# Right Sizing PI Client Tools As A Start To Digital Transformation

Mark Massey

TATE & LYLE



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# Who Am I?

- Mark Massey
- With Tate & Lyle since 1998
- Power and Process Controls Resource, 1998-2011
- Global Process Control Software Manager, and Global PI administrator in 2011
- SMART Operations Team Leader in 2020

**SMART**
**S**implified
**M**anufacturing
**A**nalytics
**R**eal **T**ime

**Increase**
- Throughput
- Product quality
- Yield
- Rework efficiency
- Equipment utilization
- Material utilization
- Energy utilization
- Line uptime
- Plant communications
- Market response
- Regulatory compliance

**Decrease**
- Inventory
- Regulatory costs
- Waste
- Time-to-volume
- Cycle time
- Changeover time
- Maintenance costs
- TCO for systems


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# Introducing Tate & Lyle

- Founded in the UK in 1859, the Henry Tate & Sons and Abram Lyle & Sons businesses merged to form Tate & Lyle in 1921
- Headquartered in London and listed on the London Stock Exchange; FTSE 250 member
- Customers include many of the world's largest food, beverage, industrial and pharmaceutical companies
- Production facilities, laboratories and offices in approximately 60 locations in around 30 countries

**1** For the year ended 31 March 2019
**2** Adjusted profit before tax

**Values**
Safety
Integrity
Respect

**Behaviours**
Partnership
Agility
Execution

More than **4,100** employees worldwide

Around **55** different nationalities work at Tate & Lyle

**£2.8bn** sales[1]
**£309m** profit [1,2]

**18** application and technical service labs globally

Support customers in over **120** countries

**1.5m** acres of corn processed at our US manufacturing facilities each year


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The Chicago Bears started in Decatur, Ill. in 1920 when the Staley Starch Company decided to sponsor a football team. Then in 1920, the Staleys, with George Halas as their representative, joined the American Professional Football Association, which was renamed the National Football League in 1922. The franchise fee was $100.

In 1921, the Staley Starch Company gave Halas the team, $5,000 and permission to move the team to Chicago if he would agree to keep the Staleys name for a year. The Staleys won the 1921 league championship. A year later, the team was renamed the Chicago Bears


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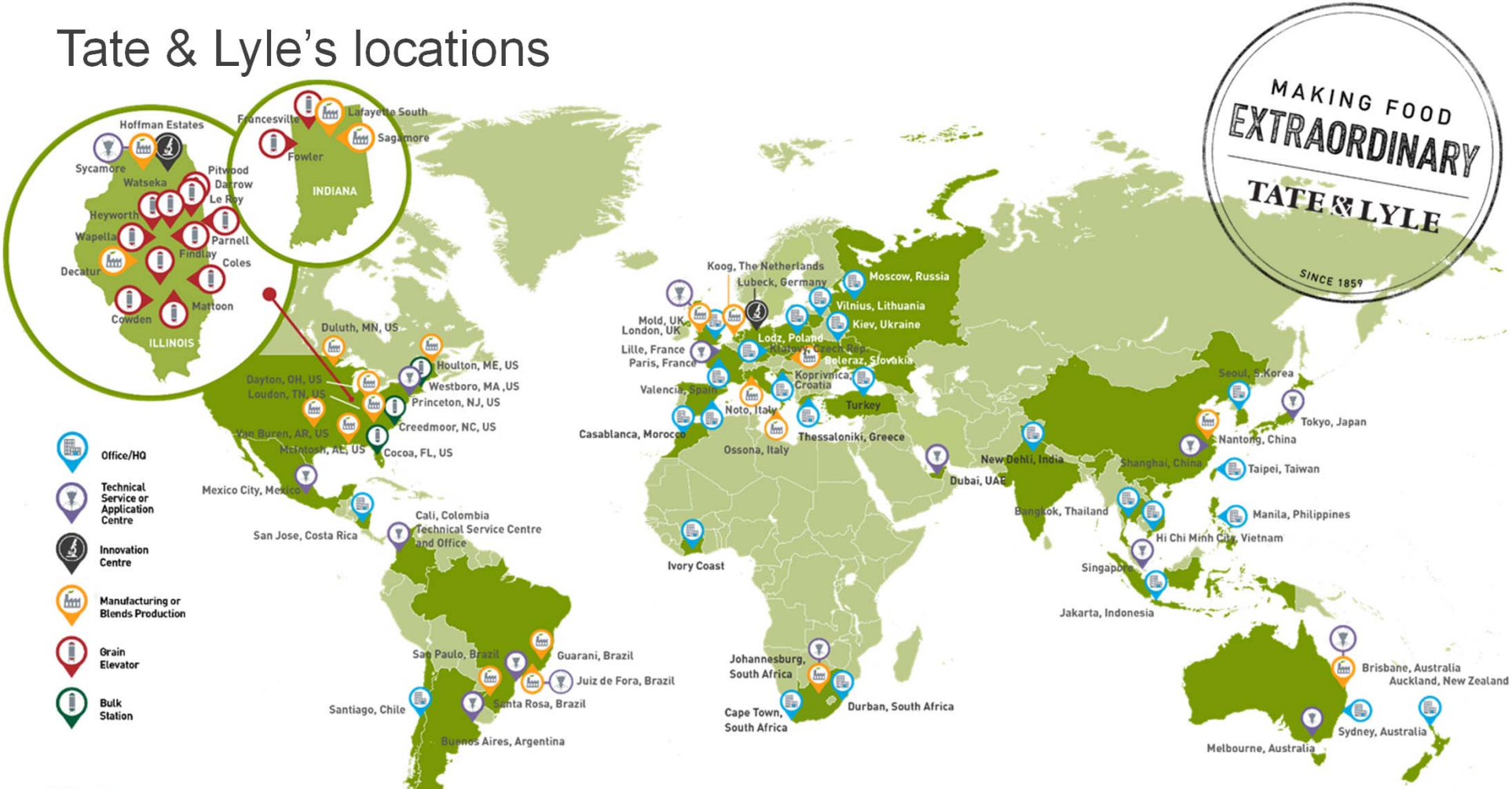
# Tate & Lyle's locations



# Tate & Lyle Portfolio Snapshot – Food & Beverage Solutions

## Sweeteners

**Leading provider of sweetener solutions**

- Match sweetness
- Replace sugars
- Reduce calories
- Influence product body and mouthfeel

Splenda, tasteva, Dolcia PRIMA, Purefruit monk fruit extract, KRYSTAR, SGF TATE & LYLE Extraordinary Stevia Solutions

promitor Soluble Fibre, sta-lite Polydextrose

## Health & Wellness

**Leading position in soluble fibre enrichment solutions**

- Replace sugar to reduce calories while maintaining taste and enjoyment
- Add nutrition through fibre enrichment

## Texturants

**A leading provider of texture solutions**

- Adds body and mouthfeel when sugars, fat or gluten are taken out
- Improves shelf life; provides stability

claria Functional Clean-Label Starches

STA-MIST™ Starch

RESISTAMYL® Starch

CESAGUM® Locust Bean Gum

HAMULSION® Stabiliser Systems

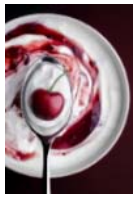
HAMULTOP® Stabiliser Systems

HAMULTASTE® Stabiliser Systems

## Stabilisers and Functional Systems

**One of the broadest toolboxes of stabilising solutions**

- Preserve structure
- Prevent separation
- Maintain stability

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# Tate & Lyle serves major customers worldwide

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# PI System at Tate & Lyle

**Tate & Lyle standardized on PI in 2000**

- **Serving 14 sites with centralized PI Servers In Decatur, IL & London, UK**
- **500,000 tags licensed globally**
- **Sixteen (16) PI Data Archives (PI 2016 R2) & Sixty (60) Interfaces**
- **Each site has a local PI administrator**
- **PI AF is currently at AF2018**
- **Primary tools in use are PI ProcessBook & PI DataLink**
- **Operations heavily relies on PI as a decision driver**

# Getting Ready for a Digital Transformation

All transformations start with assessing the current infrastructure, remediating issues, and then building for the future.

A robust, dynamic environment can only be achieved by ensuring that the foundational components of the data delivery system are solid.

# Prior to 2016: anonymous, powerful users

- All PI users connected via Citrix (from the same IP address)
- All PI users connected with a trust (to the same PI User)

This was not only not as secure as we'd like, it was impossible to even know how many users we had. Users had too much privilege and our I.T. department didn't have good tools to count them.

Looking forward we weren't even sure how to size PI Vision from a systems or licensing perspective.


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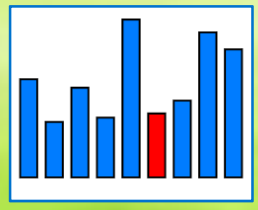
# Steps

- Securing Interfaces

- Securing Users

- Assessing Tool Usage



- Migrating to PI Vision

# What is the ‘Why’?

Why change what is already working?

Why secure the interface connections?

Why secure user connections?

Why assess tools usage?

Why migrate to PI Vision?

*a journey of a thousand miles begins with a single step*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# Defining Interface Security Model

- The first step was to create an interface security model that could be replicated globally across the infrastructure.

- To support the superior security of Active Directory and migrate away from trusts – we needed **Windows Service Accounts** for the interfaces for **interfaces & buffers**. These were created with a **standard naming convention, working with I.T.**

- And we'll need PI Data Archive **"Identities" for the Interfaces & Buffers** so we can give them privilege in PI. You can build these Identities in the Security part of the PI System Management Tool (PI-SMT)

PI Guideline Documents:
https://customers.osisoft.com/s/knowledgearticle?knowledgeArticleUrl=KB00833


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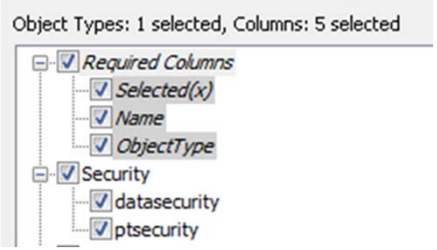
# PI Tag Data/Point Security Changes

All PI tags should have the datasecurity and pointsecurity tag attributes modified to provide the interface & buffer identities the appropriate access.

Each tag will need to have the following added:
datasecurity – PIInterfaces: A(r) and PIBuffers A(r,w)
ptsecurity – PIInterfaces: A(r) and PIBuffers A(r)

Using the PI Builder Excel add-in

- Download all of the OPC tags (by Point Source) from the PI Data Archive
- Select only the Security attributes to modify (see right)
- Edit the attributes as above to the top tag, & copy this to all rows (tags).
- Publish these changes back to the Data Archive. Select the Edit Only choice.




** Changes in the SMT Database security are required – PIARCHDATA, PIPOINT most notably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# Modify OPC Interface Service Account

We need to implement our service accounts in services on the interface computers. There can be several interfaces. They are connected under trusts, and we won't change that until later.

- Log into the interface computer (API).
- Open the Windows Services application & PI-Interface Configuration Utility (PI-ICU) & the PI System Manager Tool (PI-SMT) (may require a separate laptop)
- Identify the running interfaces in the PI-ICU (names & PointSource)
- If you find these in PISMT under Operation, Network Management Tools they'll be running under a trust
- In the services application, locate the services with the same names
- Modify the user logon for the PI-opcint(x) service to the service account
- Apply & Restart the service. They'll reconnect under the trust (temporarily) This will cause a brief disruption in the data collection for this interface (data loss).


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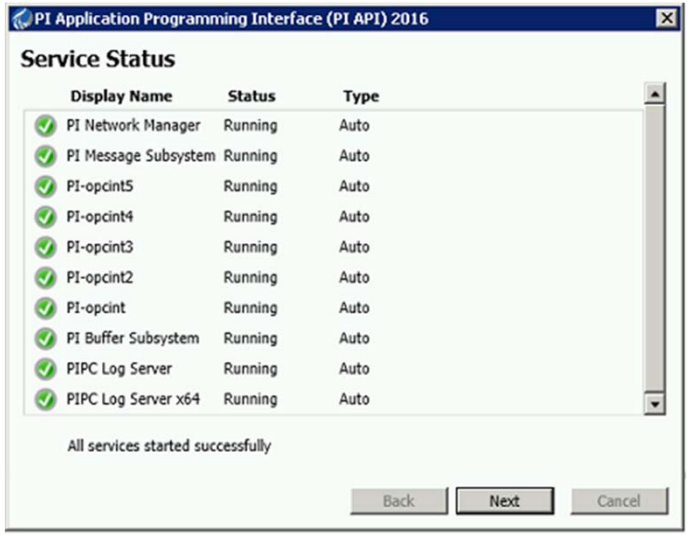
# Install PI-API

With these steps in place, we'll upgrade to a new version of the PI-API to support interface & buffer communications to PI that will be Windows Active Directory Security based and not trust-based.




- Installation software can be found in the customer portal. It is located in Products -> PI Server ->Data Archive -> PI API
- Run As Administrator to install the application
- Click OK on all dialog boxes
  - Be aware that this will disrupt data collection as the system stop and restarts services related to the installation

**WARNING: PI API 2016 does NOT support PI trusts and explicit logins**. Read https://customers.osisoft.com/s/knowledgearticle?knowledgeArticleUrl=AL00309 before you install this product.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# Validate PI-API Credentials

**Validate & Clean up after this process**

1) **Make sure we are still getting data**
2) **Check to see that the interfaces/buffers are connecting as identities with Active Directory & not trusts**
3) **Disable/delete any obsolete trusts.**

| Identity | OSUser |
|---|---|
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |
| PIInterfaces | Interface Service |

**<u>Credential Validation</u>**

- Open the PI-SMT, Operation, Network Manager Statistics.
- Sort by Name and find the OPCpE names.
- These should all be associated with the domain\svc*servername*pibufss and domain\svc*servername*poc account instead of a trust

**<u>Cleaning up the trusts</u>**

- Disable obsolete trusts with the PI-SMT, Security, Mappings & Trusts applet.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DECAPI04_HOST | DECOSI01 | | DECAPI04 ICU interface | piadmin | | pi-icu.exe | decapi04 |
| DECAPI04_IP | DECOSI01 | | | piadmin | | | |
| DECAPI05_HOST | DECOSI01 | | DECAPI05 ICU interface | piadmin | | pi-icu.exe | decapi05 |
| DECAPI05_IP | DECOSI01 | | | piadmin | | | |


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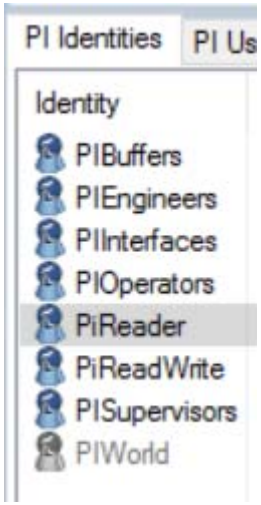
# Defining User Security Model

The process is similar for users:

- create Active Directory Groups (instead of Service Accounts) and put the right people in the right groups,
- associate them with PI identities,
- implement this in the way people connect.




For Each PI Data Archive server 3 AD groups created

***servername*Admin** associated with the **PIAdmins** group
***servername*Reader** associated with the **PIReader** identity
***servername*ReadWriter** associated with the **PIReadWrite** identity

Creating this structure allowed for the segregation of users by plant or function. No longer could users access data from another facility without specific access.

Specific users would only have the privileges they need

Even administrators should use their accounts & get their security privilege in this way and not use PIAdmin for everything.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# PI Tag Data/Point Security Changes

Using PI Builder as we did for interfaces, we'll need to modify the PI Security attributes of every tag to support these changes..

Each tag will need to have the following added:
datasecurity - PiReader A(r) and PiReadWrite A(r,w)
Pointsecurity - PiReader A(r) and PiReadWrite A(r)

| Name | datasecurity |
|---|---|
| Tagname1 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r,w) \| PIInterfaces: A(r) \| PIBuffers: A(r,w) |
| Tagname2 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r,w) \| PIInterfaces: A(r) \| PIBuffers: A(r,w) |
| Tagname3 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r,w) \| PIInterfaces: A(r) \| PIBuffers: A(r,w) |
| Tagname4 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r,w) \| PIInterfaces: A(r) \| PIBuffers: A(r,w) |
| Tagname5 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r,w) \| PIInterfaces: A(r) \| PIBuffers: A(r,w) |

| Name | ptsecurity |
|---|---|
| Tagname1 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r) \| PIInterfaces: A(r) \| PIBuffers: A(r) |
| Tagname2 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r) \| PIInterfaces: A(r) \| PIBuffers: A(r) |
| Tagname3 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r) \| PIInterfaces: A(r) \| PIBuffers: A(r) |
| Tagname4 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r) \| PIInterfaces: A(r) \| PIBuffers: A(r) |
| Tagname5 | piadmin: A(r,w) \| piadmins: A(r,w) \| PiReader: A(r) \| PiReadWrite: A(r) \| PIInterfaces: A(r) \| PIBuffers: A(r) |

**** still some work to be done to eliminate the piadmin on all of the tags*


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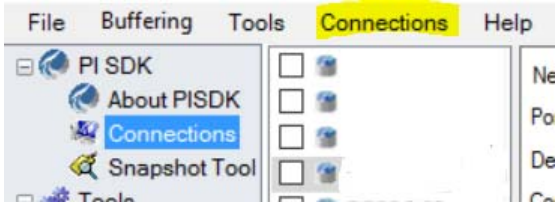
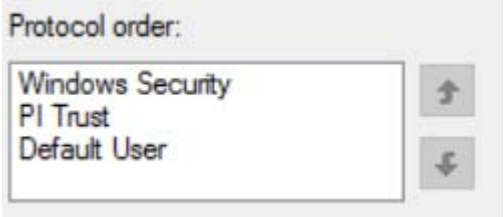
# Modify PI Login

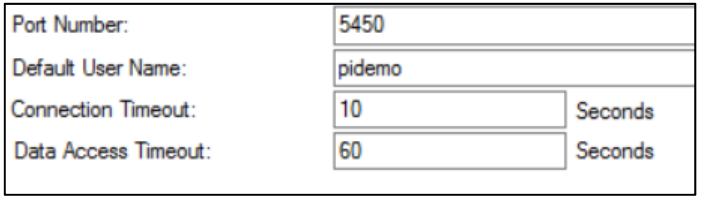
Next, we implemented this in the client computers
Most of our clients connected through Citrix – so this was not as difficult as it might seem.




To force the user to log into the PI system utilizing Windows Integrated Security

- Open the About PI SDK Utility
- Click on the Connections item in the left pane
- Click on Connections in the drop down menu
- Select Options
- Modify the Protocol Order
    - Windows Security
    - PI Trust
    - Default User




Also modify each connection login Default User Name to pidemo

** *pidemo, generally has no credentials*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# Validate PI Login Credentials

As we did with interfaces & buffers we can now use the PI-SMT, Operations, Network Manager Statistics utility to verify that our users are connecting with identities & not trusts.

| RegAppName | Identity | OSUser |
|---|---|---|
| PI DataLink | PiReader | domain\CollierJ |
| PI DataLink | PiReader | domain\MillerM2 |

| RegAppName | Identity | OSUser |
|---|---|---|
| PI ProcessBook | PiReader | domain\AllenT |
| PI ProcessBook | PiReader | domain\AllenT |
| PI ProcessBook | PiReader | domain\AllenT |
| PI ProcessBook | PiReadWrite | domain\AndersonA2 |
| PI ProcessBook | PiReader | domain\BatchelderS |
| PI ProcessBook | PiReader | domain\BequetteR |
| PI ProcessBook | PiReader | domain\BloomfieldJ |
| PI ProcessBook | PiReader | domain\BondT |
| PI ProcessBook | PiReader | domain\BuschR |
| PI ProcessBook | PiReader | domain\CazelH |
| PI ProcessBook | PiReader | domain\CazelH |
| PI ProcessBook | PiReader | domain\CazelH |
| PI ProcessBook | PiReader | domain\ChenowethJ |


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# PI Interface and User Security Summary

**Utilizing Windows Integrated Security to access the PI system**

- Create service accounts for buffers and interfaces & associate with Identities
- Create AD groups for users to associate to PI Identities
- WINS creates a secure connection from data collection sources to the data archive server
- WIS creates a secure connection from client tools users to the data archive server
- Exposes an audit path for client tool usage
- Validates that all client tool users have the appropriate Identity to access the client tool
- It puts a smile on the face of your IT security team

- Check out the OSIsoft Live Library article [Why use Windows Integrated Security] for more reasons.

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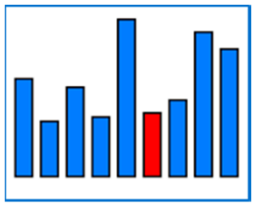
# How Many users do we have?



Now that we have this security in place – we should be able to see who's using the system

OSIsoft's **PI ProcessBook and PI DataLink Usage Reporting Tool** can help

- This tool can be found in the customer portal under the PI ProcessBook Individual User, Downloads, All Versions

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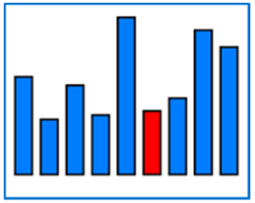
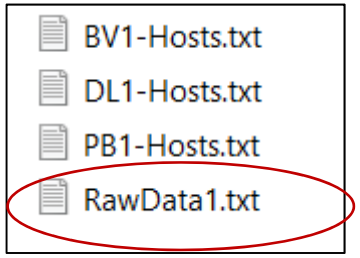
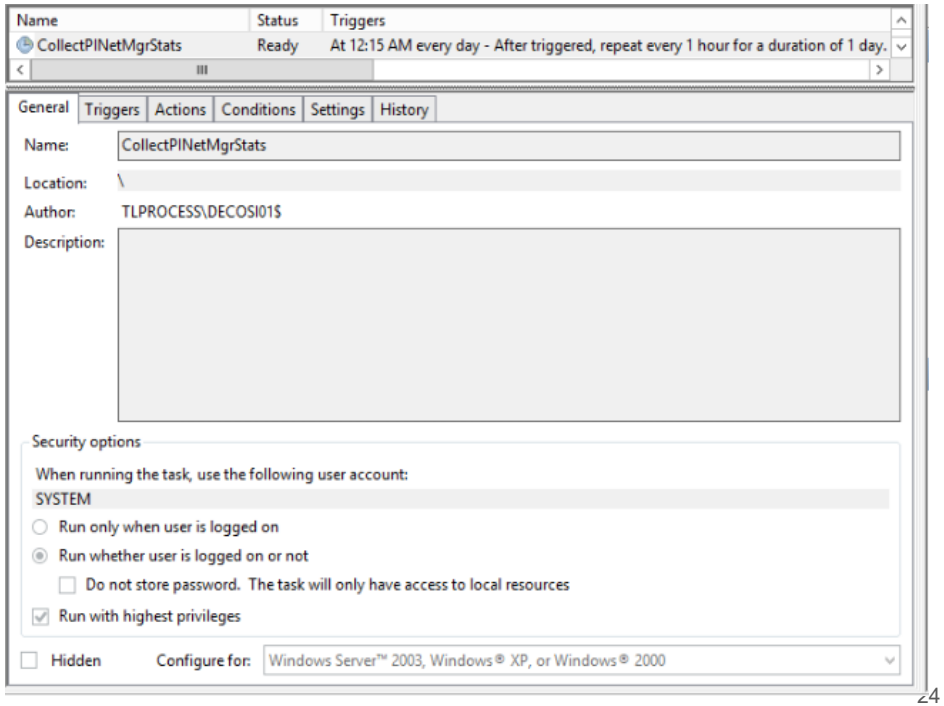
# PI ProcessBook & PI DataLink Usage Reporting Tool



- The tool is Run as Administrator on the data archive server
- A scheduled task needs to be created to run the executable
- The tasks run every hour at 15 minutes past the hour, by default
- Four files are created / updated each time the task runs




Use this one for Analysis!





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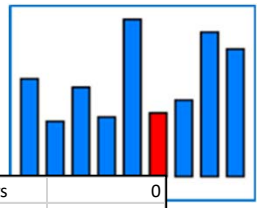
# Analyzing the Data

I utilized a scheduled task batch file to consolidate these data files from servers around the globe into one network directory

I brought the results into Excel & used VBA to parse them

```
::xxxOSI01
net use z: \\xxxOSI01\C$ /user:domain\user password
z:
cd Program Files (x86)\PIPC\PBDLUsageReport\Logs
dir
copy *.* "netdrive:\0\OSI\ProcessBook_DataLink Usage\xxxOSI01"
dir
h:
net use z: /delete /y

::yyyOSI01
net use z: \\yyyOSI01\C$ /user:domain\user password
z:
cd Program Files (x86)\PIPC\PBDLUsageReport\Logs
dir
copy *.* "netdrive:\0\OSI\ProcessBook_DataLink Usage\yyyOSI01"
dir
h:
net use z: /delete /y
```



| | |
|---|---|
| Duplicate PB/BV Users | 0 |
| Total ProcessBook Users | 14 |
| Total DataLink Users | 6 |
| Total BatchView Users | 0 |
| **User** | **App Short** |
| domain\BartlettT | DataLink |
| domain\BoggsE | DataLink |
| domain\BoggsE | ProcessBook |
| domain\BrooksE | ProcessBook |
| domain\CampbellB2 | ProcessBook |
| domain\DavisT | DataLink |
| domain\DavisT | ProcessBook |
| domain\DiazR | ProcessBook |
| domain\FrederickG | DataLink |
| domain\FrederickG | ProcessBook |
| domain\HowellJ | ProcessBook |
| domain\HubbardS | DataLink |
| domain\HubbardS | ProcessBook |
| domain\JonesC2 | ProcessBook |

| USAGE | aaaOSI01 | bbbOSI01 | cccOSI01 | dddOSI01 | eeeOSI01 | fffOSI01 | Duplicates | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Duplicate PB/BV Users | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| Total ProcessBook Users | 51 | 31 | 282 | 11 | 0 | 15 | 20 | 370 |
| Total DataLink Users | 52 | 24 | 81 | 2 | 1 | 2 | 30 | 132 |
| Total BatchView Users | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Users** | **103** | **55** | **363** | **13** | **1** | **17** | | |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# Next Step – PI Vision

Having set a good foundation, utilizing AD groups, and all users accounted for, we are now set to being the journey to converting our Processbook workbooks and displays to PI Vision

- Download and Install the PI Processbook to PI Vision Migration Tool
- Analyze all files for migration
- Remediate issues discovered
- Migrate workbooks and displays
- Validate migrations
- Socialize with key stakeholders
- Roll out deployment

# PI Processbook to Vision Migration Tool

This new installable utility migrates PI ProcessBook displays from PI ProcessBook 2012 or later to PI Vision 2019. They are now longer read-only PI ProcessBook displays to PI Vision – they are fully editable in the web-based tool. It will migrate *.PDI (stand alone PI ProcessBook displays) or extract displays from *.PIW PI-PB book files.

Find it on the Customer portal in products next to PI ProcessBook (see below)
Install it (probably on the PI Vision server)

CURRENT VERSION | ALL VERSIONS

Quick Find | All Files

Installation Kits (5)

| FILE NAME | VERSION NAME | FILE TYPE | PLATFORM | |
|---|---|---|---|---|
| PI ProcessBook 2015 R3 Install Kit | 2015 R3 | Installation Kit | Windows | Download |
| PI ProcessBook 2015 R3A MUI Language Pack Install Kit | 2015 R3 | Localized kits | Windows | Download |
| VBA Install Kit for PI ProcessBook 2015 R3 | 2015 R3 | Installation Kit | Windows | Download |
| PI ProcessBook to PI Vision 2019 Migration Utility MUI Language Pack | 2019 Migration | Localized kits | Windows | Download |
| PI ProcessBook to PI Vision Migration Utility Install Kit | 2019 Migration | Installation Kit | Windows | Download |


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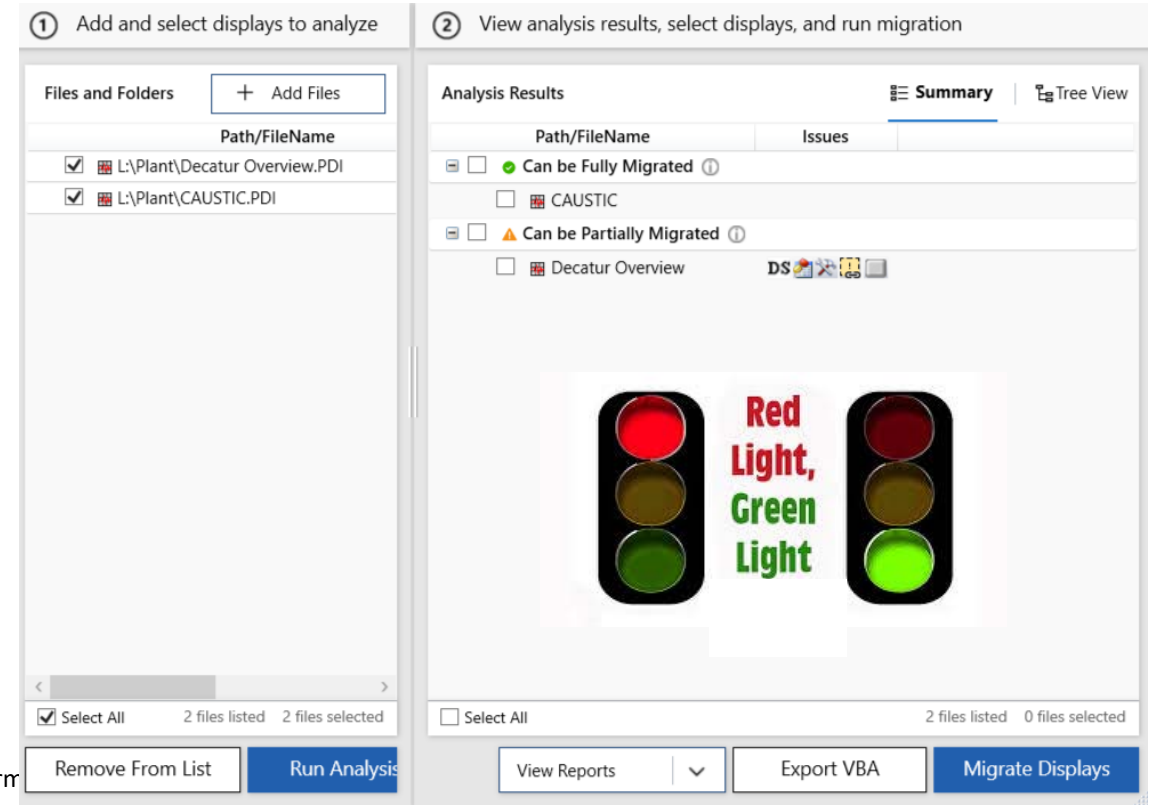
# Using the migration tool

- Select files to migrate (click Add files or drag & drop)
- Run Analysis
- The outcome of the analysis is shown in the right hand pane.
- Full migration is denoted with a green ball with a check
- Partial migration is denoted with a yellow triangle, with the issues icons listed after the file name.





External use perm

# Migration Tool Common Issues

Here are some common migration issues encountered with migrating mature ProcessBook piw and pdi files

| | | |
|---|---|---|
| Datasets | | DS |

PI AF can be leveraged to create a data set pi point, and backfill the data as needed.

VBA is not supported. You will need to be creative in regards to this. Our vba was easily replaced with native PI Vision functionality

| | | |
|---|---|---|
| VBA | | |

| | | |
|---|---|---|
| Control | | |

Active X objects are not supported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# Migration Tool Issues Report

The tool provides a report that can be saved out as a csv file for sorting and analysis.
Items in Error will be an issue that will need to be resolved.
Items in Info will be an issue that may not need to be resolved, but may distort the migration (i.e.; font styles)
Items in OK will be an issue that may be migrated differently than expected (i.e.; font text multistates may apply the multistate to background of the text)

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | Item | Type | Name | Input | Result | Comment |
| 2 | DATASET | Expression | #MILLSON.Total | L:\Plant\DEC_PLANT_PROC_BK.PIW | Dectur Graphic | Datasets are not supported |
| 3 | DATASET | Expression | 1&5L_JETS.1&5LineJets | L:\Plant\DEC_PLANT_PROC_BK.PIW | Error | Datasets are not supported |
| 4 | DATASET | Expression | 1&5LINEMRS.MR2&3Flow | L:\Plant\DEC_PLANT_PROC_BK.PIW | Error | Datasets are not supported |
| 94 | DISPLAY | Display | Decatur Energy Overview | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | Error | VBA not supported |
| 95 | SYMBOL | line | Line | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | OK | |
| 96 | SYMBOL | line | Line33 | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | OK | |
| 100 | SYMBOL | MultiState | Value100 | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | OK | Multistate state limits cannot b |
| 101 | SYMBOL | MultiState | Value106 | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | OK | Multistate state limits cannot b |
| 357 | SYMBOL | statictext | | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | Info | Font styles are not supported |
| 358 | SYMBOL | statictext | | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | Info | Font styles are not supported |
| 359 | SYMBOL | value | Value | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | Info | Font styles are not supported |
| 360 | SYMBOL | value | Value1 | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | Info | Font styles are not supported |
| 361 | SYMBOL | value | Value100 | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Energy Overview | Info | Font styles are not supported |
| 591 | SYMBOL | activexcontrol | cboApps | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Graphic | Error | Symbol is not supported |
| 592 | SYMBOL | activexcontrol | cboReports | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Graphic | Error | Symbol is not supported |
| 593 | SYMBOL | activexcontrol | cboStartUnits | L:\Plant\DEC_PLANT_PROC_BK.PIW!Decatur Graphic | Error | Symbol is not supported |


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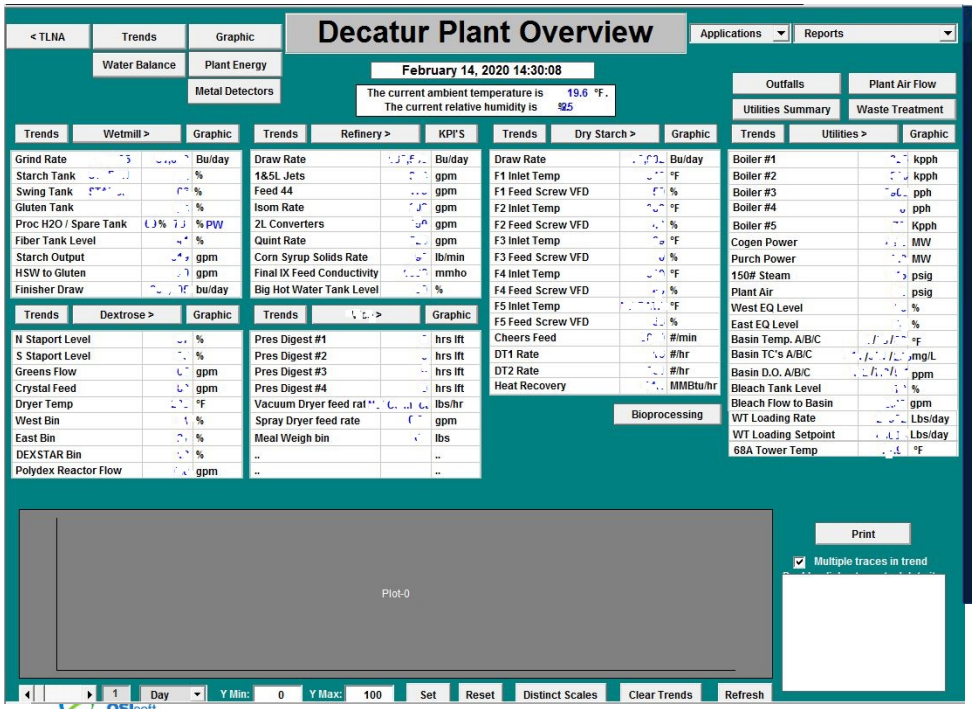
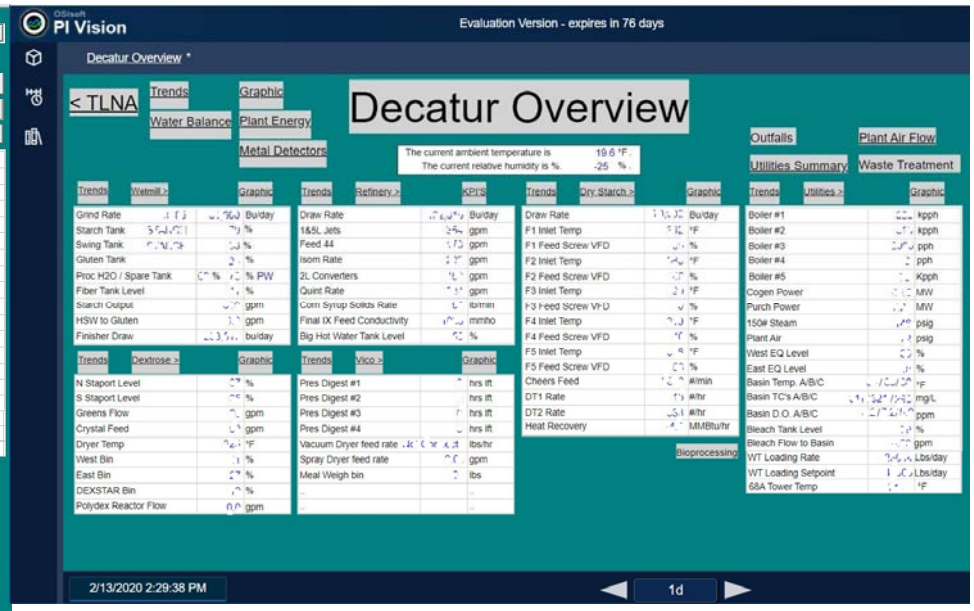
# Migration Tool Output – PI Vision Display

Most everything migrated as expected. You can see the few things that didn't migrate are missing, and some of the button visuals are slightly different.



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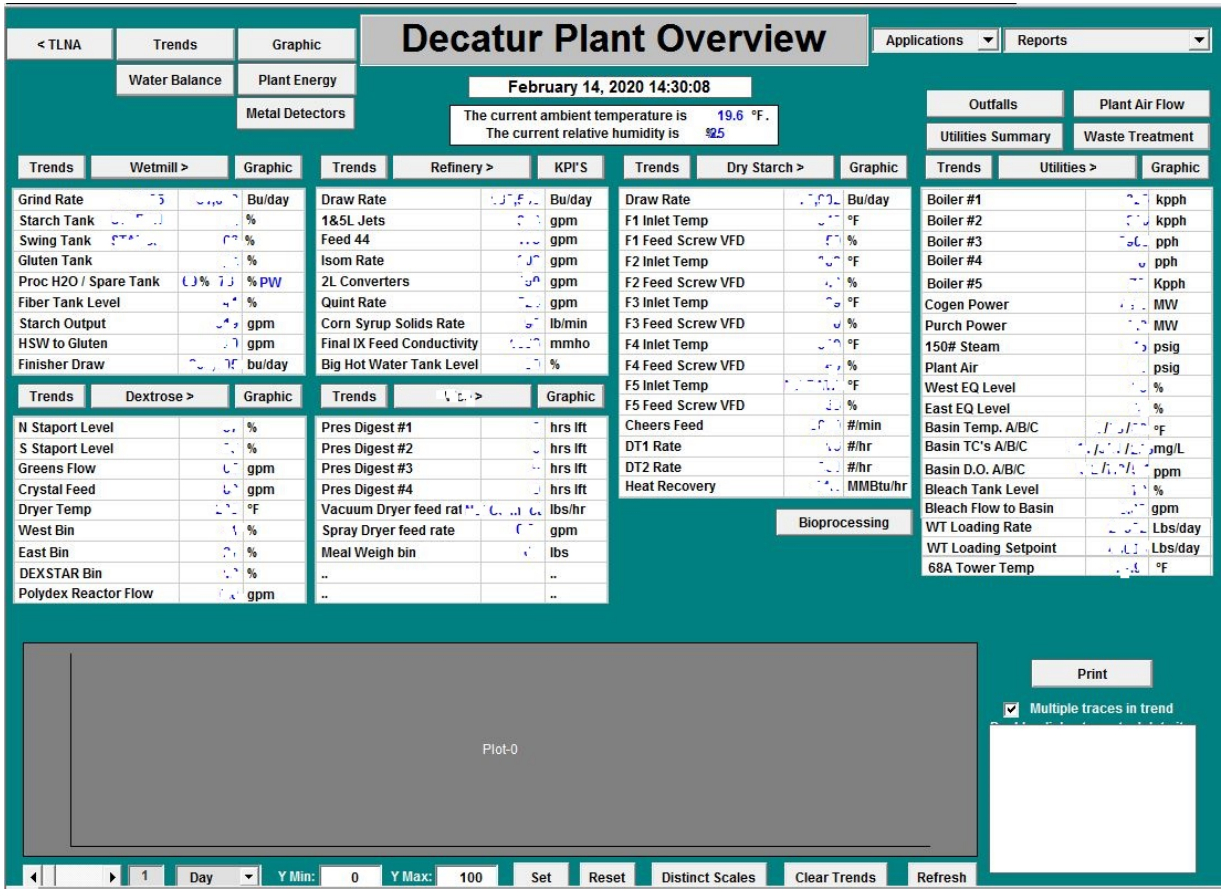
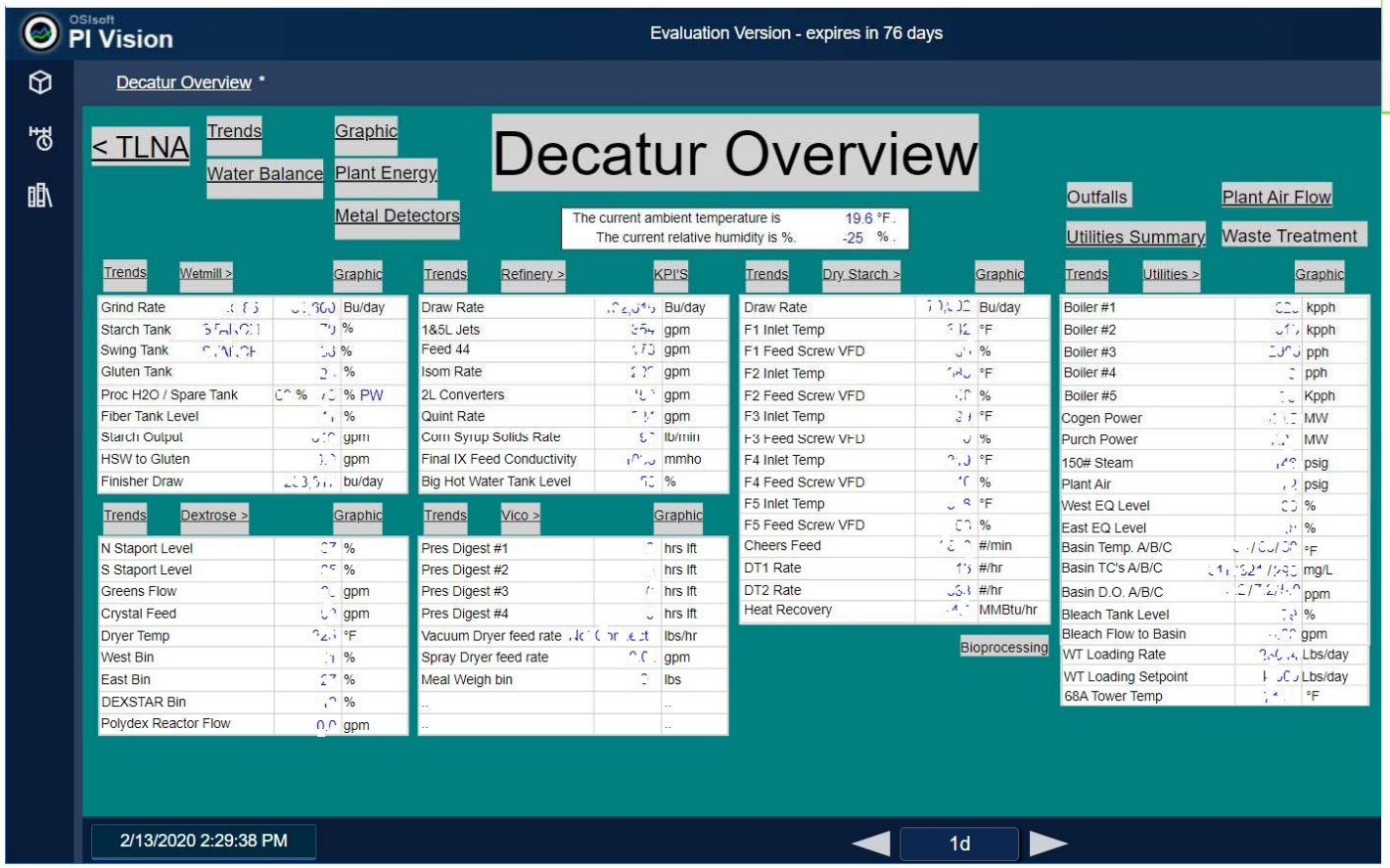
# Migration Tool input – PI ProcessBook Display



# Migration Tool Output – PI Vision Display





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# Migration Tool Issues

- Ownership of each display
  - Is assigned to the person who migrates the PI ProcessBook page
  - Can only be owned by 1 named user – not an active directory group
- Pages created in older versions may require reselection of the PI tags, as the server name does not always migrate
- Text does not animate, but the background of the text does.

None of these are show stoppers, just items to be aware of


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# Migration Tool Takeaways

- The install of the tool was very easy
  - We chose to install it on the PI Vision server to control migration access
- The displays created were very functional and saved a lot of creation time
  - Repairs to displays does not require an engineer level resource, a trained summer intern can do those changes.
- The drag and drop functionality of adding data items to a screen was very easy
  - Duplicating a formatted object and dropping new data sources onto them was a very nice feature, along with the ease of changing the display type; trend, gauge, value

- It does require going through the displays to validate functionality
- Initial setup of the PI Vision server does require IT assistance; infrastructure team (server creation, service accounts, and credentialing), application team (IIS know-how), DBA team (SQL assistance).


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# PI Vision Setup to Utilization

In general, it took a couple of hours to install the application and work through any SQL and IIS issue to make the server function.  There was some techsupport help needed to resolve some access issues across domains.

In the timespan of 1 week, I was able to turn over the system to my beta testers for feedback.

I migrated 750+ out of 1200 displays in less than 2 hours.  Validating and fixing any errors, did take some time.

**Beware of the sins of the past!!**

Screens that do not do anything!

Screens that did not function before you migrated them!

Screens that have defunct Pi tags!


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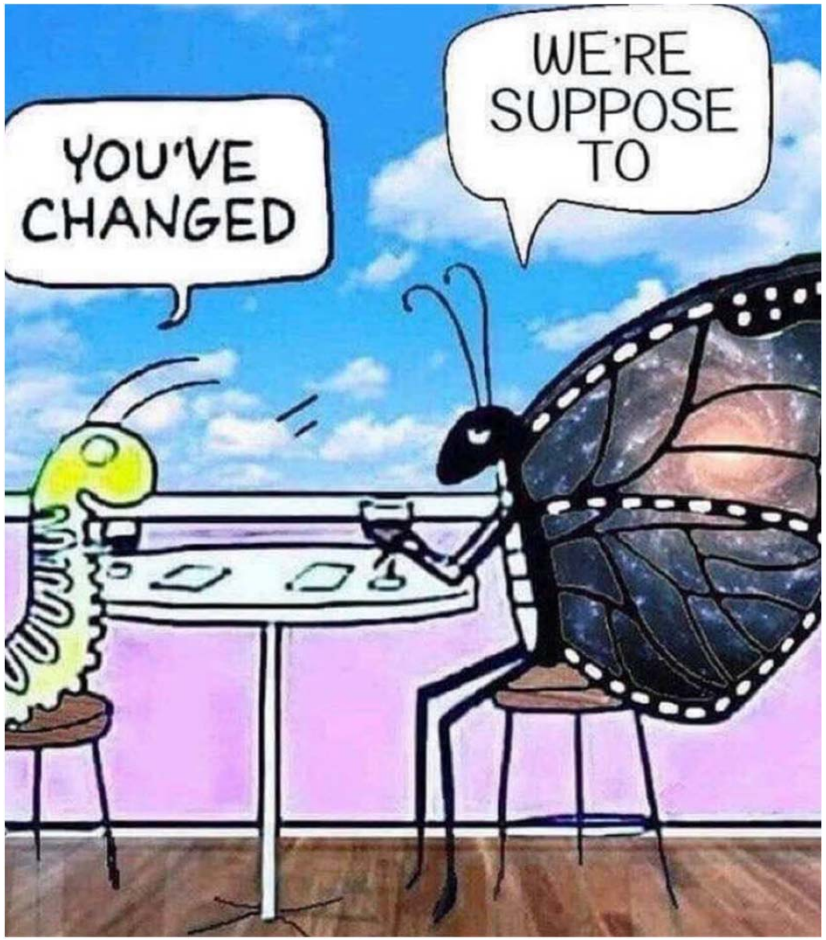
# Here is “Why”

- Lower cost of ownership – one upgrade upgrades everyone – no more desktop versioning – centralized management of displays
- Easier sharing of displays – embed the URL in an e-mail
- Embedding and integrating displays into other webpages in an I-frame or with links
- Access from mobile platforms – pads, phones, etc.
- Event Frames compatibility
- Downloads of ascii data (CSVs, XMLs) directly into Excel without PI Datalink

- Mark Massey
- SMART Operations Team Leader
- Tate & Lyle
- mark.massey@tateandlyle.com





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# Questions?

Please wait for the **microphone**

State your **name & company**

## Save the Date...

AMSTERDAM
October 26-29, 2020

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