation Time: 10/18/2017 3:48:07 PM Last Trigger Time: 9/28/2017 11:14:32 PM Advanced Event Frame Settings...

*Multiple start triggers are configured. Child event frames will be generated when the trigger changes. See documentation for more details.*

File Search View Go Tools Help

Database Query Date Back Check In Refresh New Element Search Elements

**Elements**

- PI Data Archive
  - Pump Station
    - Pump01
    - Pump02
    - Pump03
    - Pump04
    - Pump05
    - Pump06
  - Element Searches
    - Element Search 1

**PI Data Archive**

General Child Elements Attributes Ports Analyses Notification Rules Version

Name:

Description:

Template:  Type:

Categories:  Default Attribute:

[Extended Properties \(0\)](#) [Annotations \(0\)](#) [Location](#) [Security](#)

Find: [Parents](#) [Children](#) [Event Frames](#)  
[Models](#) [Layers](#) [Connections](#)

PI Data Archive Modified:2/27/2017 11:19:47 AM Ownersystem Version: 1/1/1970 12:00:00 AM, Revision 1

# AF 2018 and Beyond

# AF 2018 and Beyond – Research

## Enhance Streaming Calculation

- Extensibility – Integrate with 3<sup>rd</sup> party engines – e.g. MATLAB

## Health and Manageability

- PI System Health
- Directory Service: Cache support

## Performance and Scalability

- Search capability and performance
- Event frame scale
- General throughput

## Usability and Features

- Incorporate Data Quality into the PI System
- Flag stale data
- Display Digits



# Evolution of the PI System

# Current Focus

## Expand



Increase the **volume & velocity** of operations data

## Extend



Ensure **data quality** information is visible and understandable where its used

## Ease



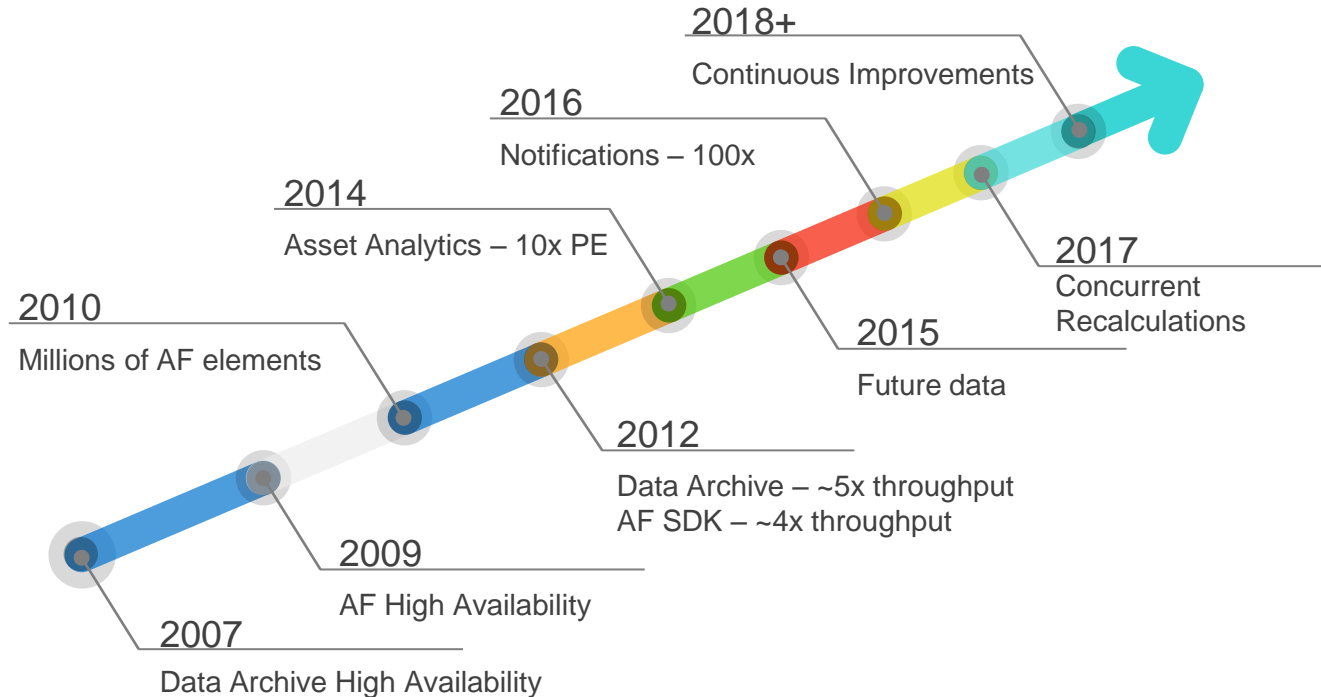
PI system tools designed to work across the enterprise

# Expand the PI System: Performance and Scalability

Expand



Increase the **volume & velocity** of operations data



# Extend the PI System: Data Quality

## Extend



Ensure **data quality** information is visible and understandable where its used

### Data Collection



Identify stale data and propagate staleness

### Storage



Record periods of stale data

### Asset Analytics



Calculations take into account quality of data

### Developer Technologies



Indication of quality of data

### Visualization



Display data with staleness information

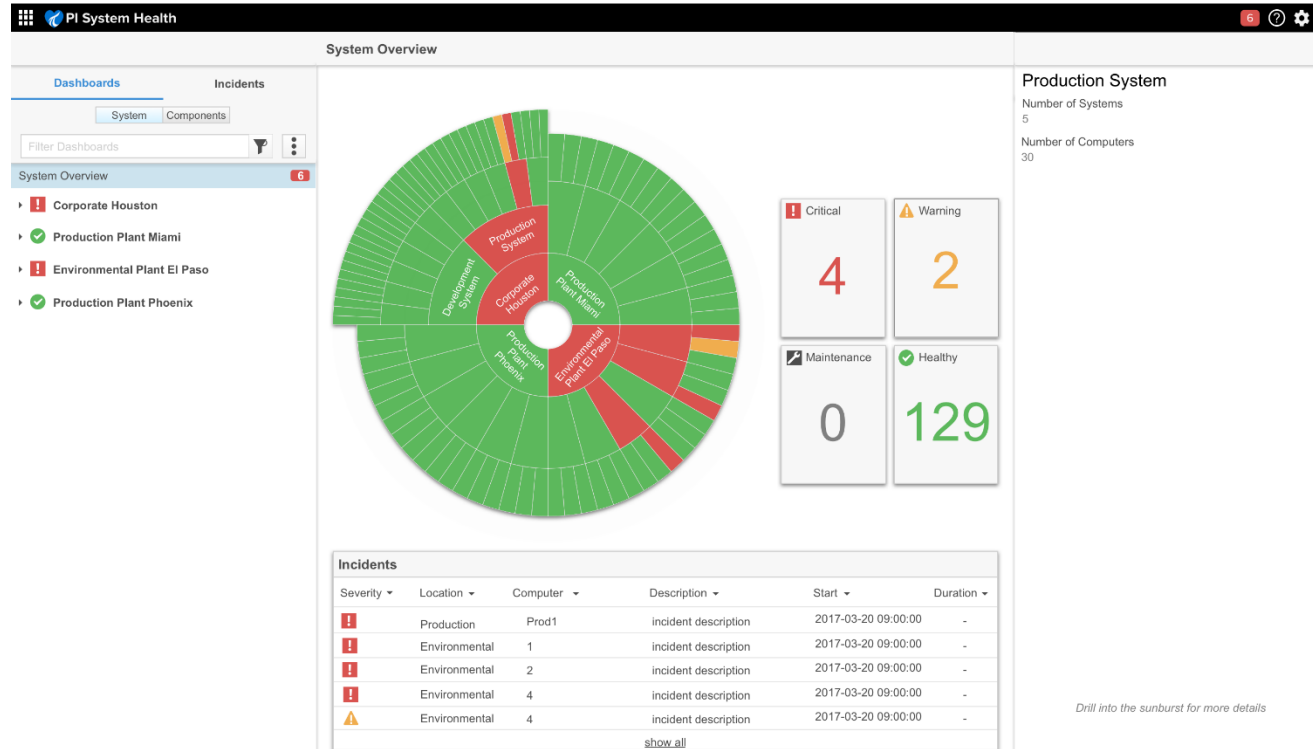


# Ease of Use with the PI System: Management and Administration

Ease



PI system tools  
designed to work  
across the enterprise



Drill into the sunburst for more details



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Danke

Merci

Gracias

**Thank You**

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Спасибо

Obrigado