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# Using AVEVA™ PI Vision™ to display a profile view of a sheet

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AVEVA

# Kruger used AVEVA™ PI Vision™ to display the profile view of a sheet

## Challenge

- Create a real-time profile view where limits adjust automatically with the current product
- Use out of the box AVEVA™ PI System™ functionalities we had (AVEVA PI Vision and AVEVA PI Server asset framework)
- Highlight zones of the sheet with out-of-spec properties
- Link limits to our master system. **No duplication.**

## Solution

- AVEVA PI Vision to display the profile with color coding for challenging zones
- AVEVA PI Server asset framework to order the data and to link limits from our master system on grade changes
- AVEVA PI System Builder to deploy new profiles



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# Agenda

- Introduction
- Business challenge
- What is a profile
- Implementation
  - Connection to an external database for limits
  - Setup AVEVA PI Server asset framework
  - Create the profile in PI Vision
- Final result
- Conclusion
- Questions

# Introduction

 **Kruger** : We turn renewable resources into sustainable, high-quality essentials made for everyday life

- Private holding
- 10 Sectors
- 19 manufacturing and production operations
- 5000 employees
- +115 years of history
- 42 Renewable energy power plants



## Sectors related to this presentation

### Tissue Products

We make best-selling brands for consumers and businesses across Canada and the U.S.A.

### Publication Papers

Kruger is a leading manufacturer of newsprint, coated paper and a variety of specialty grades.



### Containerboard

Kruger manufactures 100% recycled linerboard and innovative containerboard products.

### Specialty Papers

Kruger is constantly developing various grades of eco-friendly specialty papers such as OGR, C1S and.



**AVEVA**

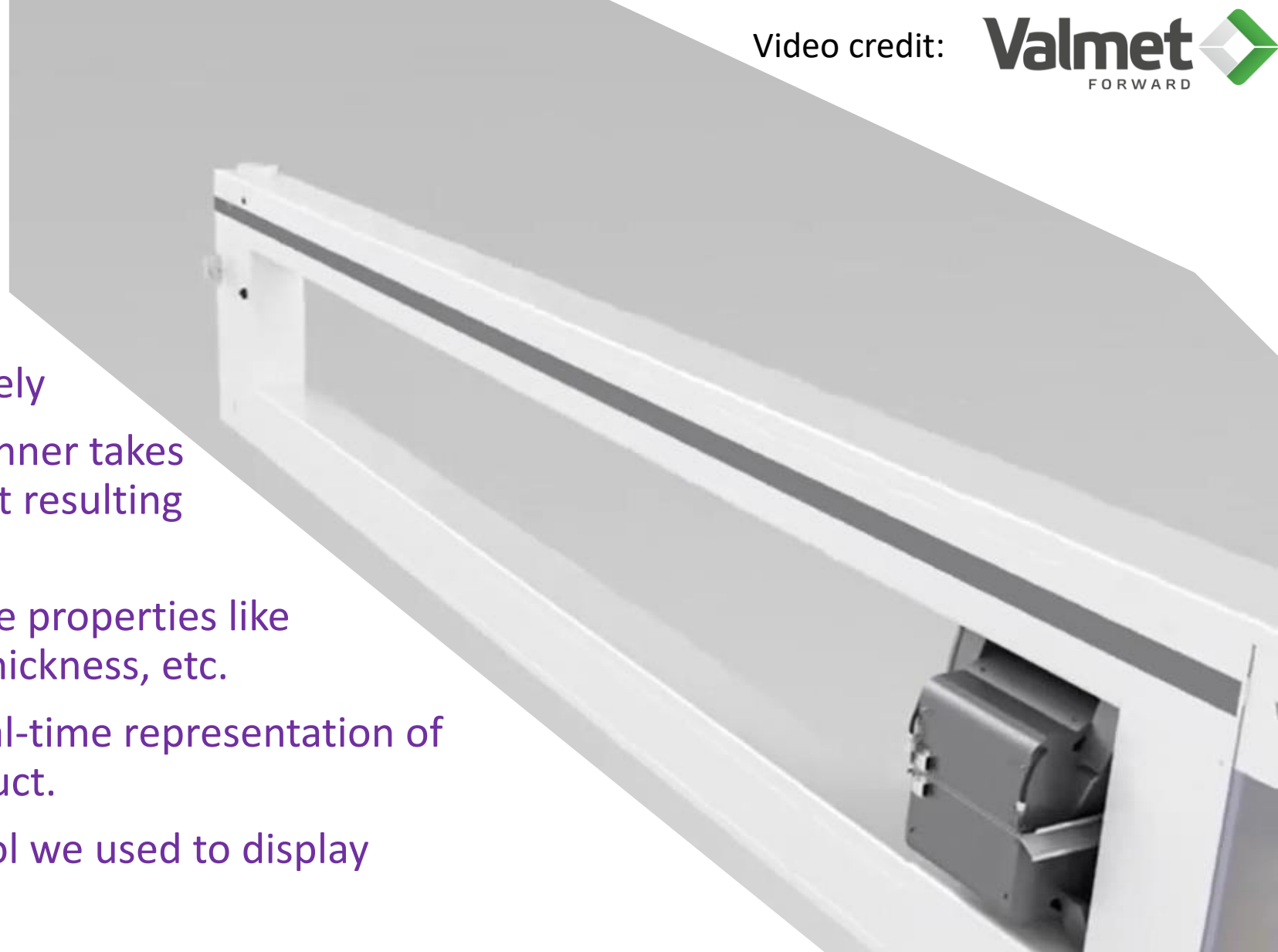
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## Business challenge

- Multiple solutions are used to display/analyze a sheet profile
- Solution must be secure and accessible remotely
- No client must be installed
- No or low investment
- Limits must follow the grade changes
- Limits are coming from an external system (no data entry duplication)
- Profile problems must be highlighted

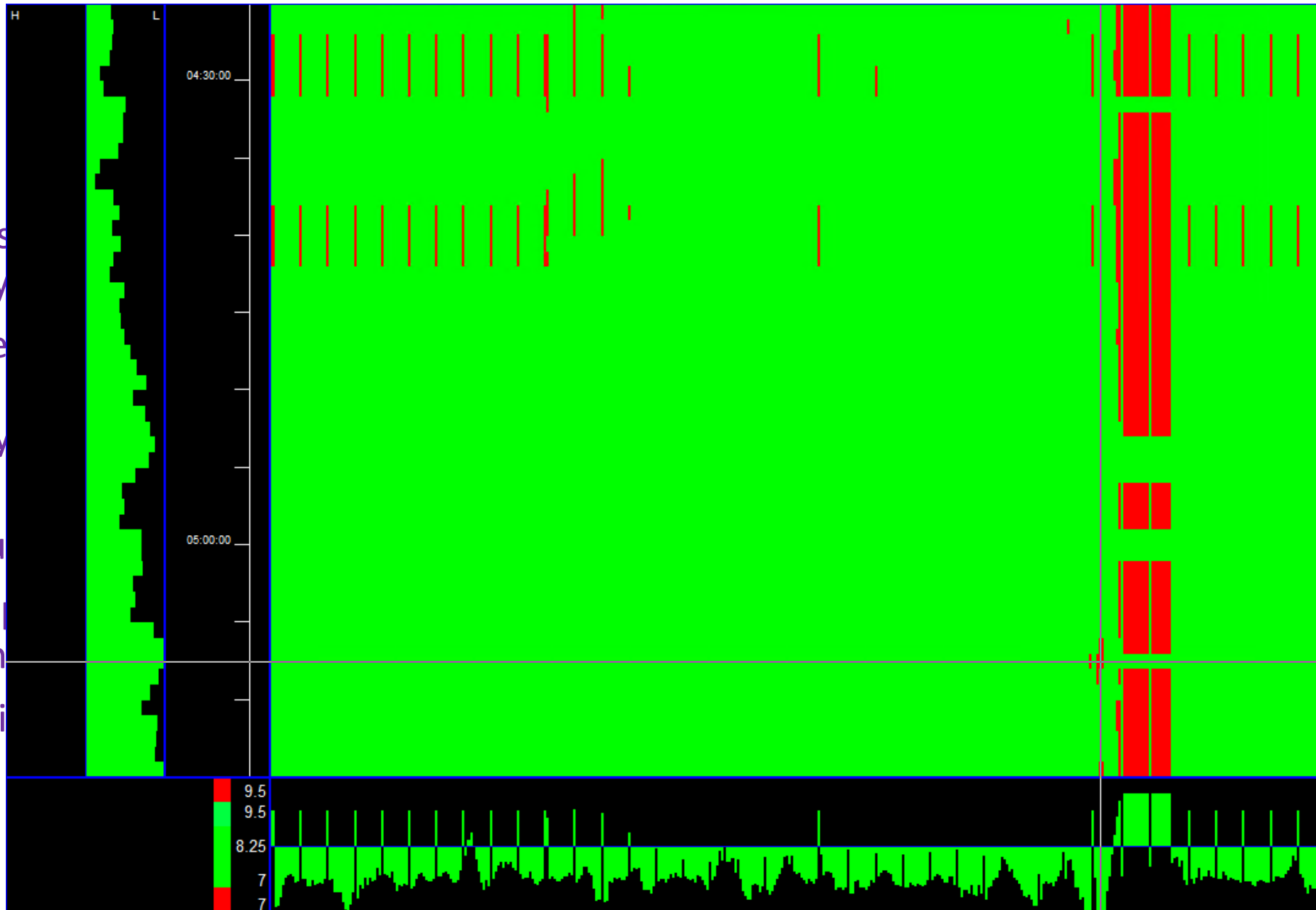
# What is a profile

- A profile is an analysis of a property of a sheet transversely
- As the sheet is produced, a scanner takes measures on the width of sheet resulting in an array of measures.
- A scanner can measure multiple properties like caliper, humidity, dry weight, thickness, etc.
- Profile displays give a visual real-time representation of the health of the running product.
- PI-Profile is a retired AVEVA tool we used to display profiles



# What is

- A profile is a property
- As the she measures in an array
- A scanner caliper, hu
- Profile disp the health
- PI-Profile i profiles



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# Implementation

## Connection to an external database for limits

- Create the query to retrieve the limits per grade
  - At least 3 columns are required
    - Grade: product grade or ID
    - Lo: The lowest value before considering a value as out of specs
    - Hi: The highest value before considering a value as out of specs
    - (Optional) Profile: The name of the profile. We created 1 query per profile.
- In AVEVA PI Server asset framework
  - Create a table connection to your limits
  - Create a table to query your limits



# Implementation

Connection to an external database for limits

The screenshot displays the PI System Explorer interface for a project named 'PB - Place Turcot'. The 'Library' pane on the left shows a tree structure with 'Tables' expanded to 'Humidity Profile Limits per Grade'. A red circle '3' points to this table. Below it, 'Table Connections' are listed, with 'EKHO V3' highlighted by a red circle '2'. At the bottom, the 'Library' tab is selected in the navigation bar, indicated by a red circle '1'. The main window shows the 'Humidity Profile Limits per Grade' table with columns 'Grade', 'Lo', and 'Hi'. The first row is highlighted, and a red box encloses the header row.

Grade	Lo	Hi
0001	5,5	8,5
0011	5,5	8,5
0012	5,5	8,5
0010	5,5	7,5
0000	4	9,5
0000	4,5	8
0006	4	8
0007	4	7
0008	4	8
0011	4	7
0005	3	5
0004	3	5
0010	3	5
0011	3	6
0010	3	5
0000	3	5

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# Implementation

## Setup AVEVA PI Server asset framework

- Create an object to store all the series of values of your profile's positions
- Create a series of attribute to hold the grade at every 5 min for the last 60 min.
  - Each grade must set the child attributes Minimum, Maximum, Lo and Hi limits
- Create multiple series of attributes to hold the profile values
  - 1 series per 5 minutes for the last 60 minutes
  - The current values series only must set the limits Minimum, Maximum, Lo and Hi limits for each value of the series.

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# Implementation

## Setup AVEVA PI Server asset framework (Next)

- Create multiple series of attributes to hold the profile qualities
  - 1 series per 5 minutes for the last 60 minutes
  - 0 = bad, 1 = good = value is between Lo and Hi values
- Lo and Hi values are coming from the table created previously
- Minimum values are set to 10% of the span Hi-Lo below Lo.
- Maximum values are set to 10% of the span Hi-Lo over Hi.

Note: Minimum and Maximum are used to automatically define the profile display range of values.

Note 2: 10% fits our needs and ease the development of the display. You can change it with minor modifications.

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# Implementation

## Setup AVEVA PI Server asset framework (Trick)

- Use attribute names that can be ordered for your Quality and Value attributes (Ex. Profile Pos 001, Profile Pos 002, etc.)
- Create the first attributes of each series then use PI Builder in Excel to create/configure all the other attributes using formulas.
- Series of attributes are categorized to group them together

Note: Once your profile asset is good, create a template from it. Use PI Builder to configure your new asset.

# Implementation

Setup AEVA PI Server asset framework

The screenshot displays the 'Humidity Profile' configuration window. The 'Attributes' tab is active, showing a table of grades. The 'Grade 10m ago' attribute is selected. The settings panel on the right shows the 'Data Reference' field with the value: '\\KPSVPIDAPD \\PI-ORACLE-PI;TimeMethod=Interpolated;RelativeTime=-10m'. A callout box highlights the '-10m' value in the data reference string.

Name	Value
Category: Grades	
Current Grade	9.27%
Grade 5m ago	9.27%
Grade 10m ago	9.27%
Minimum	3,05
Lo	3,2
Hi	4,7
Maximum	4,85
Grade 15m ago	9.27%
Grade 20m ago	9.27%
Grade 25m ago	9.27%
Grade 50m ago	9.27%
Grade 55m ago	9.27%
Grade 60m ago	9.27%

Settings Panel:

- Name: Grade 10m ago
- Description:
- Properties: <None>
- Categories: Grades
- Default UOM: <None>
- Value Type: Single
- Value: 9.27%
- Display Digits: -5
- Data Reference: PI Point

Callout Box:

```
\\KPSVPIDAPD  
\\PI-ORACLE-PI;TimeMethod=Interpolated;RelativeTime=-10m
```

# Implementation

Setup AVEVA PI Server asset framework

Humidity Profile

General Child Elements Attributes Ports Analyses Notification Rules Version

Filter

Name	Value
Category: Grades	
Current Grade	100%
Grade 5m ago	100%
Grade 10m ago	100%
Minimum	3,05
Lo	3,2
Hi	4,7
Maximum	4,85
Grade 15m ago	100%
Grade 20m ago	100%
Grade 25m ago	100%
Grade 50m ago	100%
Grade 55m ago	100%
Grade 60m ago	100%

Group by:  Category  Template

Name: Lo

Description:

Properties: Lo

Categories:

Default UOM: <None>

Value Type: Single

Value: 3,2

Display Digits: -5

Data Reference: Table Lookup

Settings...

```
SELECT Lo FROM [PB Humidity Profile Limits per Grade]
WHERE Grade = @[Grade 10m ago] ORDER BY
Grade;RWN=No Data
```

Limits Forecasts

```
SELECT Lo FROM [PB Humidity Profile Limits per Grade]
WHERE Grade = @[Grade 10m ago] ORDER BY
Grade;RWN=No Data
```

# Implementation

Setup AVEVA PI Server asset framework

Humidity Profile

General Child Elements Attributes Ports Analyses Notification Rules Version

Filter

Name	Value
Category: Grades	
Current Grade	9275
Grade 5m ago	9275
Grade 10m ago	9275
Minimum	3,05
Lo	3,2
Hi	4,7
Maximum	4,85
Grade 15m ago	9275
Grade 20m ago	9275
Grade 25m ago	9275
Grade 50m ago	9275
Grade 55m ago	9275
Grade 60m ago	9275

Group by:  Category  Template

Name: Minimum

Description:

Properties: Minimum

Categories:

Default UOM: <None>

Value Type: Single

Value: 3,05

Display Digits: -5

Data Reference: Formula

Settings...

H=Hi;L=Lo;[L - ((H-L)\*0.1)]

Limits Forecasts

H=Hi;L=Lo;[L - ((H-L)\*0.1)]

# Implementation

Setup AVEVA PI Server asset framework

Humidity Profile

General Child Elements Attributes Ports Analyses Notification Rules Version

Filter

Name	Value
Category: Grades	
Category: Profile Quality	
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0
Profile Quality Positio...	0

Group by:  Category  Template

Name: Profile Quality Position 001

Description:

Properties: <None>

Categories: Profile Quality

Default UOM: <None>

Value Type: Byte

Value: 0

Display Digits: -5

Data Reference: Formula

Settings...

A=Profile Value Position 001;H=|Current Grade |Hi;L=|Current Grade |Lo;[if (A >= L and A <= H) then 1 else 0]

Limits Forecasts

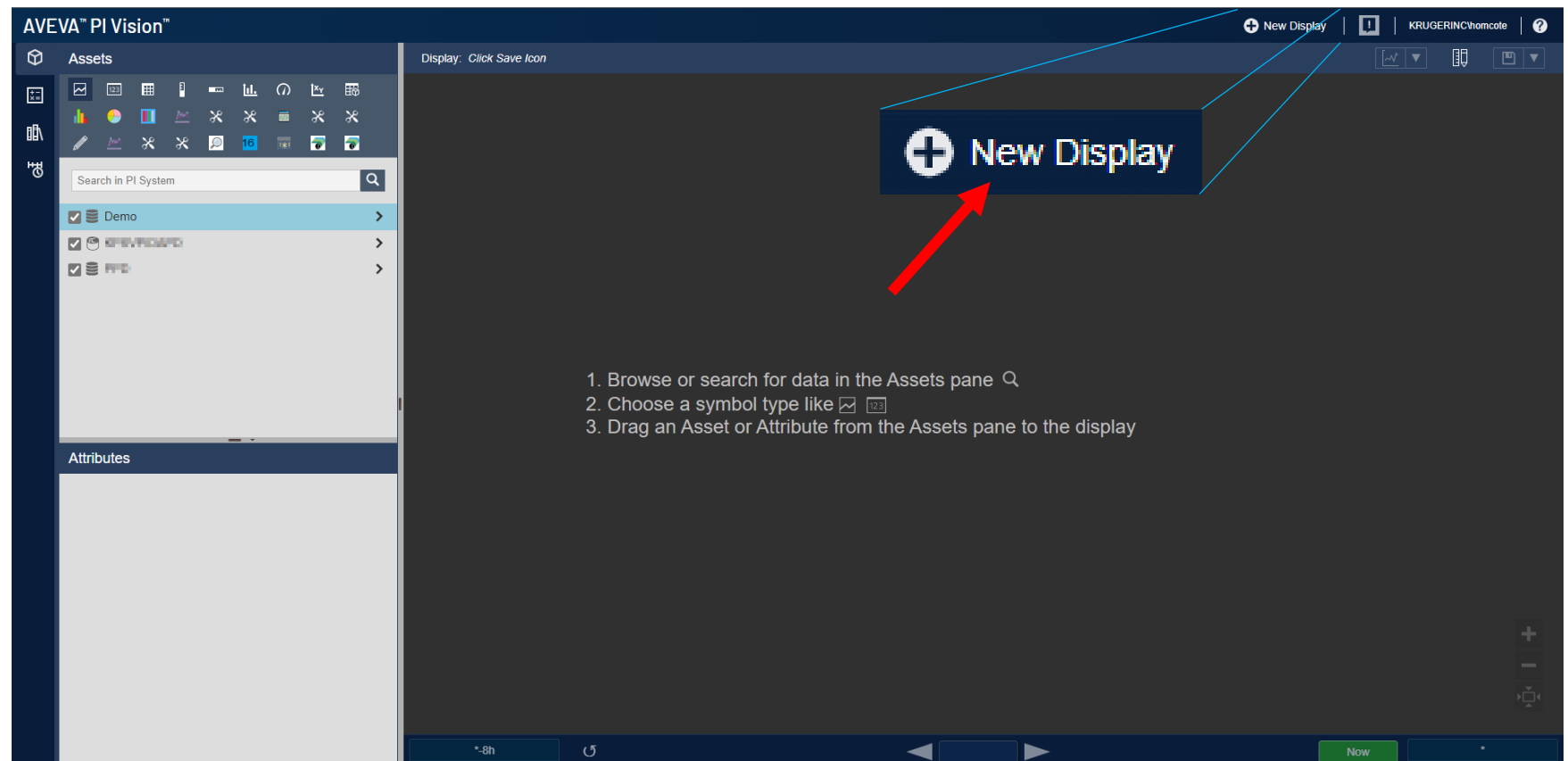
A=Profile Value Position 001;H=|Current Grade |Hi;L=|Current Grade |Lo;[if (A >= L and A <= H) then 1 else 0]



# Implementation

Create the profile in AVEVA PI Vision

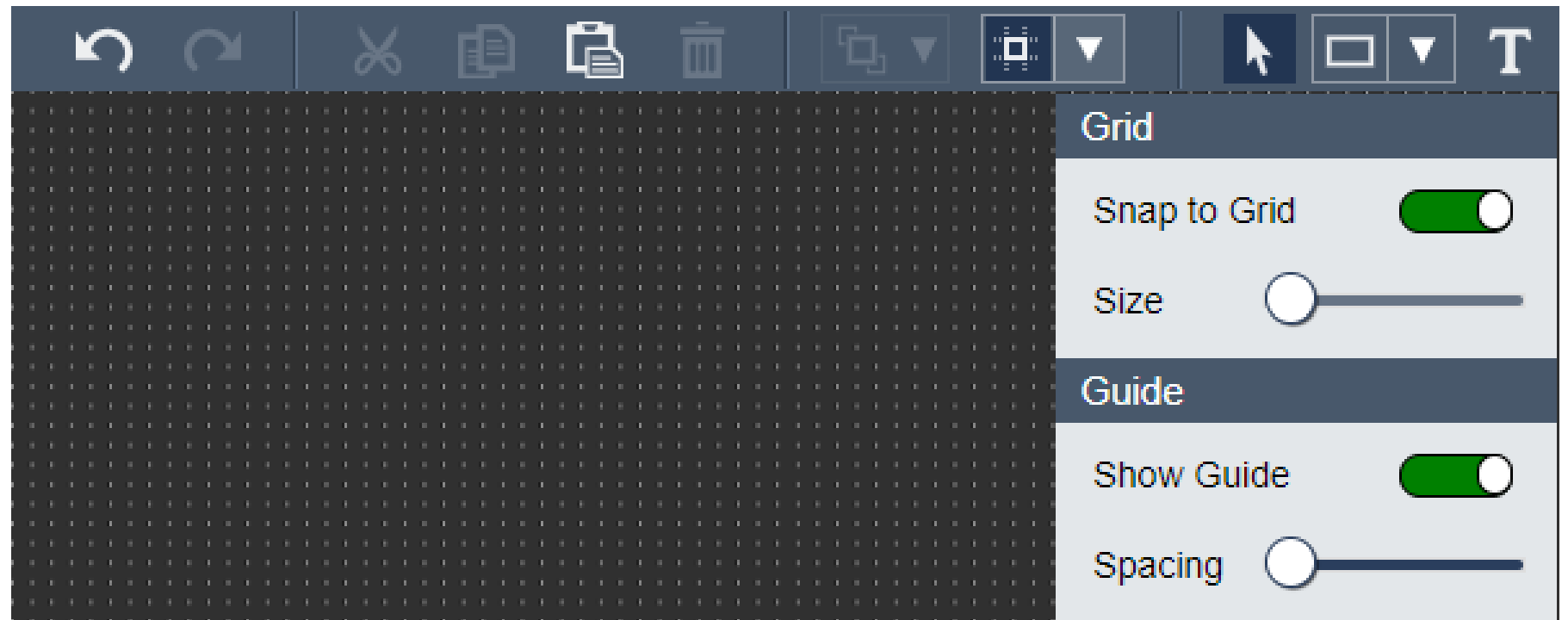
- Press the “New Display” button.



# Implementation

Create the profile in AVEVA PI Vision

- Activate the “snap to grid” feature and adjust you’re the size to the minimum

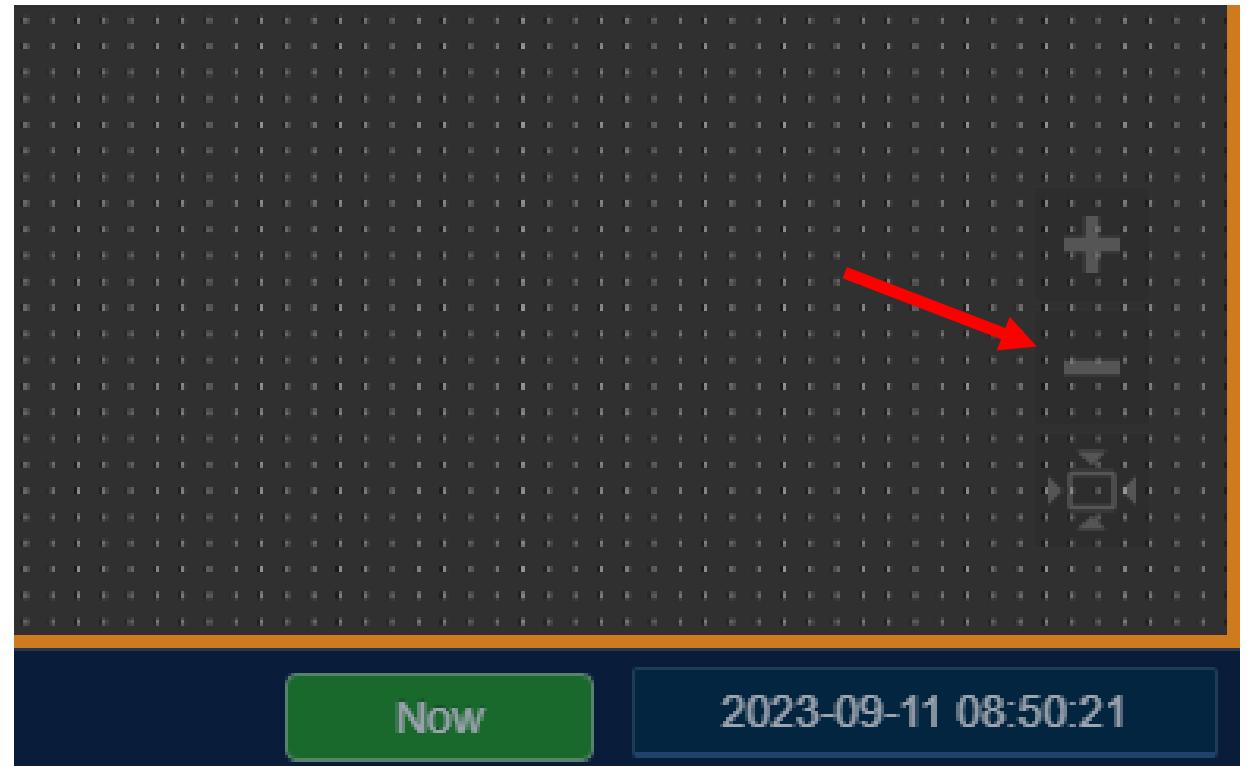


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# Implementation

Create the profile in AVEVA PI Vision

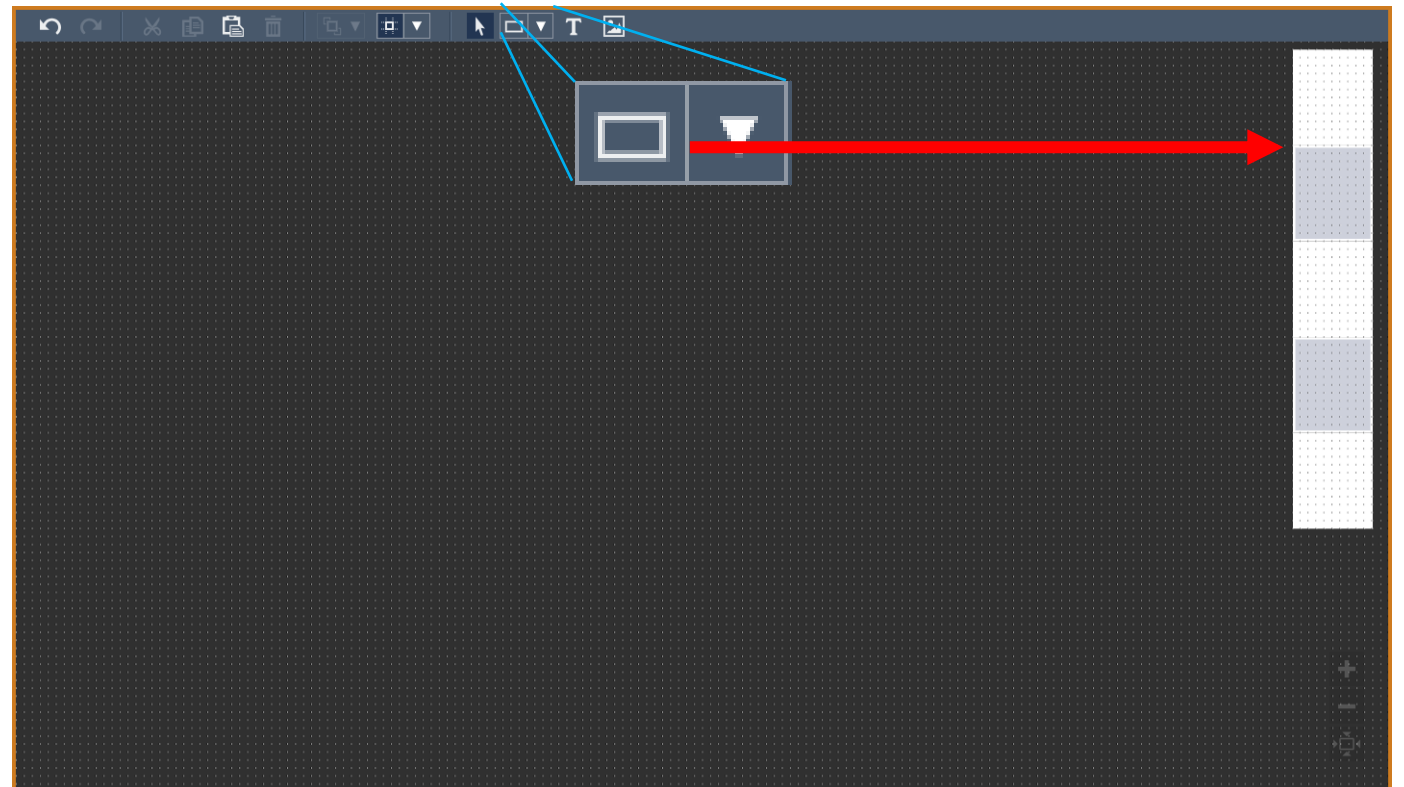
- Zoom your canvas by pressing twice the  button.



# Implementation

## Create the profile in AVEVA PI Vision

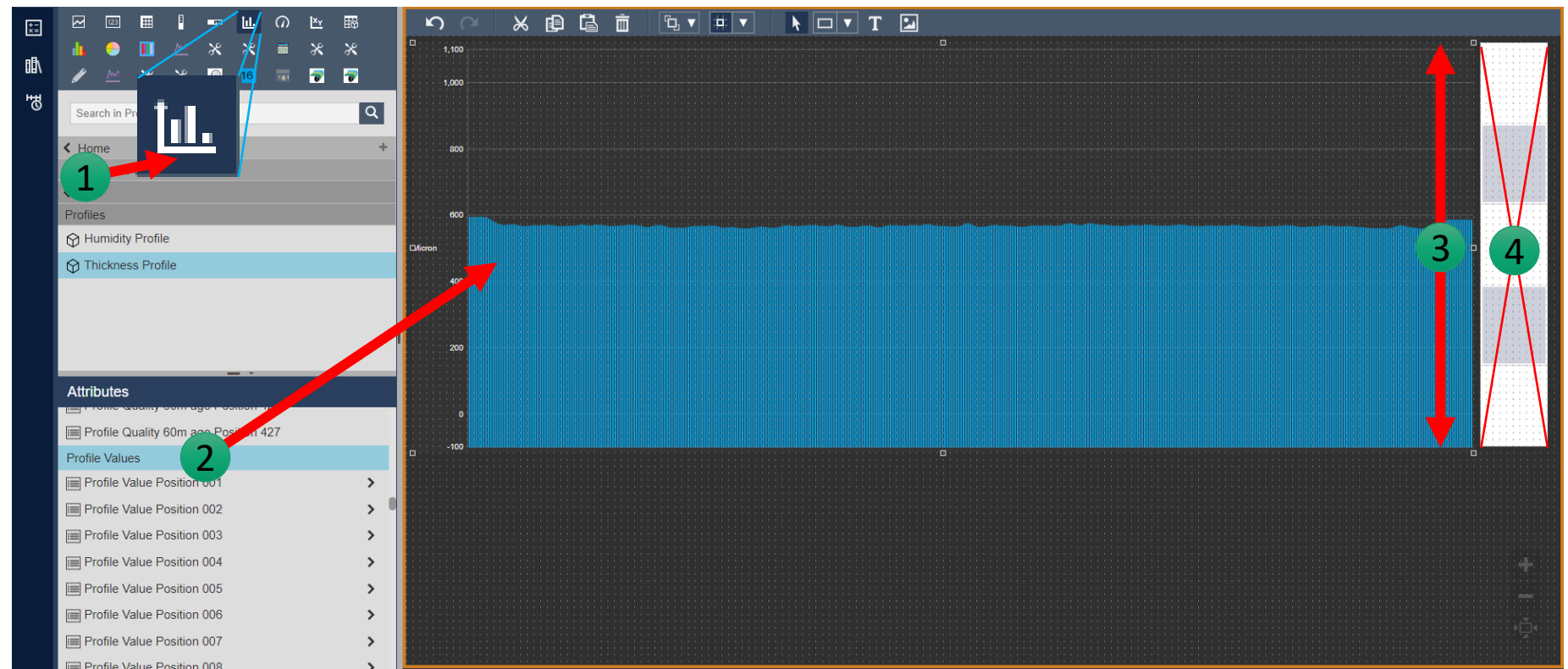
- The height of the main profile needs to be a multiple of 12. Create a box that is 12 units high and repeat it 5 times.



# Implementation

## Create the profile in AVEVA PI Vision

- Search for profile's current value category and add it to the screen has a Bar Chart. Resize it to the height of your boxes created previously. Delete the boxes.



# Implementation

## Create the profile in AVEVA PI Vision

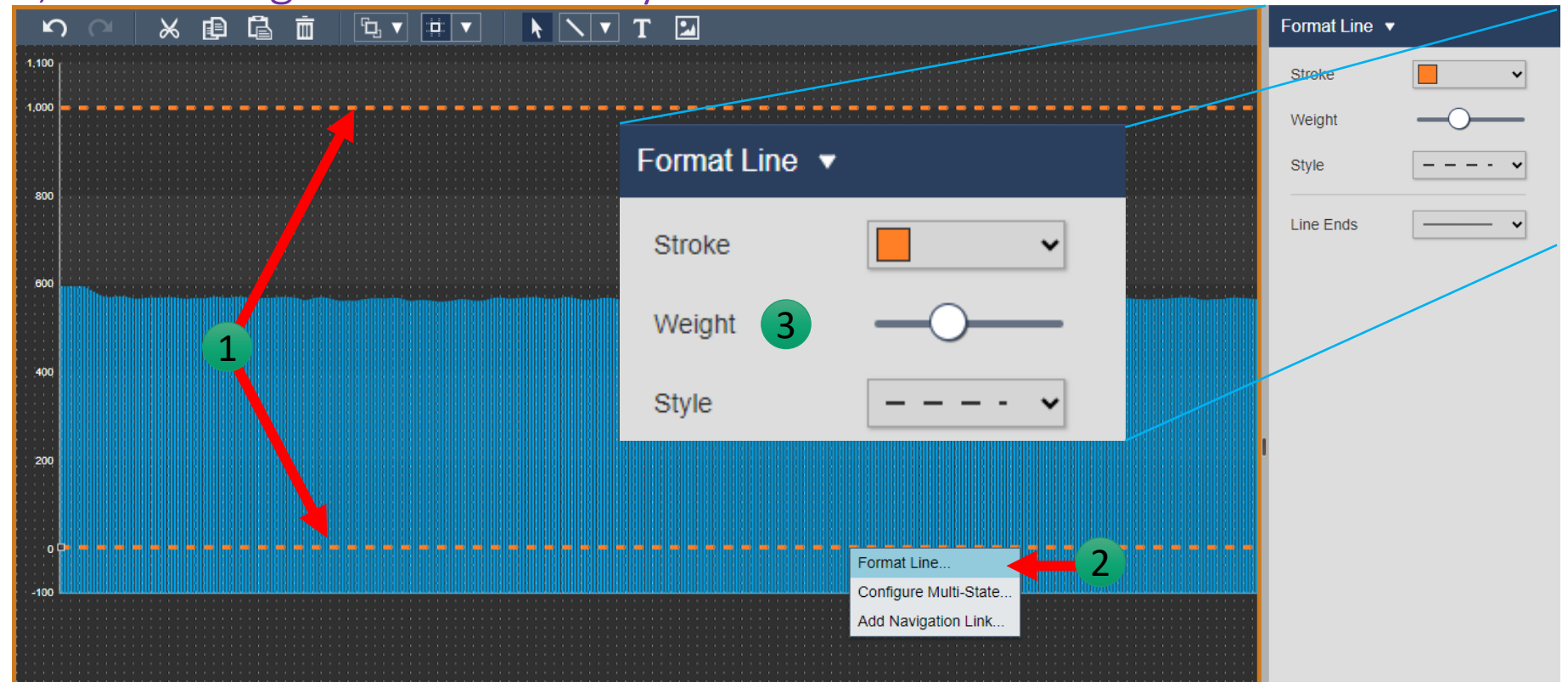
- Show the properties of the Bar Chart. Change the grid style to “Bands” and uncheck all the visibility boxes

The image shows a screenshot of the AVEVA PI Vision software interface. On the left, a bar chart is displayed with a blue grid. A red arrow labeled '1' points to a context menu that appears over the chart, with the 'Format Bar Chart...' option highlighted. On the right, the 'Format Bar Chart' dialog box is open. The 'Style' section is expanded, showing options for Title, Bars, Foreground, Background, Value, Format, and Bar Label. The 'Orientation' section shows two icons for bar orientation. The 'Grid' section shows three icons for grid styles, with the 'Bands' style selected and highlighted by a red arrow labeled '2'. The 'Visibility' section is expanded, showing checkboxes for Label, Value, and Units, all of which are unchecked. A red arrow labeled '3' points to the 'Value' checkbox. At the bottom of the dialog, the 'Bar Options' section is visible, listing five profile value positions.

# Implementation

## Create the profile in AVEVA PI Vision

- Place horizontal lines at 1/12 of the top and 1/12 of the bottom of the Bar Chart. Select a color, a line weight and a dash style.



# Implementation

## Create the profile in AVEVA PI Vision

- Browse to the “Current Grade” attribute. Place its Hi and Lo child attributes at the end of the horizontal lines. Set the label and uncheck “Units” and “Timestamp”.

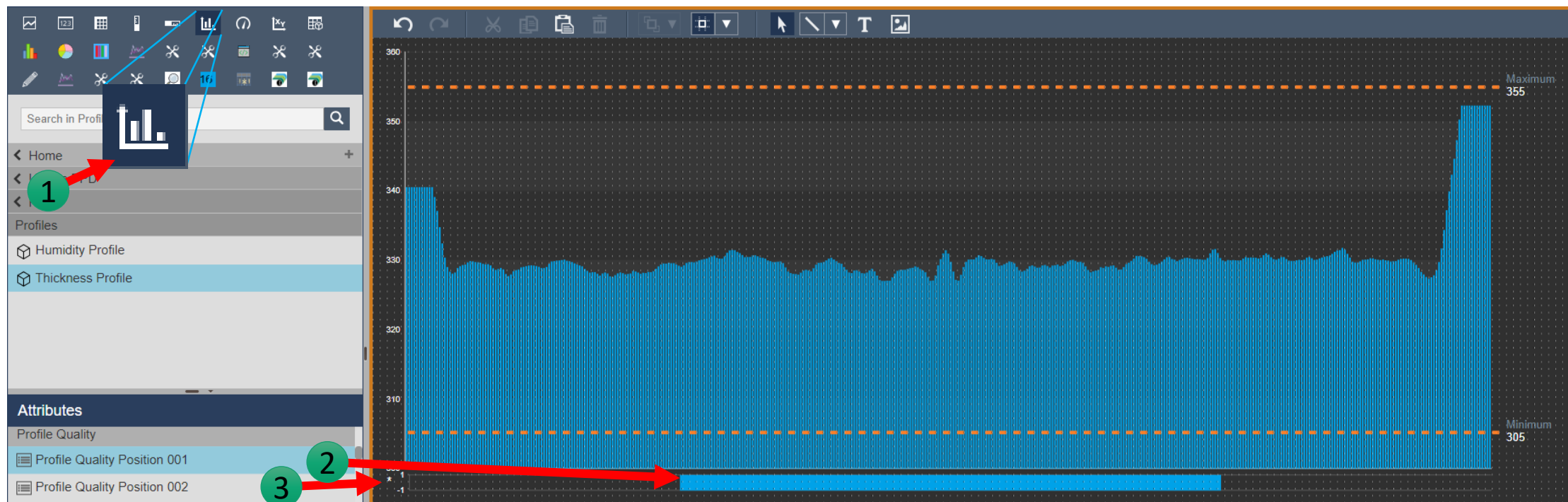
The screenshot displays the AVEVA PI Vision interface. On the left, the 'Attributes' list shows 'Current Grade' with child attributes 'Hi', 'Lo', 'Maximum', and 'Minimum'. A red arrow labeled '1' points to the search bar containing '123'. Another red arrow labeled '2' points to the 'Lo' attribute. A third red arrow labeled '3' points to the 'Lo' attribute being placed at the end of a horizontal line in the central visualization area. A fourth red arrow labeled '4' points to the 'Format Value' panel on the right, which is configured to show 'Minimum' and has 'Units' and 'Timestamp' unchecked.



# Implementation

## Create the profile in AVEVA PI Vision

- Browse to the “Profile Quality Position 001” attribute and add it to the screen has a Bar Chart below the main Bar Chart. Resize it to the same width as the main Bar Chart but only 2 units high. Place a label displaying “\*” to a left of the Bar Chart.



# Implementation

## Create the profile in AVEVA PI Vision

- Open the Bar Chart settings. Set the foreground color to the color of the display's background. Uncheck all the visibility boxes and change the scale to 0 to -1

The image shows the AVEVA PI Vision Bar Chart settings interface. The central part of the image displays a bar chart with blue bars on a dark background. Four callouts, numbered 1 through 4, point to specific settings:

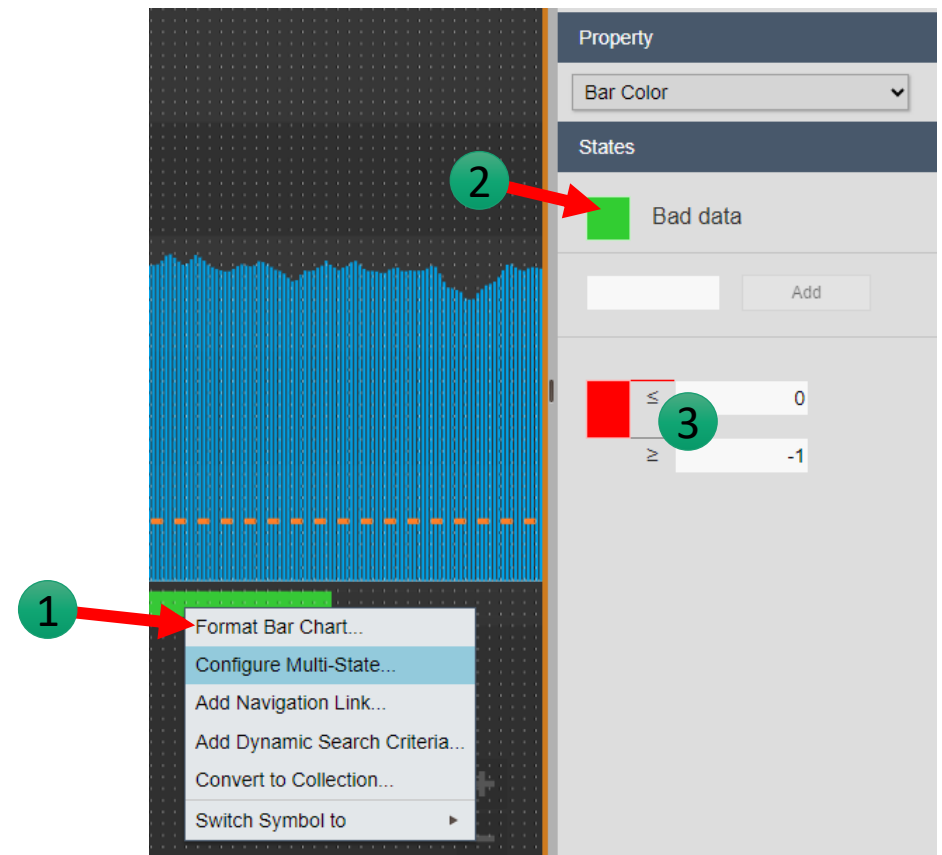
- 1:** Points to the context menu option "Format Bar Chart..." which is highlighted in blue.
- 2:** Points to the "Foreground" color selection in the "Style" panel, which is set to a dark grey color.
- 3:** Points to the "Value" visibility checkbox in the "Visibility" panel, which is unchecked.
- 4:** Points to the "Bottom" scale range input in the "Scale Range" panel, which is set to -1.

The "Style" panel includes options for Title, Bars, Foreground, Background, Value, Format, and Bar Label. The "Visibility" panel includes checkboxes for Label, Value, and Units. The "Bar Options" panel shows "Profile Quality Position 001" and "Units: Default". The "Scale Range" panel shows "Custom limits" and "Top: 0", "Bottom: -1".

# Implementation

Create the profile in AVEVA PI Vision

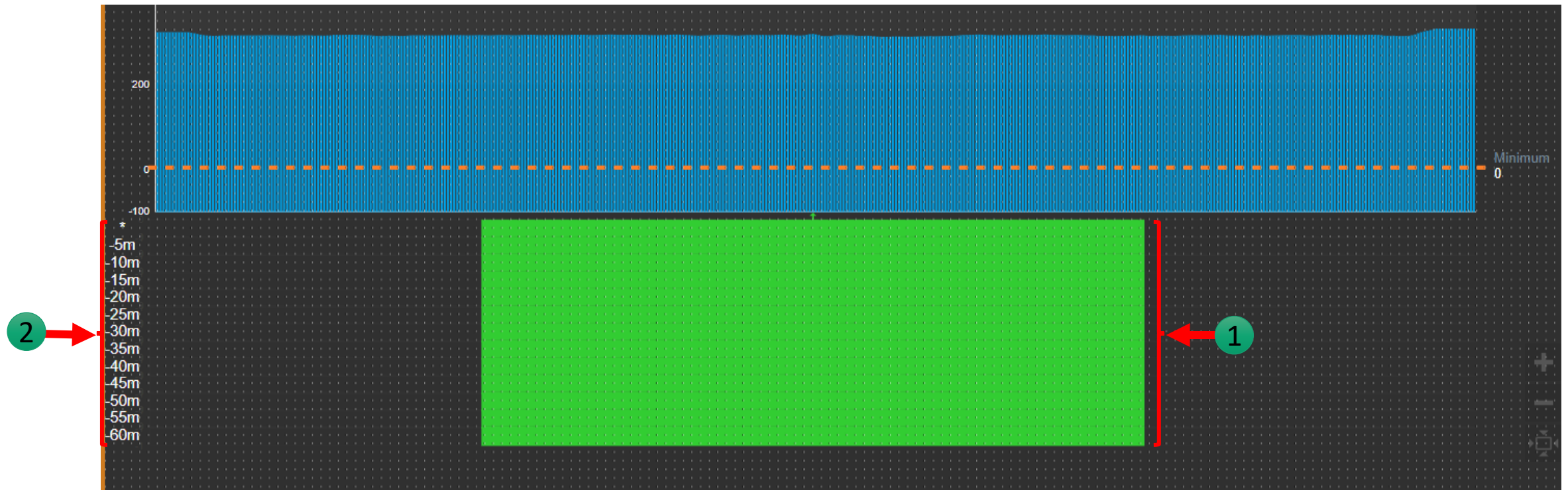
- Open the Bar Chart Multi-State settings. Remove all entries. Set “Bad Data” to Green and the range between 0 and -1 to Red.



# Implementation

Create the profile in AVEVA PI Vision

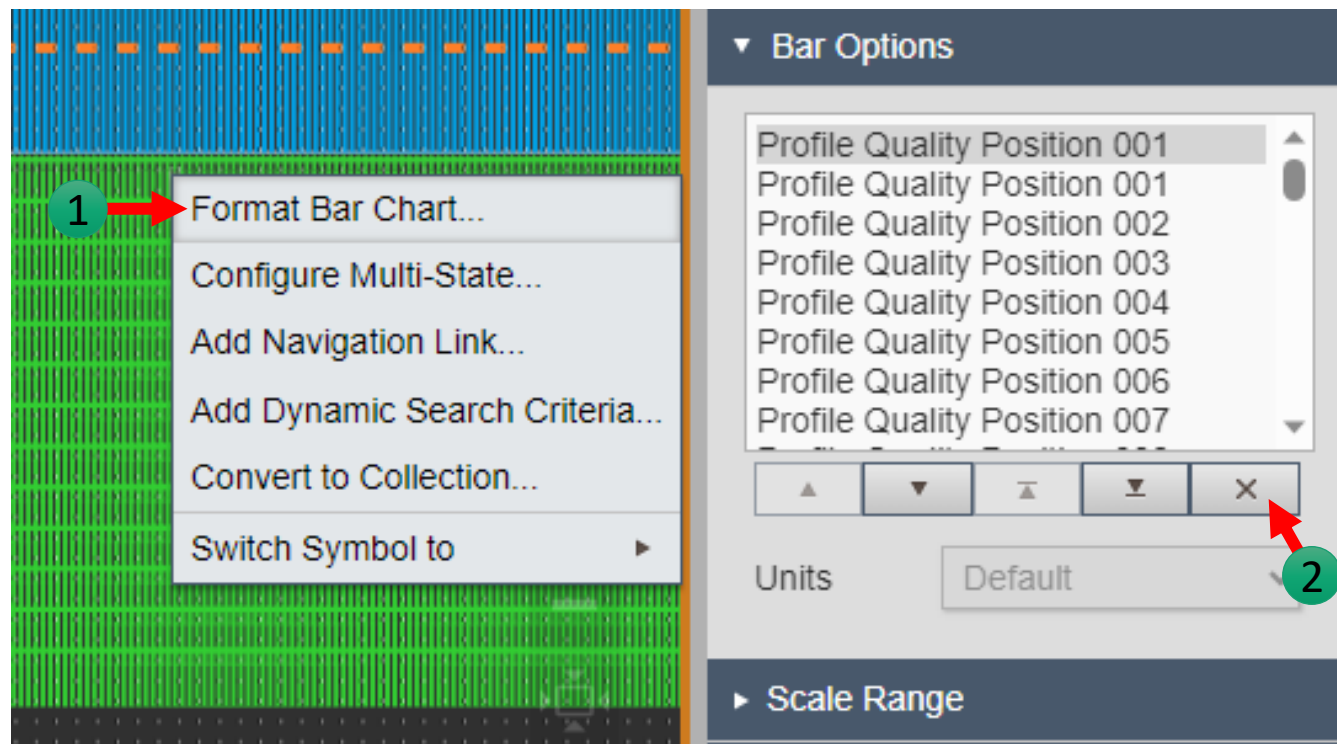
- Copy the label and the Bar Chart so you get a total of 13. Change the labels to display the 5 minutes steps between each Bar Chart.



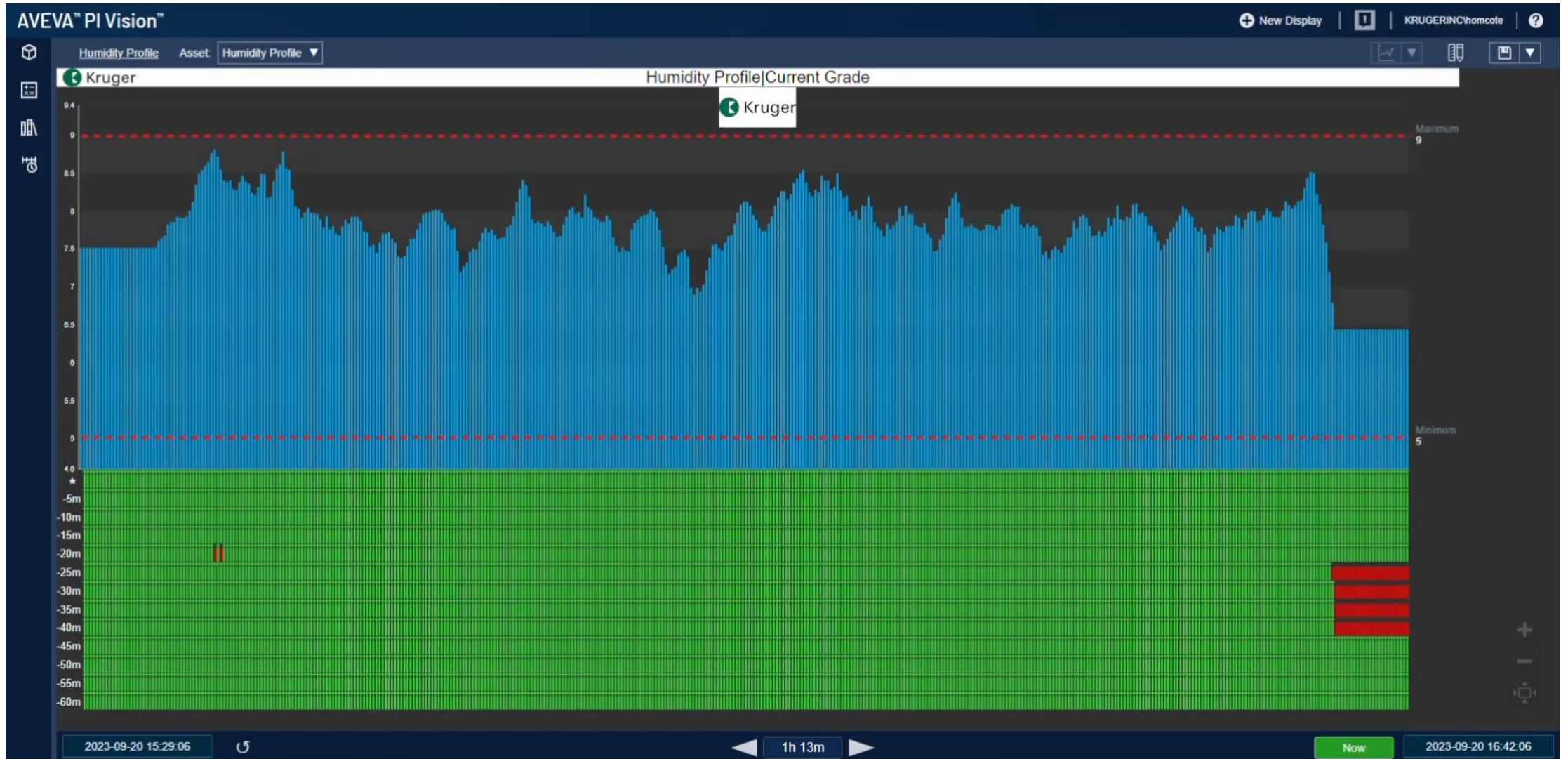
# Implementation

## Create the profile in AVEVA PI Vision

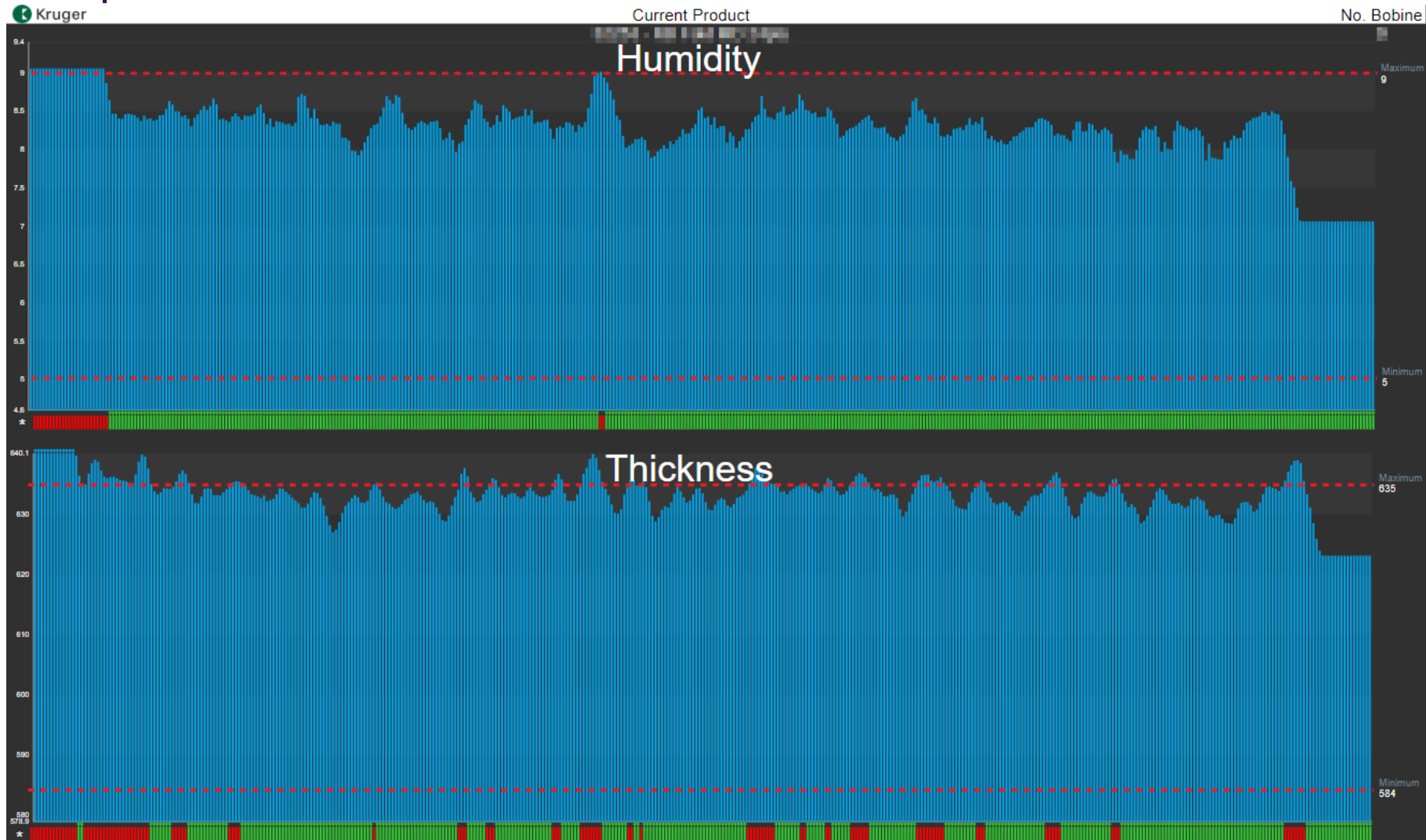
- For each 13 Bar Chart, drag the corresponding Quality category on the symbol and open the setting to remove the first attribute which is the one selected prior the copy.



# Final Result



# Future improvement



# Kruger used AVEVA™ PI Vision™ to display the profile view of a sheet

## Challenge

- Create a real-time profile view where limits adjust automatically with the current product.
- Use out of the box AVEVA PI System functionalities we had (AVEVA PI Vision, AVEVA PI Server asset framework).
- Highlight zones of the sheet with out-of-spec properties.
- Link limits to our master system. **No duplication.**

## Solution

- AVEVA PI Vision to display the profile with color coding for challenging zones.
- AVEVA PI Server asset framework to order the data and to link limits from our master system on grade changes.
- PI Builder to deploy new profiles.

## Results

- We can keep a central version of our limits – Less maintenance, less errors.
- Real-time health of our production – more uniform quality, less rejects.
- Color coding helps to easily isolate the issues – quicker response from the operators.
- We can easily go back in time for deeper analysis – process improvement.





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# Conclusion

## Pros

- Displays are more accessible and from anywhere
- People reacts more quickly to visual problems – gain in quality
- Great tool for real-time troubleshooting
- Add new profile within 15 minutes (using an Excel tool with PI Builder 😊)
- Minimal investments were required (time)

## Cons

- A bit slow on start (~10 sec) – better server hardware will improve it
- A recent version of AVEVA PI Vision Server is required. (Tested on 3.7.1)
- Not all capabilities of AVEVA PI-Profile are present – Key functions are there



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# Questions?

Please wait for the microphone.  
State your name and company.



# Please remember to...

Navigate to this session in the mobile app to complete the survey.



# Thank you!

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Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life's essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world's most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

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