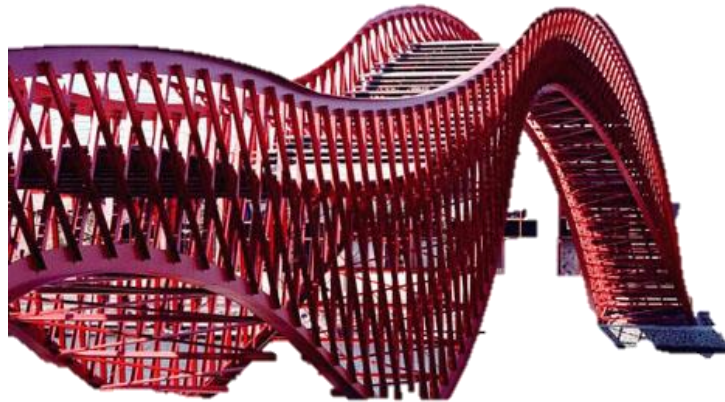


# Kunstmatige Intelligentie (AI) een brug te ver?

Wat je van je eigen mensen, processen en data kunt leren

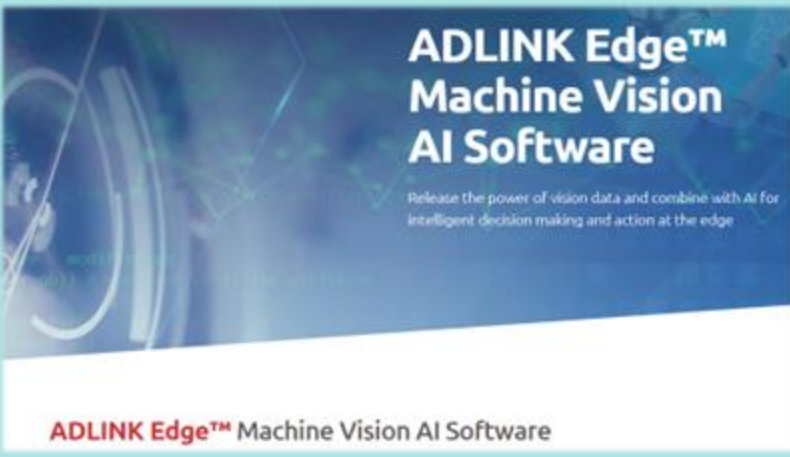


## ChatGPT is at capacity right now

[Get notified when we're back](#)

Write a poem about the status of ChatGPT.

ChatGPT, oh ChatGPT  
With AI so smart  
But alas, it's at capacity  
Leaving us to wait  
For a chance to chat  
With its wisdom and wit  
We long to be part  
Of its conversation  
But for now, we sit  
On the sidelines  
Patiently waiting  
For the day  
When ChatGPT  
Is ready to play  
Again.



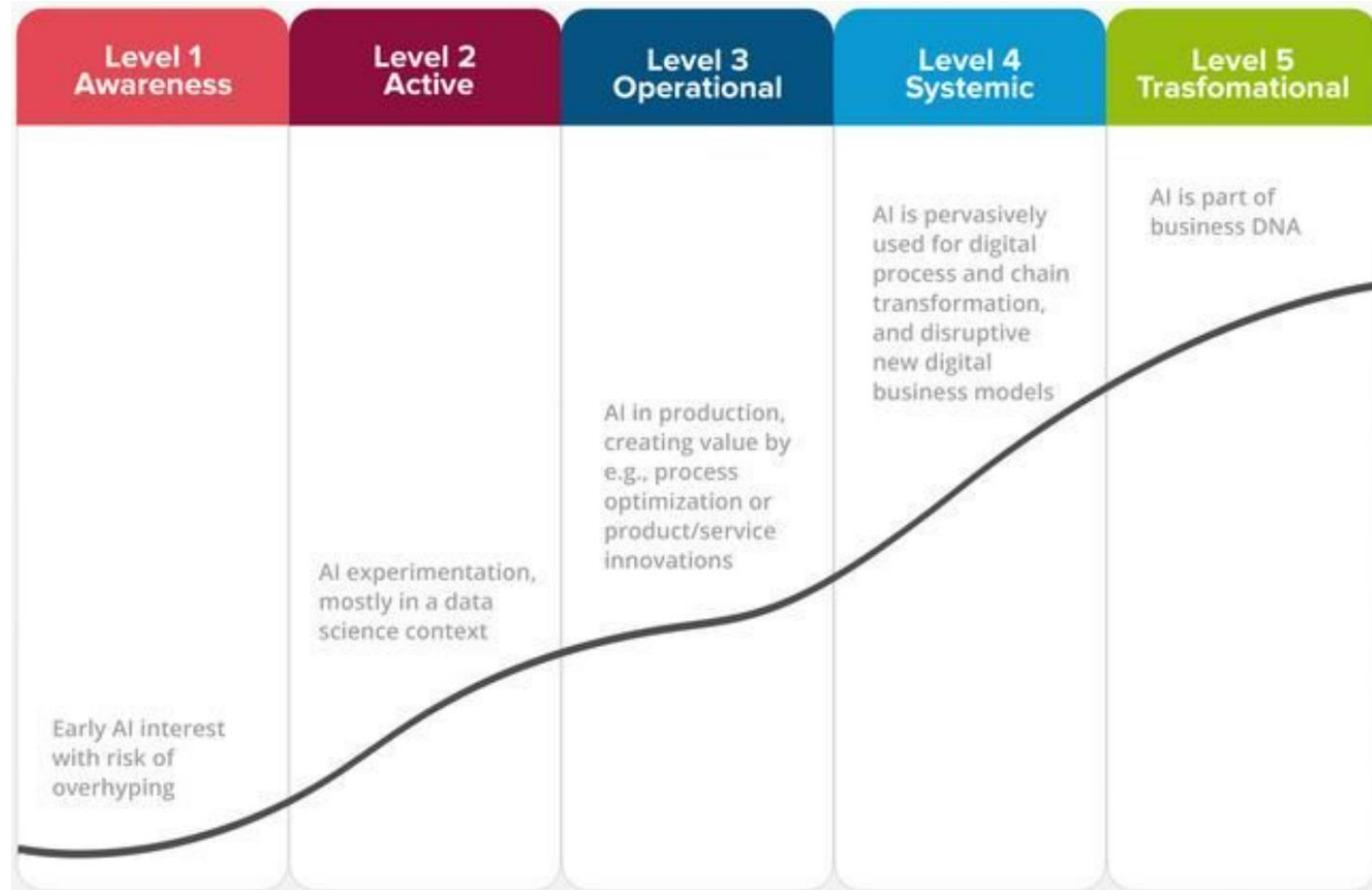
## Productie Proces Automatisering

24 januari 2023 | Hart van Holland Nijkerk



## Maturity model

1. Bewustwording
2. Actief
3. Operationeel
4. Systematisch
5. In het DNA

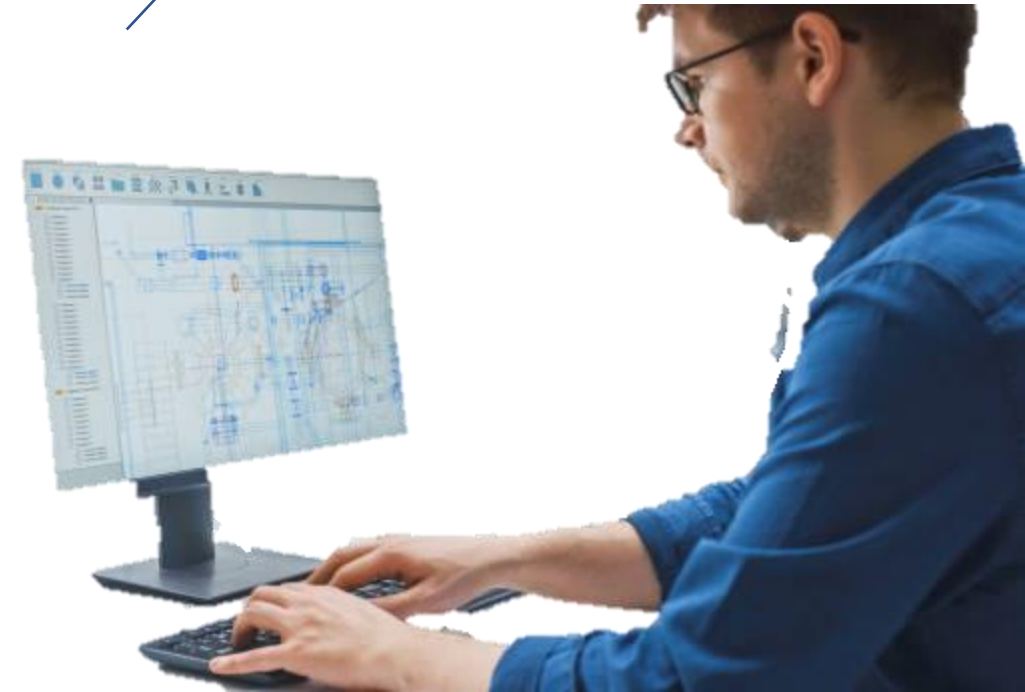


Vraag : In welke Maturity model zit uw bedrijf ?

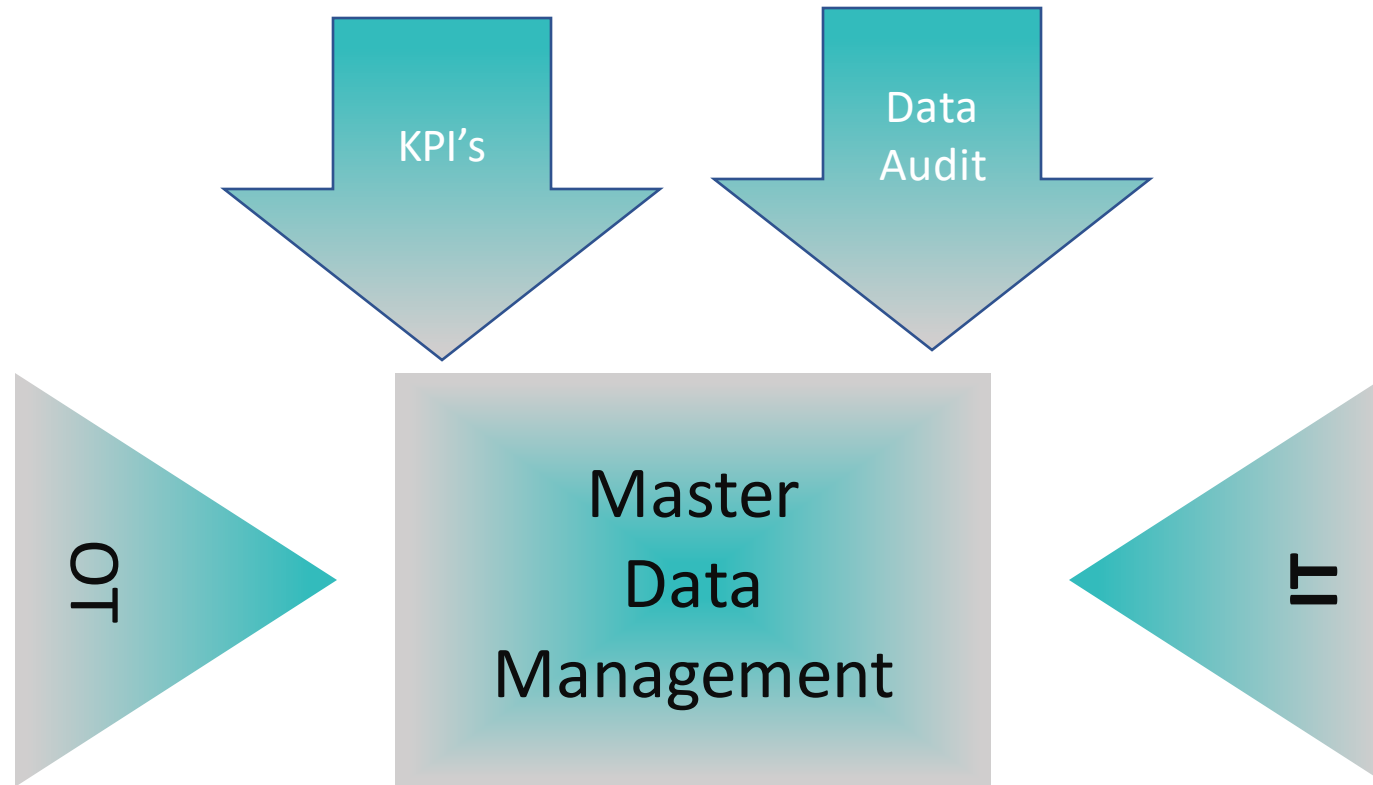




Waar zie je dit aan?

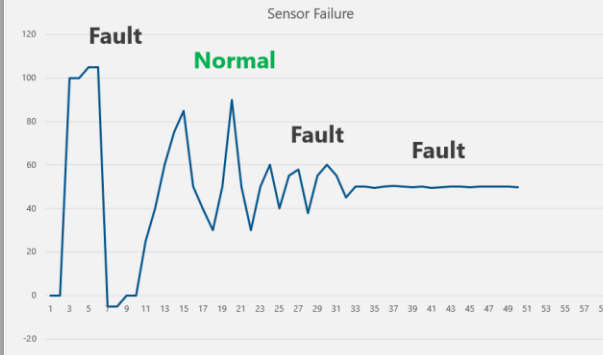


# Datasets op orde ?



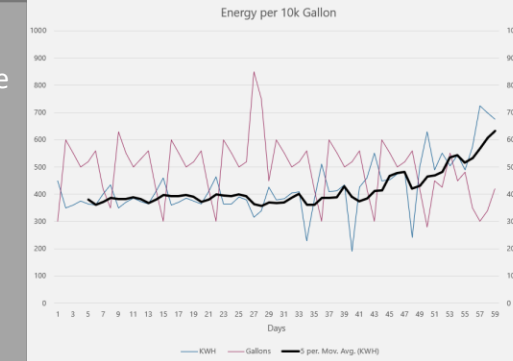
## Sensor validatie

- Range validatie
- Dynamische range
- Sensor Stuck



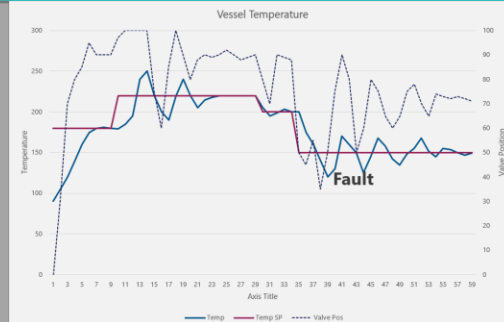
## Langzame veranderingen

- Range validatie
- Dynamische range
- Sensor Stuck



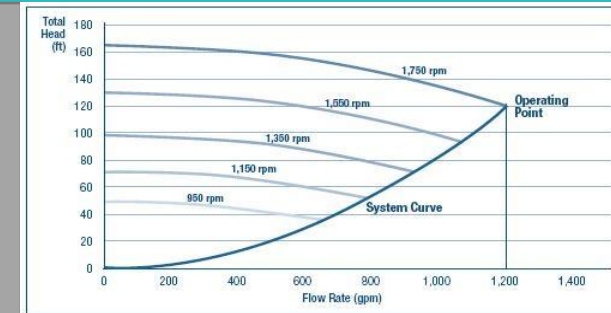
## Tuning problemen

- Hunting
- Oscillatie

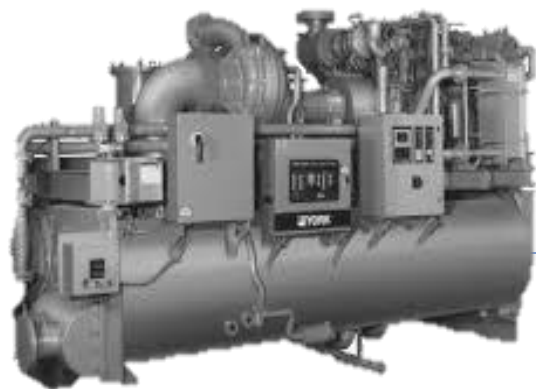


## Volgens specificatie

- Handleiding
- Performance Graphs



Luchtbehandelingskast



Chiller

VAV  
naregelaar



VAV



VAV



VAV



VAV



VAV



98 ALARMS

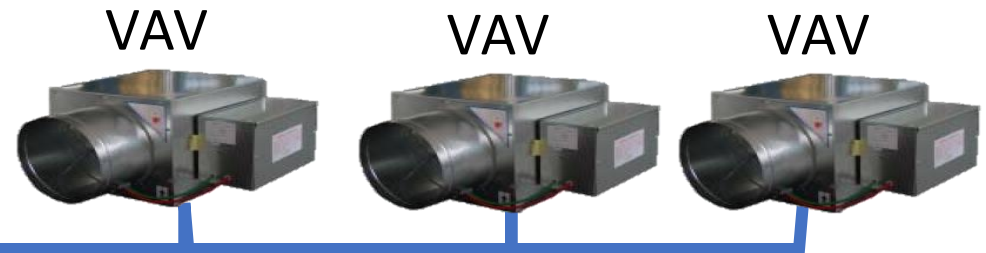


Chiller

40 ALARMS



36 ALARMS



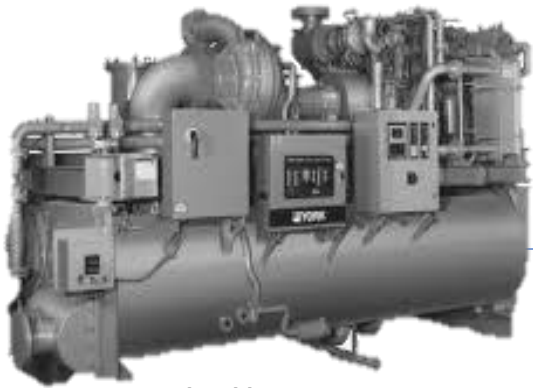
36 ALARMS





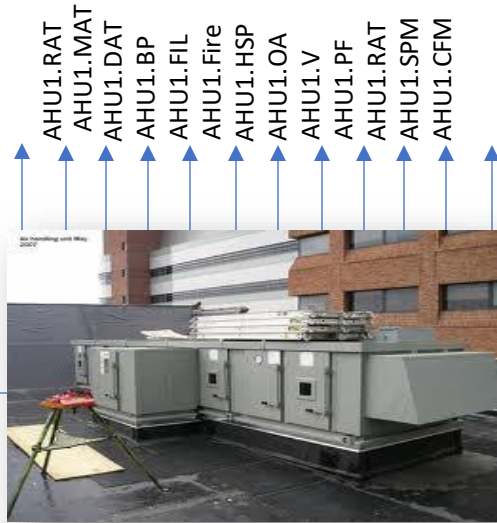
# Alarms vs. Fouten

1 Operations FAULT  
1 Efficiency FAULT



Chiller

1 Operations FAULT  
1 Efficiency FAULT



AHU



AHU

3 FAULTS



3 FAULTS



Power OK for last 3 min

OK

Chilled Water OK for last 3 min

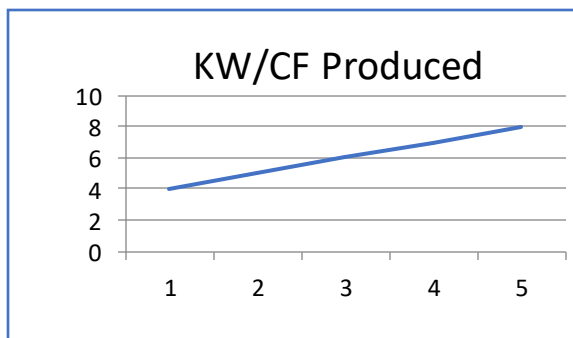
OK



Discharge Temp & Pressure OK or Setpoint Change during last 3 minutes

ELSE

Operational FAULT



Efficiency FAULT



# Van Fout naar Diagnose



Conditie

Symptomen

Oorzaken

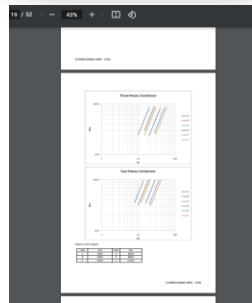
Waarschijnlijkheid



# Diagnose model



Kennis



Handleidingen

VAV 01 x VAV Diagnostic Model

Diagnostic Model  
Name: VAV Diagnostic Model

**Fault Symptoms/Causes Diagnostics Matrix**

Diagnostic Symptoms	High airflow alarm	High discharge temperature alarm	High zone temperature alarm	Low airflow alarm	Low discharge temperature alarm	Low zone temperature alarm
<b>Possible Causes</b>						
Zone temperature sensor drift/failure	0 (0%)	0 (0%)	1 (25%)	0 (0%)	0 (0%)	1 (25%)
Airflow (DP) sensor drift/failure	1 (33%)	0 (0%)	0 (0%)	1 (33%)	0 (0%)	0 (0%)
Discharge temperature sensor drift/failure	0 (0%)	1 (33%)	0 (0%)	0 (0%)	1 (33%)	0 (0%)
Damper stuck or failed	1 (33%)	0 (0%)	0 (0%)	1 (33%)	0 (0%)	0 (0%)
Damper actuator stuck or failed	1 (33%)	0 (0%)	0 (0%)	1 (33%)	0 (0%)	0 (0%)
Reheat coil valve stuck or failed	0 (0%)	1 (33%)	1 (25%)	0 (0%)	1 (33%)	1 (25%)
Reheat coil valve actuator stuck or failed	0 (0%)	1 (33%)	1 (25%)	0 (0%)	1 (33%)	1 (25%)
AHU Supply air too warm	0 (0%)	0 (0%)	1 (25%)	0 (0%)	0 (0%)	1 (25%)
AHU Supply air too cool	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

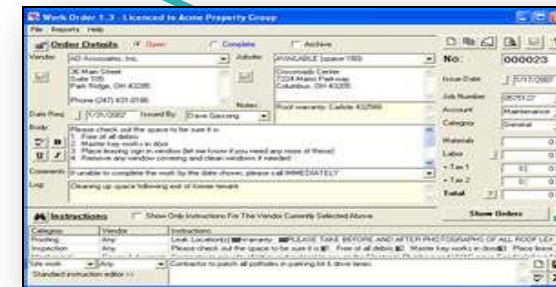
Add/Remove/Edit Causes    Add/Remove/Edit Symptoms

Apply    Close    Refresh    Reset    Apply & New...    Add New...



Fouten (symptomen)

Alarmen en Events



Order database

Productie Proces Automatisering

Drag a column header and drop it here to group by that column

Photo	Name	Date/Time	Fault	Area
	JCI VAV Model: 2514A	10/25/2010 11:26 AM	Efficiency less than 80%	BR.BR1.Floor1

Details Causes Performance Chart

**Name:** JCI VAV Model 2514A

**Area:** BR.BR1.Floor1

**Faults this week: 3**

	JCI VAV Model: 3152A	10/25/2010 12:06 PM	Not operating within parameters
	Hurst Boiler Model: B145	10/25/2010 12:31 PM	Heating ratio less than 20%
	Carrier Chiller Model: C52	10/25/2010 3:18 PM	Chilling ratio less than 20%
	JCI VAV Model: 2514A	10/25/2010 7:09 PM	Air flow VS fan speed ratio less than 10%

Drag a column header and drop it here to group by that column

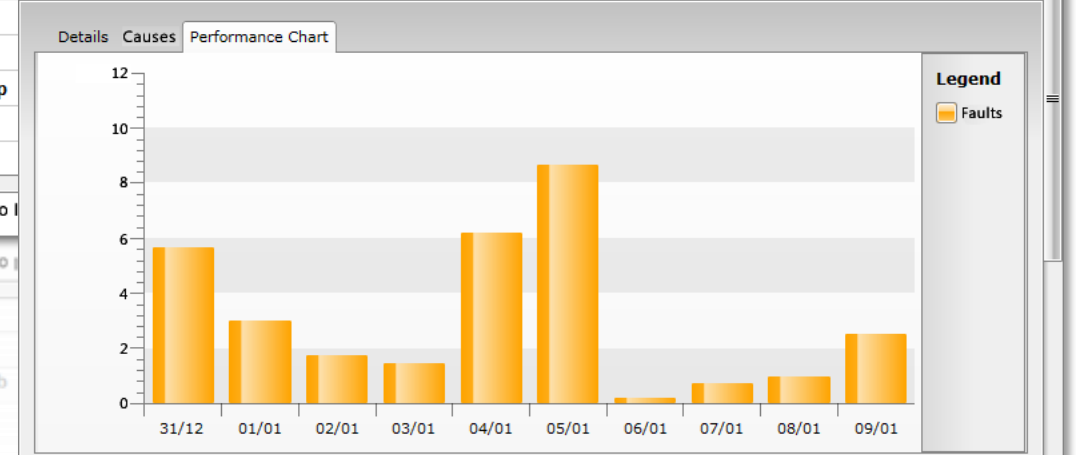
Photo	Name	Date/Time	Fault	Area
	JCI VAV Model: 2514A	10/25/2010 11:26 AM	Efficiency less than 80%	BR.BR1.Floor1

- Details Causes Performance Chart
- Possible Causes**
- Tuning problem with airflow feedback controller loop
  - Zone temperature sensor drift/failure
  - Supply air static pressure too low
  - Scheduling conflict with AHU
  - Minimum airflow setpoint too high
  - Inappropriate zone temperature setpoint
  - AHU supply air too cool
  - Damper actuator stuck or failed
  - Tuning problem with zone temperature feedback control loop
  - Maximum airflow setpoint too low
  - Discharge temperature sensor drift/failure

	JCI VAV Model: 2514A	10/25/2010 7:09 PM	Air flow VS fan speed ratio less than 10%
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Drag a column header and drop it here to group by that column

Photo	Name	Date/Time	Fault	Area
	JCI VAV Model: 2514A	10/25/2010 11:26 AM	Efficiency less than 80%	BR.BR1.Floor1



	JCI VAV Model: 2514A	10/25/2010 7:09 PM	Air flow VS fan speed ratio less than 10%	BR.BR1.Floor5
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Productie Proces Automatisering



# 22 Bishopsgate

61 floors

On-Premise – Cloud Solution

Open API's to OT and IT

Asset model

Realtime monitoring

Energy monitoring

FDD Rules: 800

Operationele kosten : 1.300.000 Pond

Jaarlijkse besparing: 300.000 Pond

Jaarlijkse SAAS model: 130.000 Pond

Hybrid on-premises and Microsoft Azure

Open API data exchange





Kwantificeer  
de fout

Leg tijd en  
hoeveelheid  
vast

Reken om  
naar Euro's



- Van Taglijsten naar :
- ISA 88 model
- ISA 95 model
- Master Datamanagement = Asset organization

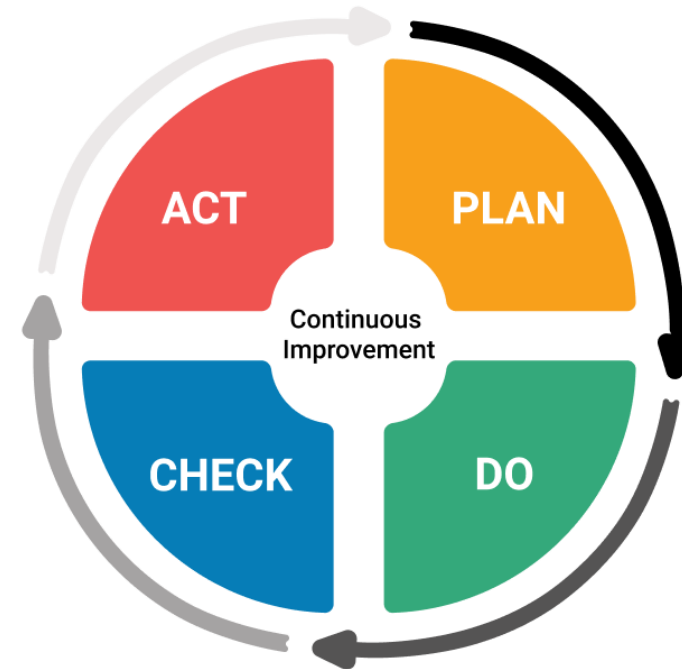
## Project Explorer

- ▲ MyProject (Ver. 01.00.000.00 )
  - ▲ Assets
    - ▲ Equipment
      - ▲ Building 1
        - ▲ Floor 1
          - ▶ Boiler 01
        - ▶ Floor 2
        - ▶ Floor 3
      - ▶ Utilities
    - ▶ Equipment classes
    - ▶ Tree views
    - ▶ Product configuration





1. Definieer pijnpunten
2. Voer een Data audit uit
3. Organiseer je data
4. Definieer de fouten
5. Maak de Diagnose
6. Leg vast en verbeter



FDD is ook start voor AI in je Maturity model...



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