

# Intelligent Plant™

*Inform, Enhance, Grow. Intelligently.*

prompt: generate a title for a no BS talk on Gen AI for the SPE with real industrial examples in hydrogen facilities with sensitive data





# Intelligent Plant™

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THE  
ROYAL  
SOCIETY



**ONE**  
OPPORTUNITY NORTH EAST



1495



# UNIVERSITY OF ABERDEEN™

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# Battery Storage Overview

Mon Sep 30 2024 12:14:44 GMT+0100 (British Summer Time)

Float Charge Current

8.0

Grid Voltage

247.7

Outlet Voltage

239.3

Batt All SOC

67.3

Charge Current

0

Volts

56.0

Float

Charge

57.6

Battery

52.5

Cut Off

46.0

Inverter Temp

21.3

Max AC Charge Current

80.0 A

3

Charge Current

0

Volts

—

Float

Charge

57.6

Battery

52.4

Cut Off

46.0

Inverter Temp

20.8

Max Charge Current

80.0 A

2

Charge Current

0

Volts

—

Float

Charge

57.6

Battery

52.5

Cut Off

46.0

Inverter Temp

20.6

Max Charge Current

80.0 A

1

Setpoint

Not Available

SP-Tagname -Input-SP-

InverterRS485.Inv3.FloatChargeVolt

Process Value

Not Available

PV-Tagname

InverterRS485.Inv3.FloatChargeVolt

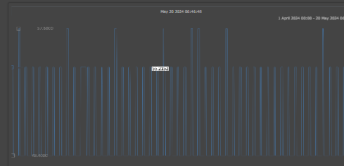
Output

Not Available

OP-Tagname

MAN AUTO

InverterRS485.Inv3.FloatChargeVolt



Mean 48.40 Median 48.40 St.Dev 1.41

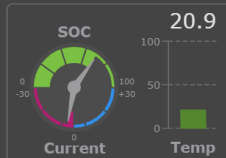
1h 1d 1w 1m

Open Trend

Fri Jun 14 2024 16:19:15 GMT+0100 (British Summer Time)

Text 225

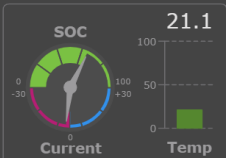
## Inverter status/control



Batterlution

69.7 SOC  
52.6 V 52.5 V  
-3.4 Current

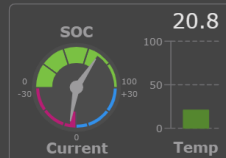
5



Batterlution

65.0 SOC  
52.6 V 52.6 V  
-2.2 Current

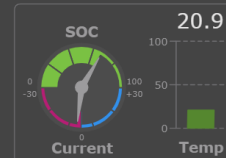
4



Batterlution

69.0 SOC  
52.6 V 52.5 V  
-3.4 Current

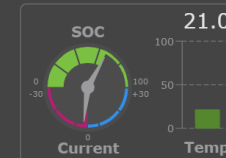
3



Batterlution

66.9 SOC  
52.6 V 52.5 V  
-2.3 Current

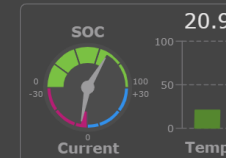
2



Batterlution

66.1 SOC  
52.6 V 52.5 V  
-2.2 Current

1



Batterlution

67.2 SOC  
52.6 V 52.5 V  
-3.5 Current

6

- Home
- My Account
- Developer
- Admin
- App Store Wiki
- YouTube

**We've recently updated our Privacy Policy.** Please click [here](#) to review the changes. Hide

Connected Applications

**Alarm Analysis Pro**  
Intelligent Plant  
Don't just report it, diagnose it. Diagnose and report your EEMUA statistics, help resolve issues with control system alarms.

**Aperture**  
Track your valve movement times to prove that they operate within their designated performance parameters.

**App Store Connect**  
Intelligent Plant Ltd  
Easily connect your data to the Industrial App Store and share it with apps and other users.

**Controller Consultant**  
Intelligent Plant Ltd  
Understand how to best manage your controllers. Do they need tuning? Are they over-tuned? The answer is within.

**Data Lake Connector**  
Intelligent Plant  
Move real time data from your historian to your data lake simply, quickly and efficiently.

**Facit**  
Aggregate alarms and alerts into an intuitive dashboard for easy tracking, workflow management and automatic task auditing.

**Gestalt PnID**  
Intelligent Plant Ltd  
Create high resolution Process & Instrumentation graphics with data-bound animations to give a real-time picture of your ...

**Gestalt Trend**  
Intelligent Plant Ltd  
A trending package which immerses you in your process data. Configure data sources then switch between multiple views for ...

**Hydraulic Usage**  
Monitor hydraulic fluid usage across your assets and detect leaks in your circuit.

**Industrial Connector**  
Utilise real-time and historical industrial data in Microsoft Power BI.


**Jupyter Hub**  
Use Python and R to analyse your data using statistical models and machine learning. BETA Version

**OASIS**  
VROC  
Real-time monitoring and remote operations


Here



**Well Intelligence**  
Optimise your choke positions to gain more production without changing anything else.



**Valve Signature Tool**  
Intelligent Plant Ltd  
Get instant diagnosis of unhealthy valves in your sub-sea systems, predict possible failures & optimise interventions.



**Wax Intelligence**  
Determine if your process is building up wax, real-time and historical.

Neural models

Model based int

# The response

The screenshot shows a web browser window with the Microsoft Copilot interface. The user's input is: "generate a title for a no BS talk on Gen AI for the SPE with real industrial examples in hydrogen facilities with sensitive data by steve aitken from intelligent plant". The Copilot response is: "How about this for a title: 'Cutting Through the Hype: Practical Applications of Generative AI in Hydrogen Facilities with Sensitive Data'". Below the response are three buttons: "Yes, that works! Thank you.", "Can we add something about security?", and "I'd like a shorter title if possible.". The interface also includes a "New topic" button and a text input field "Ask me anything...".

Microsoft Copilot in Bing

bing.com/chat

Microsoft Bing SEARCH COPILOT NOTEBOOK Steve.Aitk...

You

generate a title for a no BS talk on Gen AI for the SPE with real industrial examples in hydrogen facilities with sensitive data by steve aitken from intelligent plant

**Copilot**

How about this for a title:

**"Cutting Through the Hype: Practical Applications of Generative AI in Hydrogen Facilities with Sensitive Data"**

Does this capture the essence of the talk you're envisioning?

1 of 30 responses AI-generated content may be incorrect

Yes, that works! Thank you. Can we add something about security? I'd like a shorter title if possible.

New topic Ask me anything...

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# Agenda

- Project background
- Project aims
- Why look at alarms?
- Project progress
- What's next?



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# Project background

- Project title - Feasibility of Explainable AI to support decision making as applied to hydrogen generation
- Awarded £148,879 from the Scottish Government Emerging Energy Technologies Fund (EETF)
- Project team includes Intelligent Plant, EMEC, and University of Aberdeen
- Plans to progress technology further with additional funding



## Project Aims

- To simplify decision making for process operators
- To improve production safety and efficiency
- To build technology that is industry-agnostic



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# Why look at alarms?

- Hydrogen is a useful way to store renewable energy - but handle with care!
- Operators utilise alarm systems to monitor industrial processes
- This includes hydrogen production
- Helping operators make key decisions
- Reduces risk of process upset.

Society

## Hydrogen tank explosion kills 2 in Gangneung



Courtesy of Gangwon Fire HeadQuarter

[Hydrogen tank explosion kills 2 in Gangneung - The Korea Times](#)



Steve Aitken • 1st

Quality, Honesty, Integrity, Simplicity

4mo • 🌐

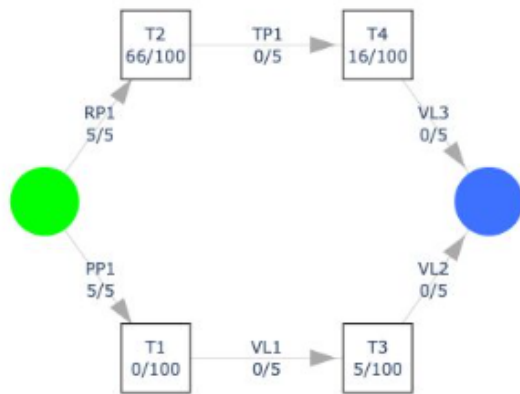
"This is amazing, I had no idea we would be doing anything like this - its the one of the most exciting projects i've seen and could completely change everything" - this was the enthusiastic quote from a recent meeting on our xAI Hydrogen project with [EMEC: European Marine Energy Centre](#) and [University of Aberdeen](#) funded by [The Scottish Government](#) under the Emerging Energy Technology Fund. We are currently making an operating game which allows the user to try to keep a simple plant running with some status and alarms (some variables are hidden or unavailable to see , just like the real world). The xAI(eXplainable AI) advisor then uses its internal model to help the operator to understand the current situation (not just a pile of alarms) This has significant implications for the industry - trusting AI is difficult so it needs to rationally explain why it is suggesting things , and what it's understanding is - so an AI advisor in an industrial setting needs to do more than just give the answer, it needs to be available to discuss the answer and to have a deterministic side. [Intelligent Plant](#) believes that alarm data is an under utilised resource and that we can give more understanding of situations by processing that live in the operations room. What do you think?

[#aiautomation](#) [#industry40](#) [#hydrogen](#) [#newenergy](#)



38

6 comments • 2 repo



Start Time: 21 Score: 21 Reset

### Controls

TP1

VL1

VL2

VL3

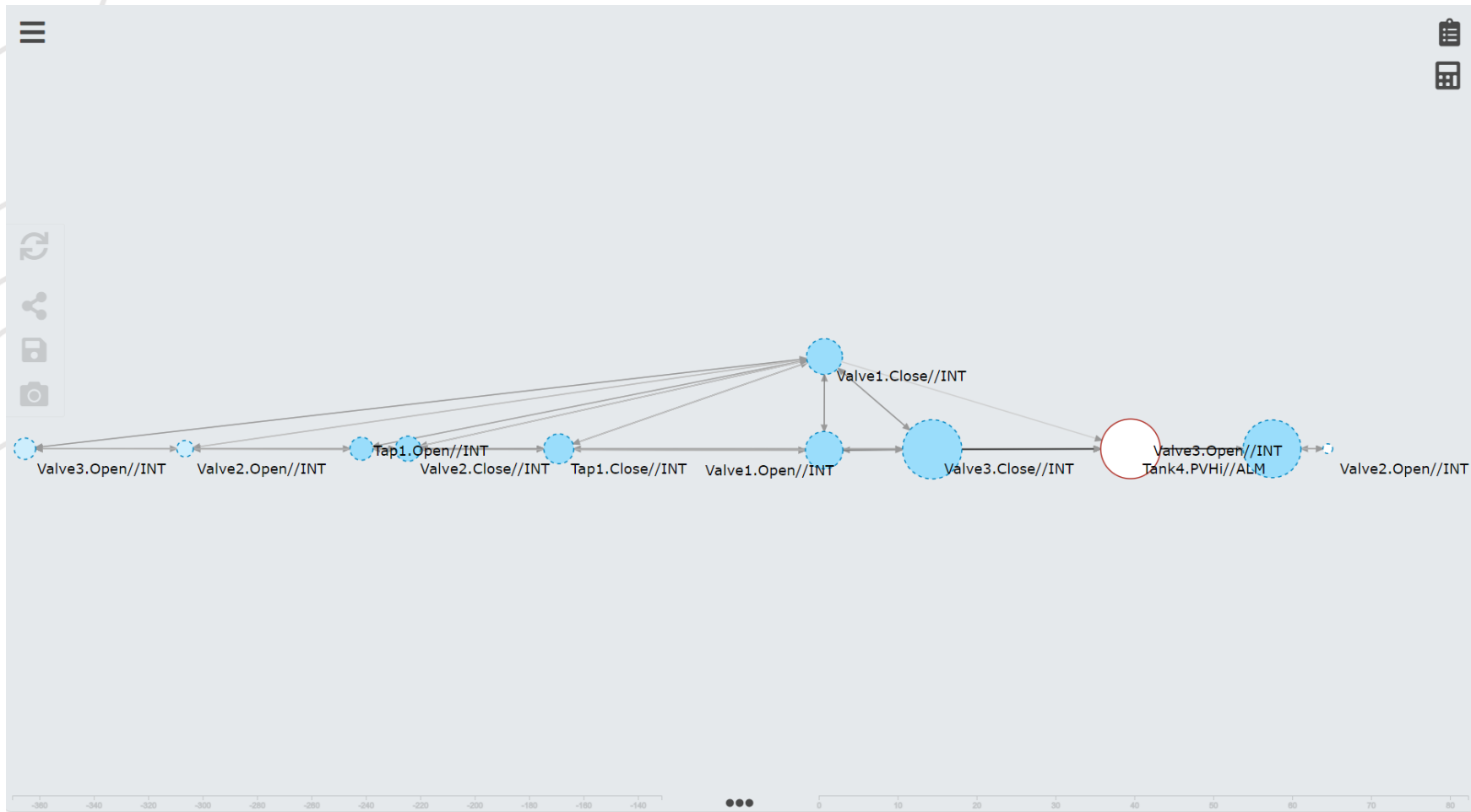
### Alarms

1	T3	<10
20	T4	<20

### Repair Teams

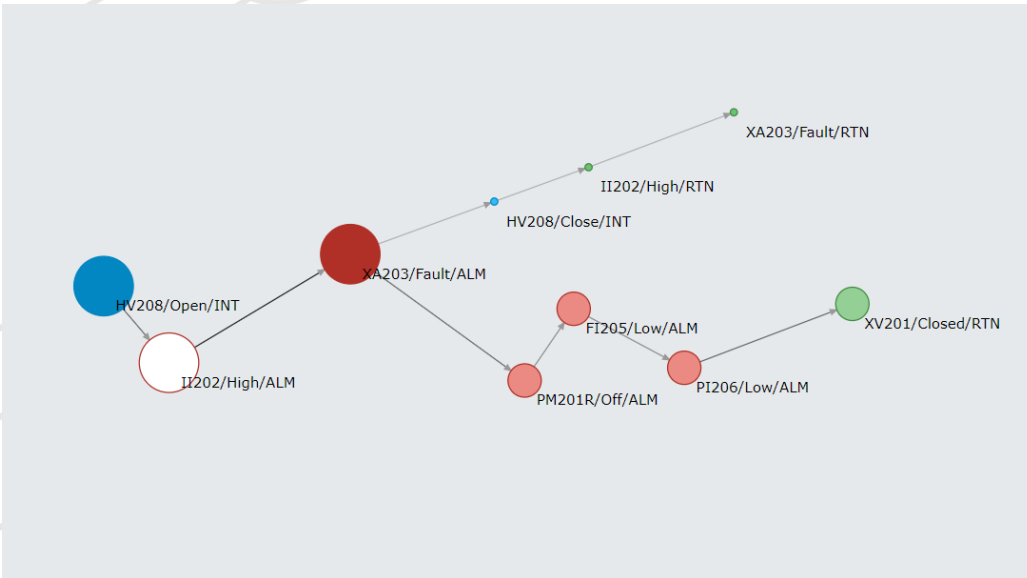
R0	PP1	x	4
R1	None	x	0

- SEER highlights event chains and shows historic relationships between alarms and interventions
- Operators can see historic decisions and the outcome of those



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# SEER - LLM



When the node with description "trigger" occurs, what is the sequence of events to get the corresponding return to happen?

## 01 Llama:70b - IP

When the node with description "trigger" (II202/High/ALM) occurs, the sequence of events to get the corresponding return to happen (II202/High/RTN) is:

1. II202/High/ALM (trigger)
2. XA203/Fault/ALM
3. HV208/Close/INT
4. II202/High/RTN (return)

This sequence of events is preceded by the trigger event and followed by the return to normal event.

When the node with description "trigger" occurs, what is the sequence of events if no intervention happens?

## 01 Llama:70b - IP

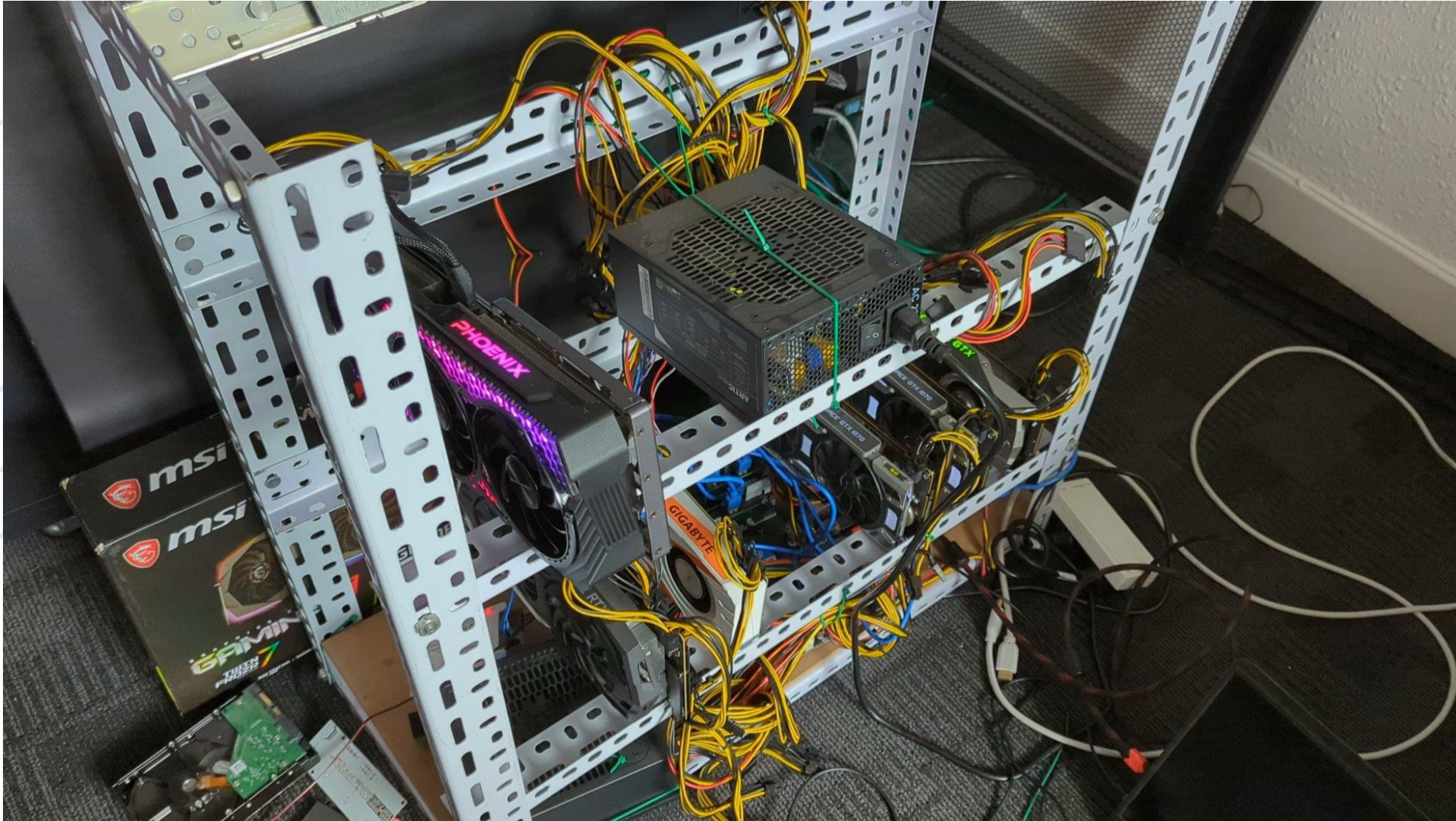
When the node with description "trigger" (II202/High/ALM) occurs, the sequence of events if no intervention happens is:

1. II202/High/ALM (trigger)
2. XA203/Fault/ALM
3. PM201R/Off/ALM
4. FI205/Low/ALM
5. PI206/Low/ALM
6. XV201/Closed/RTN

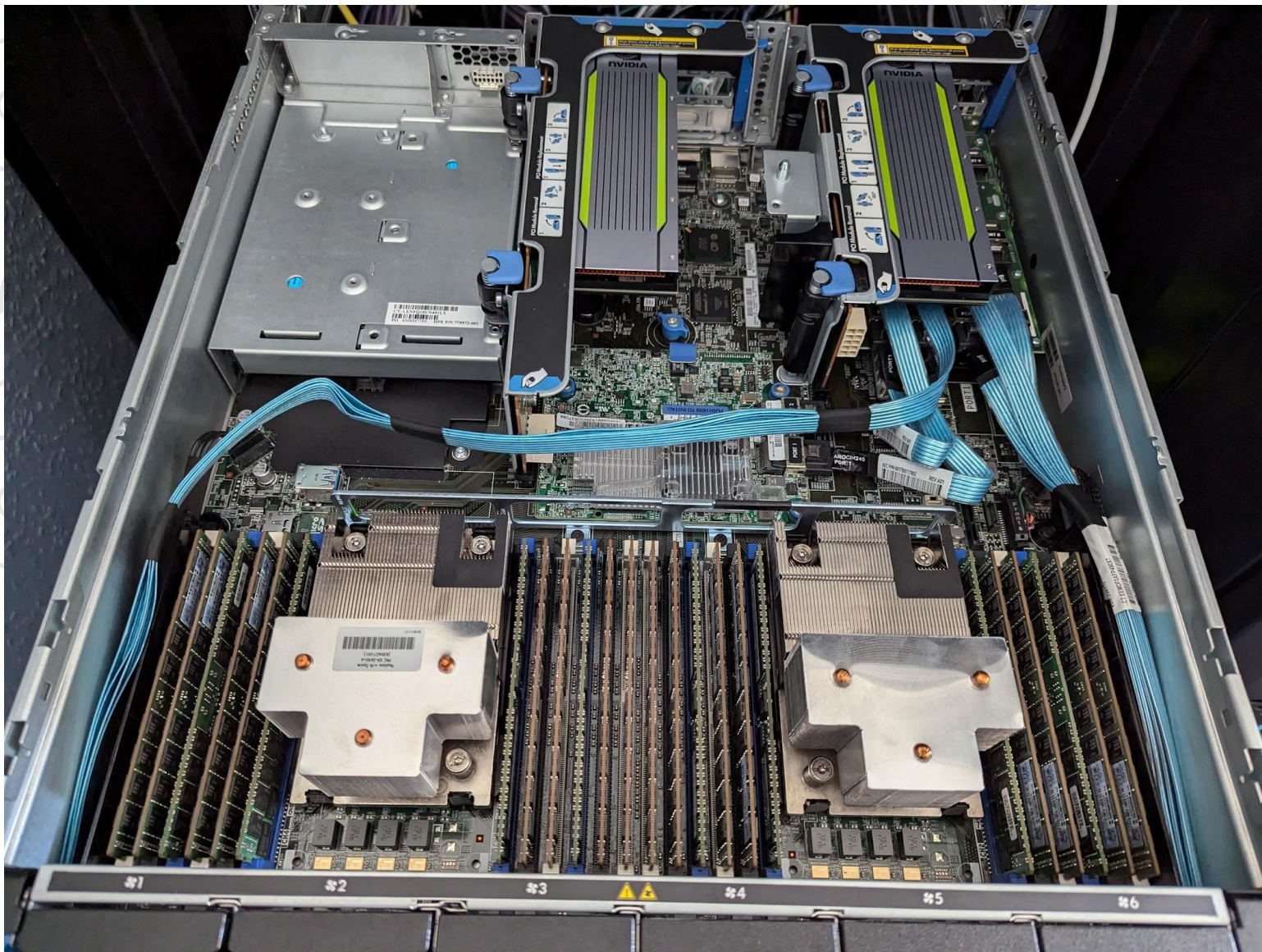
This sequence of events unfolds naturally without any operator intervention, starting from the trigger event and ending with the return to normal event (XV201/Closed/RTN).



- Other things kicked off by the project



- 4xTesla T4, 768GB RAM,



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- Other things kicked off by the project

Standard\_NC64as\_T4\_v3

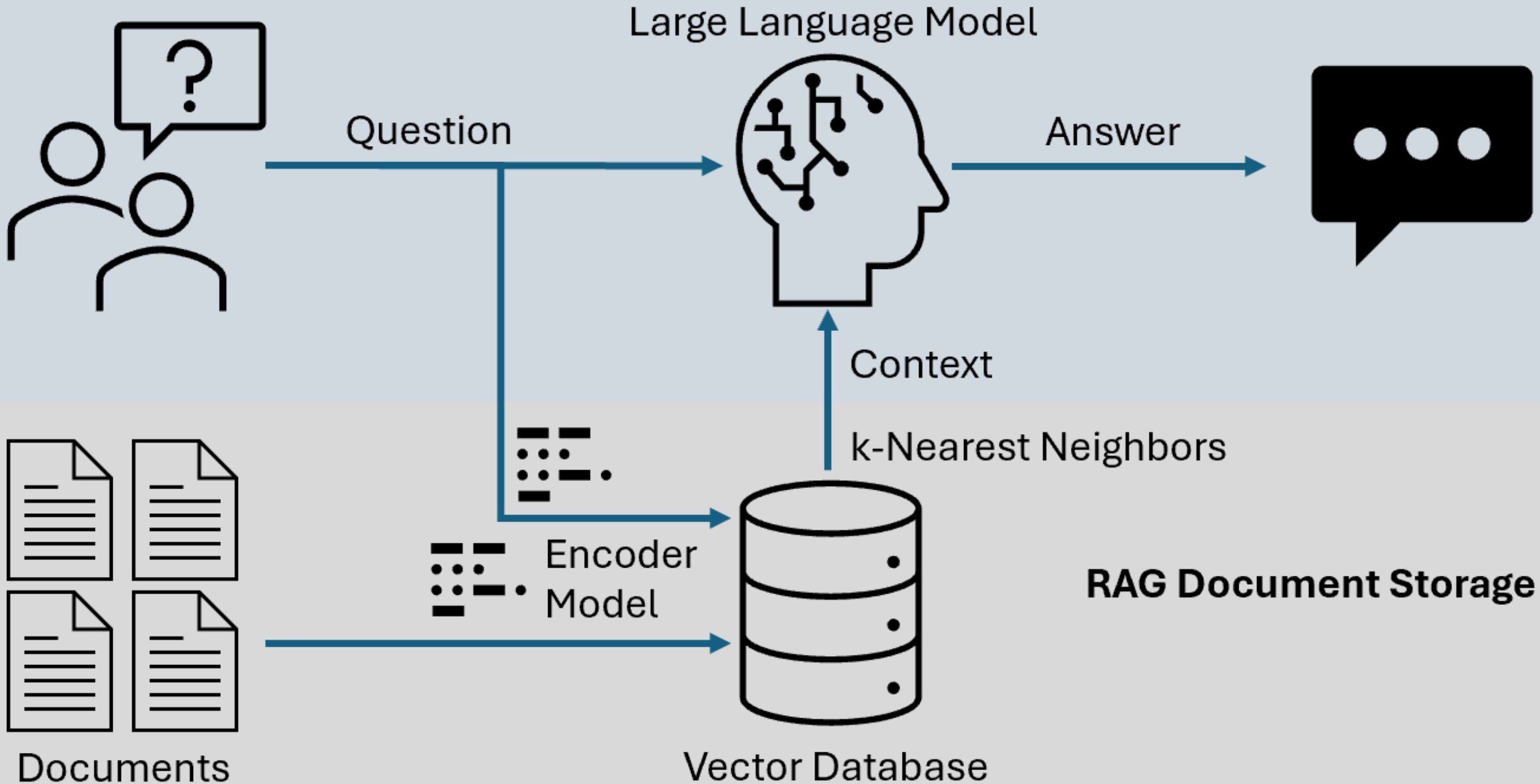
Azure Virtual Machine: NC64as\_T4\_v3 / NC64as T4\_v3 with 64 vCPUs and 440 GiB of memory. Available in 27 regions starting from \$3,176.96 per month. A -29.39% cheaper alternative is available.

Name	Standard_NC64as_T4_v3	OS Disk Size	1023 GiB
Details	<b>Standard</b> is recommended tier <b>N</b> – GPU enabled <b>C</b> – High-performance computing and machine learning workloads <b>64</b> – The number of vCPUs <b>T4</b> – NVIDIA Tesla T4 Accelerator <b>a</b> – AMD-based processor <b>s</b> – Premium Storage capable <b>v3</b> – version	Res Disk Size	2816 GiB
vCPUs	64	Max Disks	32
CPU Architecture	x64	Support Premium Disk	yes
Memory (GiB)	440	Combined IOPS	16320
Hyper-V Generations	V1,V2	Uncached Disk IOPS	48000
ACUs	0	Combined Write	240 MiB/Sec
GPUs	4	Combined Read	240 MiB/Sec
Max Network Interfaces	8		
RDMA Enabled	no		
Accelerated Net	yes		



- **In oil and gas engineering**, a pipeline refers to a system of pipes used to transport liquids or gases over long distances. For instance, crude oil is transported from oil fields to refineries through pipelines.
- **In AI/software development**, a pipeline refers to a sequence of data processing steps. For example, in machine learning, a pipeline might include steps for data preprocessing, feature extraction, model training, and evaluation.





- Other things kicked off by the project

The screenshot shows a web browser window with the following details:

- Browser Tab:** Trend to PCP Conversion
- Address Bar:** Not secure ipabzapp0010.intelligentplant.local:3002/c/459ac451-efa0-4...
- Chat Header:** ajindal//lama3.1-storm:8b
- Collection Card:** #User Guides Collection
- Message:** how do you change a trend into a pcp
- Response:** Select PCP (Parallel Co-ordinate) from the drop-down menu. The tag name appearing at the top of the available trends list will appear black on the workspace, and all other tags are greyed out. To change tag order, either select the tag you want to appear at the top of the available trends list from the drop-down list or select the actual tag name that appears beside the vertical line.
- Tags:** 1 User Guides, 2 User Guides
- Input Field:** + Send a Message
- Footer:** LLMs can make mistakes. Verify important information.

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- Other things kicked off by the project

Re: iso - hse statistics - st... x | Re: ISO 9001 Actions - ste... x | Meet - ISO 9001 Man... x | Compressor Temperature... x | ChatGPT x

ipabzapp0010.intelligentplant.local:3002/c/35d69254-2017-4474-8a8d-769f78e637e7

llama3.1:70b

what things could cause a sudden drop in the inlet temperature of a reciprocating compressor

llama3.1:70b

A sudden drop in inlet temperature of a reciprocating compressor can be caused by several factors. Here are some possible reasons:

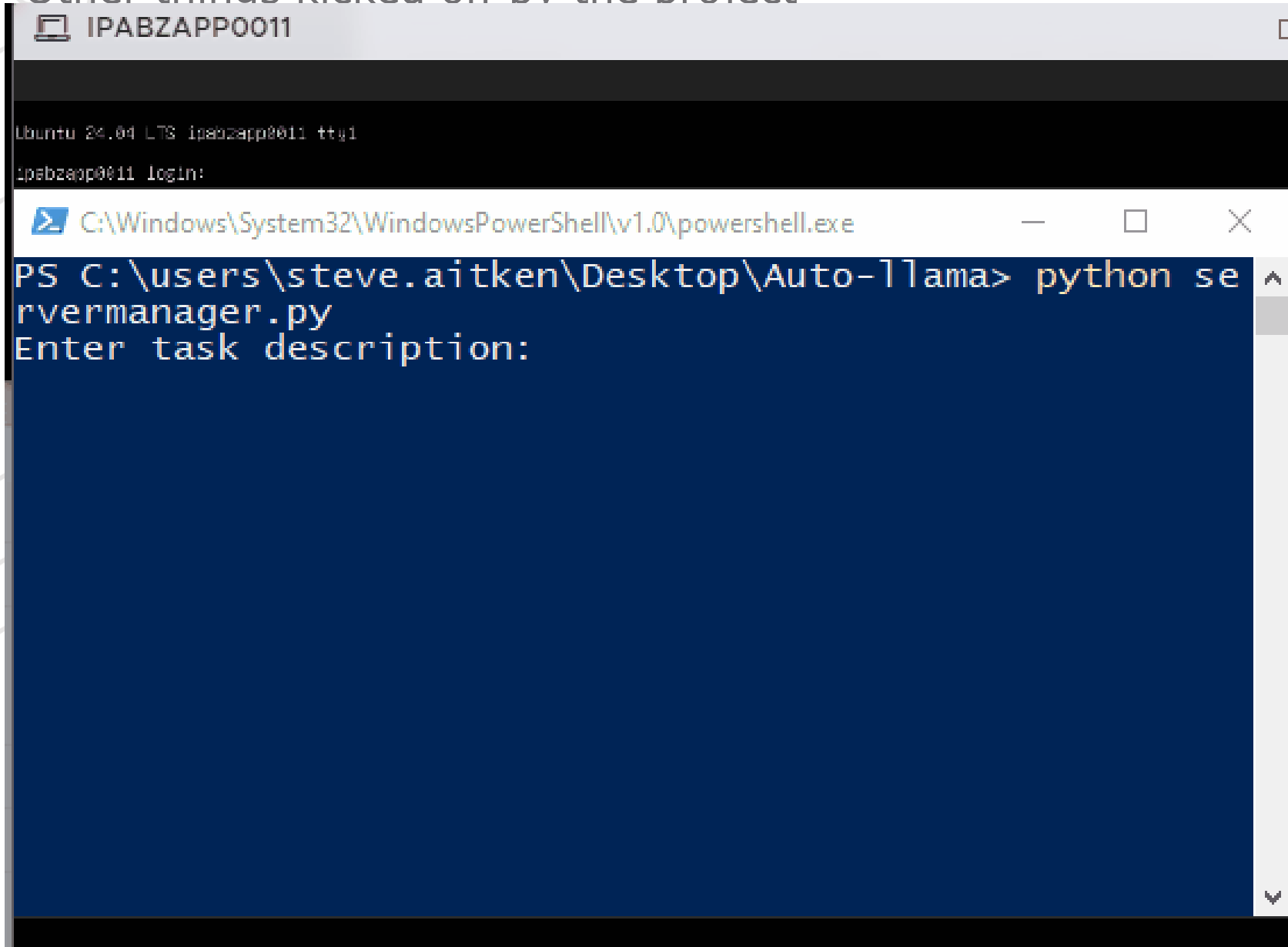
1. **Sudden change in ambient temperature:** A rapid drop in ambient temperature, such as during a cold front or at night, can cause the inlet temperature to decrease.
2. **Increase in cooling water flow rate:** If the cooling water flow rate increases suddenly, it can cause the inlet temperature to drop.
3. **Blockage removal:** If a blockage in the suction line or inlet piping is removed, it can cause a sudden drop in inlet temperature due to increased airflow.
4. **Change in gas composition:** A change in the gas being compressed, such as a switch from a hot process gas to a colder ambient air, can cause a sudden drop in inlet temperature.
5. **Incorrect valve operation:** Incorrect operation of valves upstream of the compressor, such as opening or closing a valve too quickly, can cause a sudden change in flow rate and temperature.
6. **Instrumentation error:** A faulty temperature sensor or transmitter can provide incorrect readings, leading to a perceived sudden drop in inlet temperature.
7. **Compressor loading/unloading:** When the compressor is loaded or unloaded (i.e., more or fewer cylinders are activated), it can cause a temporary change in inlet temperature due to changes in flow rate and compression ratio.
8. **Suction line modification:** A recent modification to the suction line, such as adding or removing a section of pipe, can cause a sudden drop in inlet temperature due to changed flow dynamics.
9. **Cooler fan operation:** If the cooler fans are turned on or off suddenly, it can cause a rapid change in cooling air flow rate and temperature.

+ Send a Message

LLMs can make mistakes. Verify important information.

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- Other things kicked off by the project



```
IPABZAPP0011
Ubuntu 24.04 LTS ipabzapp0011 tty1
ipabzapp0011 login:
C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
PS C:\users\steve.aitken\Desktop\Auto-llama> python servermanager.py
Enter task description:
```

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- Other things kicked off by the project

Layers of Consciousness

chatgpt.com/c/a0466772-8a04-4540-8946-32eab71c11e0

ChatGPT Auto

Share

what layers of consciousness are there

The concept of layers or levels of consciousness is explored in various fields, including psychology, philosophy, and spirituality. Here are some prominent models that describe these layers:

### 1. Freudian Model

Sigmund Freud, a pioneer in psychology, proposed a model with three levels of consciousness:

- **Conscious:** This includes everything we are aware of at any given moment, including thoughts, perceptions, feelings, and memories.
- **Preconscious:** This contains information that is not currently in consciousness but can be readily

Message ChatGPT

ChatGPT can make mistakes. Check important info.

- Other things kicked off by the project

The screenshot shows a web browser window with the URL `chatgpt.com/c/a0466772-8a04-4540-8946-32eab71c11e0`. The page title is "Layers of Consciousness". The main content is a code block with Python code for a "Consciousness" class. Below the code is an "Explanation:" section with two numbered points. At the bottom, there is a "Message ChatGPT" input field and a "ChatGPT can make mistakes. Check important info." disclaimer.

```
# (Decision logic to change the agent in charge if necessary)
self.decide_new_in_charge()

def decide_new_in_charge(self):
    # Decision logic to potentially activate the Daydreaming Agent
    if random.random() < 0.1: # 10% chance to start daydreaming
        self.in_charge = "Daydreaming"
    else:
        self.in_charge = random.choice(list(self.agents.keys()))
    print(f"New agent in charge: {self.in_charge}")

# Example usage
llm = LLaMA("LLaMA-3.1-7B")
consciousness = Consciousness(llm)
context = "an example context"
consciousness.update_context(context)
for _ in range(5): # Run for 5 cycles
    consciousness.run_cycle()
```

**Explanation:**

1. **Daydreaming Agent:** Added a new agent class `DaydreamingAgent` that generates spontaneous ideas.
2. **Decision Logic:** Modified `decide_new_in_charge` to include a condition where the Daydreaming Agent is activated with a certain probability.

Message ChatGPT

ChatGPT can make mistakes. Check important info.

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- Other things kicked off by the project

The screenshot shows a web browser window with two tabs: 'Layers of Consciousness' and 'Microsoft Copilot in Bing'. The address bar shows 'bing.com/chat'. The page header includes the Microsoft Bing logo, search, Copilot, and Notebook icons, and a user profile for 'Steve.Aitke...'. The main content area features the Copilot logo and a response to a query: 'Sure! Here's a bio for Steve Aitken of Intelligent Plant:'. The bio text is as follows:

**Steve Aitken** is the Founder and Principal of **Intelligent Plant**, an independent consultancy, software integrator, and developer based in Aberdeen, Scotland. Steve graduated with a BSc Hons in Computing Science from the University of Aberdeen in 2001. After gaining valuable experience working in Canada, he returned to the UK and established Intelligent Plant in 2006.

Under Steve's leadership, Intelligent Plant has become a leader in performance monitoring of equipment and processes through real-time data analysis and visualization, as well as alarm data management. His innovative approach has significantly contributed to the field, providing cutting-edge solutions for various industries.

Steve's commitment to fostering innovation and entrepreneurship is evident through his involvement with the University of Aberdeen. In 2014, he established the Inform Prize, which supports the development of teamwork and presentation skills among Computing Science students. Additionally, he was selected for the Royal Society Entrepreneur in Residence scheme in 2022, where he dedicates time to mentoring students and promoting industrial links.

Steve's dedication to his alma mater and the broader community has earned him numerous accolades, including the University of Aberdeen's Alum of the Year award in 2024<sup>1</sup> <sup>2</sup>. His contributions continue to inspire and

At the bottom of the chat window, there is a text input field with the placeholder 'Ask me anything...' and a microphone icon. The Intelligent Plant logo is visible in the bottom right corner of the page.



- Other things kicked off by the project

```
llama 3.1 Storm 8b
>>> how long does llama 3.1 storm take to respond on a standard laptop with
... out a special GPU
I don't have access to information about how long it takes for Llama 3.1 Storm to respond on a standard laptop without a
special GPU. If you want, I can provide general information about the capabilities and limitations of large language models
like Llama 3.1 Storm or discuss general considerations when evaluating response times in AI systems.

>>> (about 30s )|
```



## More info?

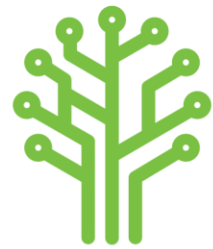
Intelligent Plant - LinkedIn



Steve Aitken - LinkedIn



ntelli



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