AVEVA PI WORLD

Leveraging AVEVA PI Cloud Connect

Chevron Alen Offshore Facility

Nigeria/Mid-Africa Business Unit (NMA), Chevron's Middle East, Africa, South America Exploration & Production Company

Angela Taylor, Application Engineer

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Equatorial Guinea:

Alen Platform + Bioko Gas Hub

Operations Background

Chevron

&

Marathon Oil

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Bioko Island Gas Hub

Focusing on the Next Stage of Business

- Noble Energy EG has been in EG for over 20 years, starting with the Alba Field
  - Alba field is a large gas condensate that is produced to Bioko Island for processing
- Alen Platform Design is Unique:
  - One of the few platforms in the world that separates the condensate and the gas onsite
  - Condensate goes to the Aseng FPSO
  - Dry gas is reinjected for later use
- With declining production of developed natural gas and liquids from the Marathon Oil-operated Alba Field, more supply is needed.
- The vision for the Gas Mega Hub will be to process and liquefy gas from various proximate fields in EG and neighboring countries

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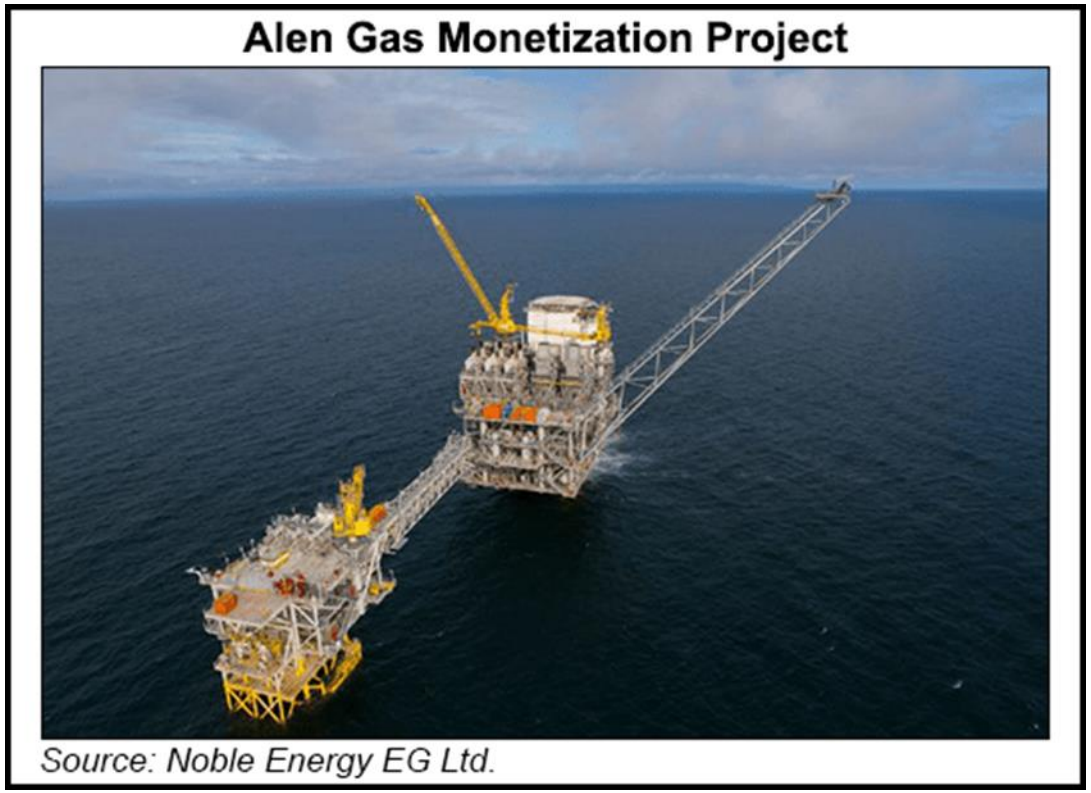
AVEVA PI World DIGITAL

Chevron



The Opportunity: As a part of Noble's Alen Offshore Facility, Noble Energy EG LTD, in Equatorial Guinea, Alen Field Gas Monetization project, a formal plan for shared information between the Noble Alen Field and the Marathon Alba Gas plant needed to be established that both companies could rely upon and met both companies' security measures.

Note: Alen Offshore Facility, Noble Energy EG LTD, a subsidiary of Noble Energy, Inc, is now Nigeria/Mid-Africa Business Unit (NMA), Chevron's Middle East, Africa, South America Exploration & Production Company.

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Challenge:

Safety in Sharing

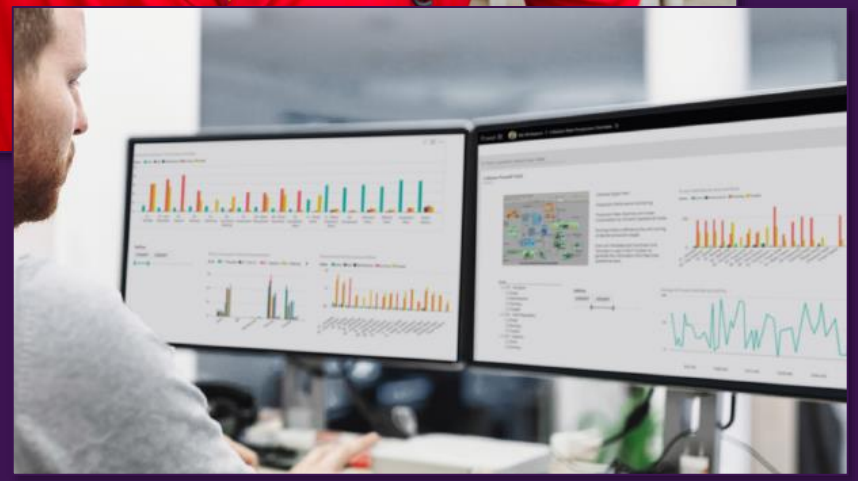
- The Operating personnel from both groups agreed that sharing operating information would provide the safest and operationally beneficial arrangements.

- The information needed to be timely (close to if not real time) and provided in a form that can be used as an input into each other's monitoring systems.

- A PDF of a generated report or excel, even if received hourly would not provide the information needed.

- There needed to be a list of data points / tags that would be shared between the two companies to monitor pipeline shutdowns, pressures, temperatures, flowrates, nominations, notes and similar information.

- These inputs would not directly cause any actions on Alen or at Alba but will provide alerts and notifications to operations that actions should be considered.



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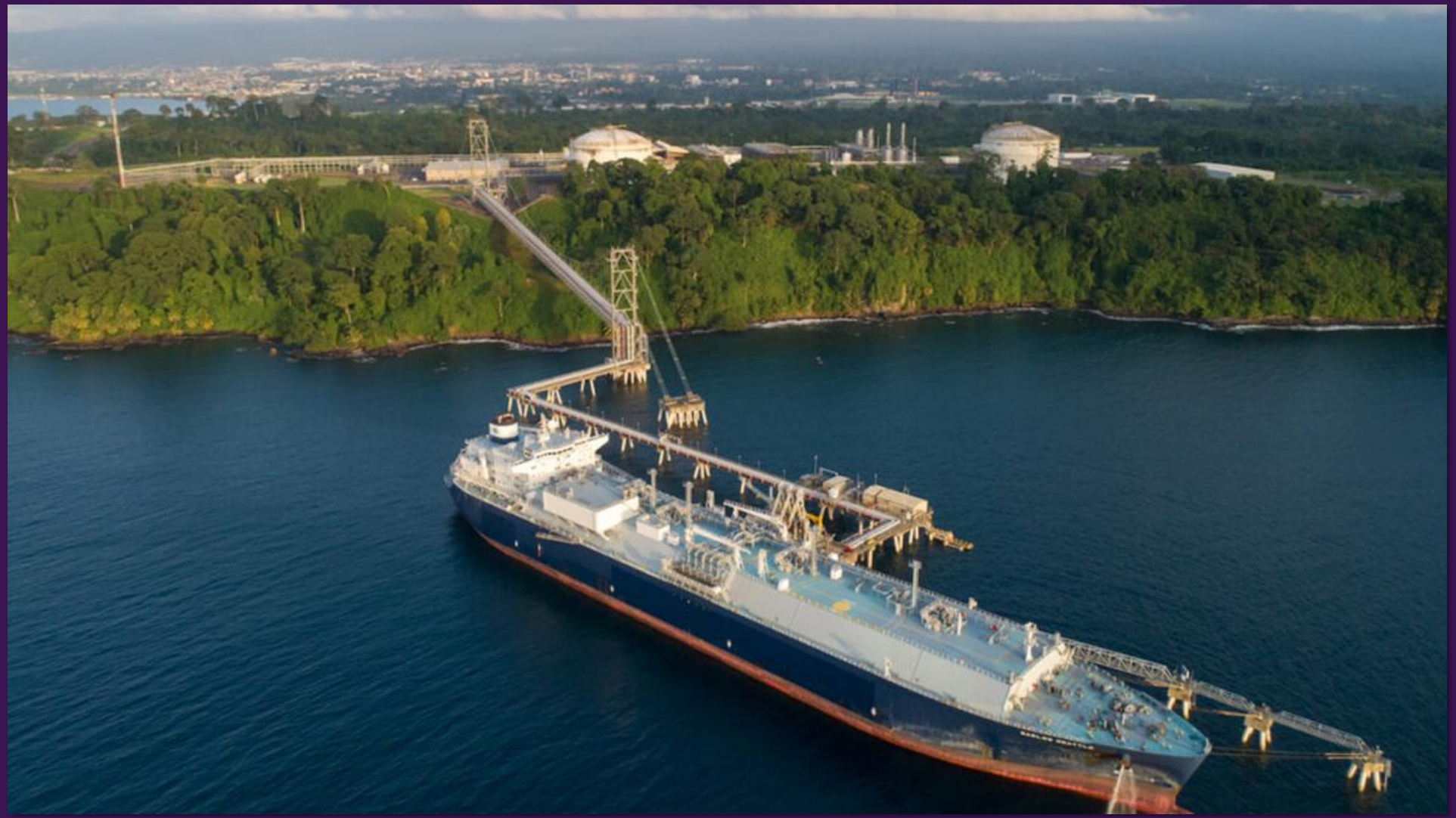

FPSO =
Floating
Production
Storage &
Offloading

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Considerations:

3 options were presented to Leadership

1. Use a third-party company to exchange data, with each company burdened with additional expense.
2. Each company to create a business-to-business environment with a VPN IPsec tunnel to be created as the “bridge” between companies, with each company maintaining their infrastructure.
3. Leverage both company’s AF experience and utilize AVEVA’s PI Cloud Connect Service.

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PI Cloud Connect

A Secure + Performant Way to Exchange Data

Security

- PI Cloud Connect utilizes four (4) layers of security:
  - ***Infrastructure Level:*** Data transfer is secured by SSL over HTTP (HTTPS) and through port 443 only
  - ***Account Level:*** Each company's account is fully isolated
  - ***Sign-In Level:*** Users authenticate at the PI Cloud Connect portal using a Microsoft account
  - ***User Level:*** Publishers control which users (not accounts) have subscription access

Microsoft Account

Microsoft Active Directory Federation Services

Scalability + Performance

- Maximum data transfer throughput is up to 10k events/sec for 100K PI Tags per node
- High flexibility around size / scope of a publication data set
- No limits on the number of PI Connect nodes per account

Ease of Deployment

- Customer (account) specific set up kit for the PI Connect nodes
- Initial connection to Azure is always outbound

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Selection

AVEVA PI Cloud Connect, software as a Service (SaaS) solution was chosen.

Why? PI Cloud Connect makes it easy to share data between PI Systems, both inside and outside the enterprise with a scalable and reliable solution based on Microsoft Azure with a minimal on-premises footprint.

The seamless and simultaneous transfer of time-series data between PI AF Structures was proven during the proof-of-concept phase and met our “close to if not real time” requirements.

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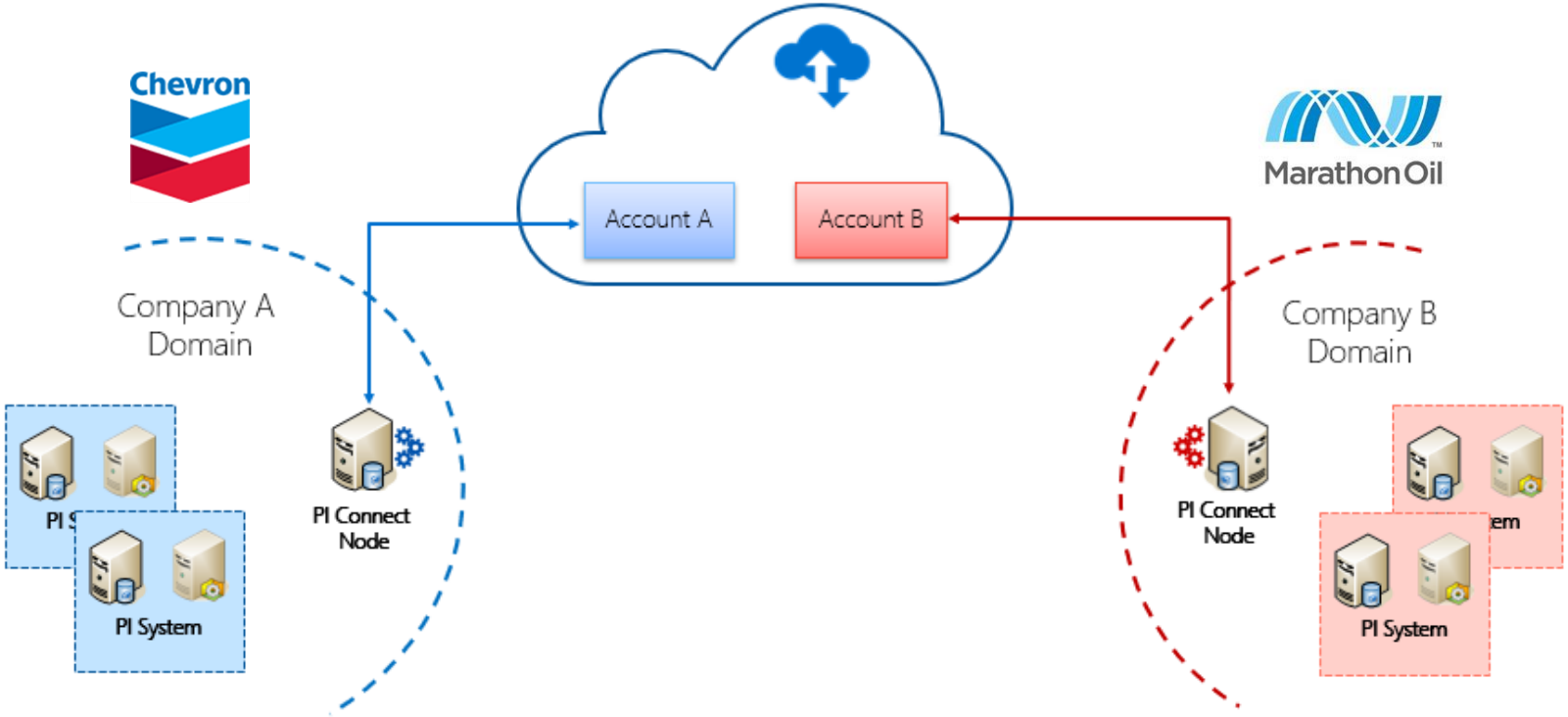
PI Cloud Connect Model Section

Connecting Operational Teams Together



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PI Cloud Connect Implementation

Modeling Key Processes in Asset Framework

- Work began with each company implementing their own infrastructure and agreements with AVEVA, then decisioning of which points to share, agreed AF Structures for both Publishing and Subscribing. Data exchange began in December.
- PI Asset Framework enables you to create notifications for pressures, temperatures and valve changes and send alerts to operators and engineering staff; even build an escalation acknowledgement.
- Event Frames capture and classify key events. This allowed us to track and identify any repetition, allowing you to proactively understand and possibly eliminate such events.
- PI Asset Analytics logic allow managing by exception and complement our preventative maintenance schedules.
- PI clients (PI Vision / PI Datalink) provide visibility into meter imbalances for revenue and accounting.
- The PI System provides the ability to signal pipe through put and maximize production.

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Benefits and Value

Working Together as One Team

- Faster Alen + Alba Plant Operator Collaboration + Response
- Safety Monitoring (Overpressure)
  - Critical for gas hub to safely manage multiple supplier headers
- Maximize Plant Throughput and Profit
  - Previously much gas was reinjected into the well, now more is sent directly for processing into methanol and LNG
- Asset Reliability (Corrosion Avoidance)
  - Monitor Gas/Liquids content + components
- Check-Meter Control Visibility + Reconciliation
- Avoid a third-party having direct access to our IT system

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ABOUT AVEVA

AVEVA, a global leader in industrial software, drives digital transformation for industrial organizations managing complex operational processes. Through Performance Intelligence, AVEVA connects the power of information and artificial intelligence (AI) with human insight, to enable faster and more precise decision making, helping industries to boost operational delivery and sustainability. Our cloud-enabled data platform, combined with software that spans design, engineering and operations, asset performance, monitoring and control solutions delivers proven business value and outcomes to over 20,000 customers worldwide, supported by the largest industrial software ecosystem, including 5,500 partners and 5,700 certified developers. AVEVA is headquartered in Cambridge, UK, with over 6,000 employees at 90 locations in more than 40 countries. For more details visit: www.aveva.com

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AVEVA

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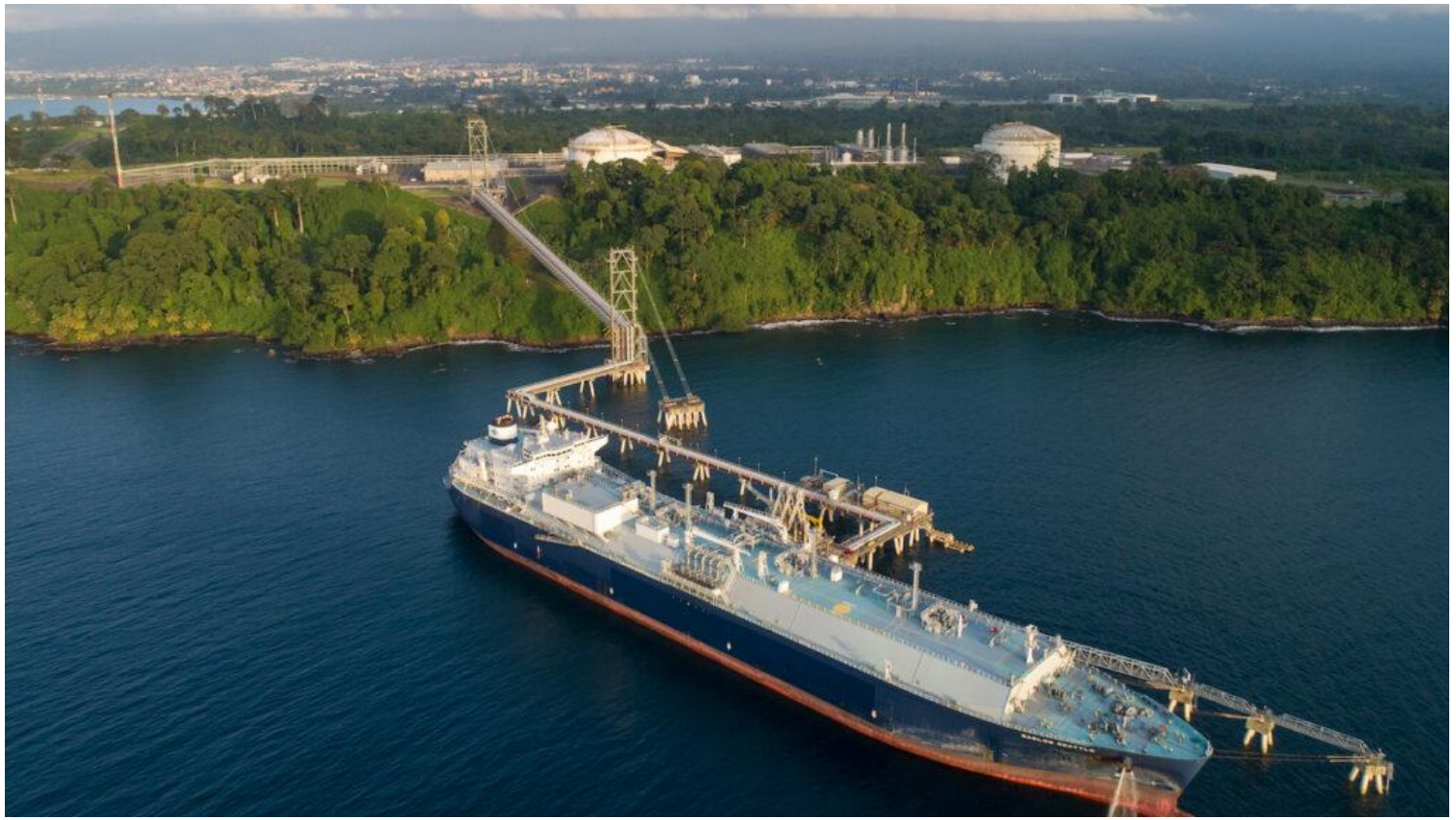
OPERATIONAL FACTS: Equatorial Guinea & Cameroon	
Net Acreage (YE 2019)	316,000
Sales volumes (YE 2019)	44 MBoe/d (all in EG)
Total Proved Reserves (YE 2019)	132 MMboe

Alen Gas Monetization Project

Source: Noble Energy EG Ltd.



the human energy company™

PI Cloud Connect

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PI Cloud Connect

Opportunity:

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Challenge:

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PI Cloud Connect

Considerations:

Three (3) options were presented to Leadership. The first, use a third-party company to exchange data, with each company burdened with additional expense. The second, each company to create a business-to-business environment with a VPN IPsec tunnel to be created as the "bridge" between companies, with each company maintaining their infrastructure. The third, leverage both company's AF experience and utilize OSIsoft's PI Cloud Connect Service.

Selection:

PI Cloud Connect, an OSIsoft Software as a Service (SaaS) solution was chosen. Why?, As stated on their website, makes it easy to share data between PI Systems, both inside and outside the enterprise with a scalable and reliable solution based on Microsoft Azure with a minimal on-prem footprint.

The seamless and simultaneous transfer of time-series data between PI AF Structures was proven during the proof-of-concept phase and met our "close to if not real time" requirements.

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PI Cloud Connect

OSIsoft Cloud Services (OCS) is a database platform as a service (dbPaaS) designed for storing, retrieving, and analyzing real-time operations data. With OCS, people in and out of your organization have flexible and secure access operations data. OCS can collect operations data from within a primary control network to the edge of the industrial network. Use OCS to add context to time-based operations data, to enable process engineers and systems operators to make decisions and take corrective or preemptive actions. From data collection to data access to data delivery, OCS provides flexibility and control with its REST API.

OSIsoft Cloud Services

Data sharing drives operations data science, application integration, and real-time collaboration. With OCS, the sky (well, cloud) is the limit.

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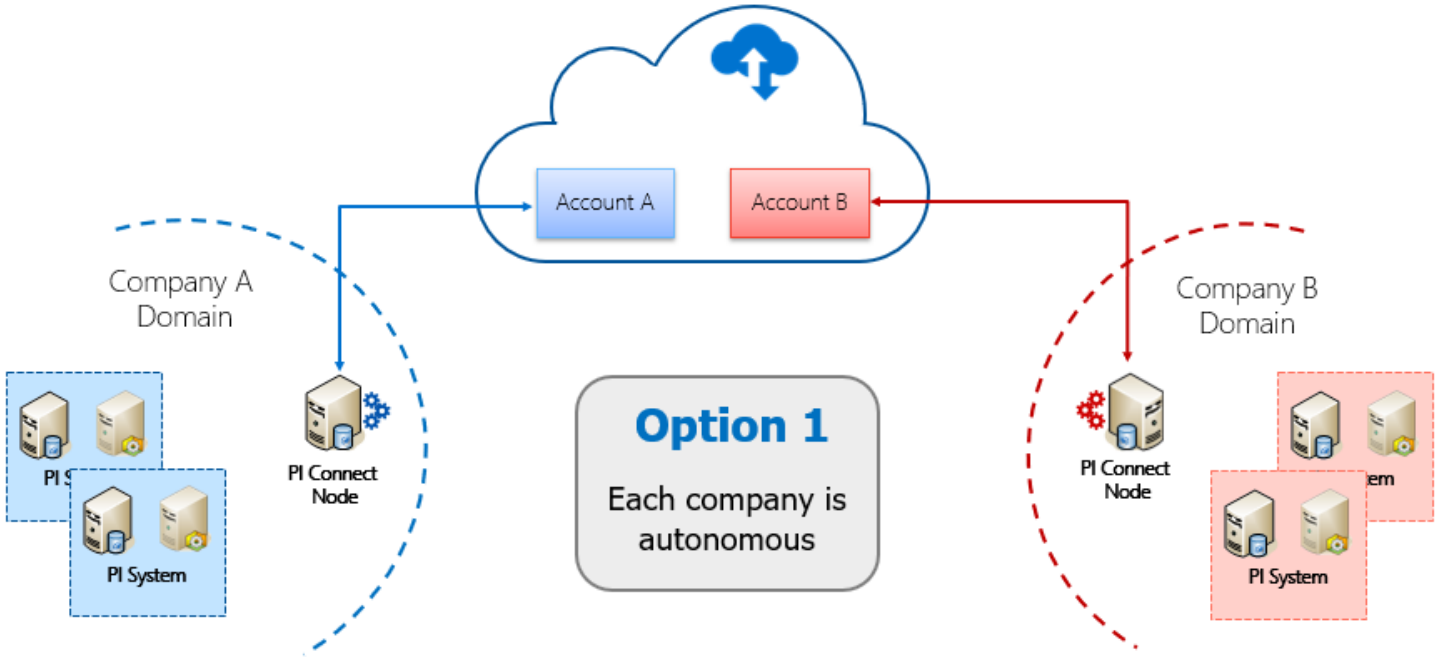
PI Cloud Connect Model Section



OSIsoft. Empowering Business in Real-time. © Copyright 2018 OSIsoft, LLC.

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PI Cloud Connect Customer Portal
https:/www.picloudservices.com/Login

Recommended items to create/decide before beginning set-up:

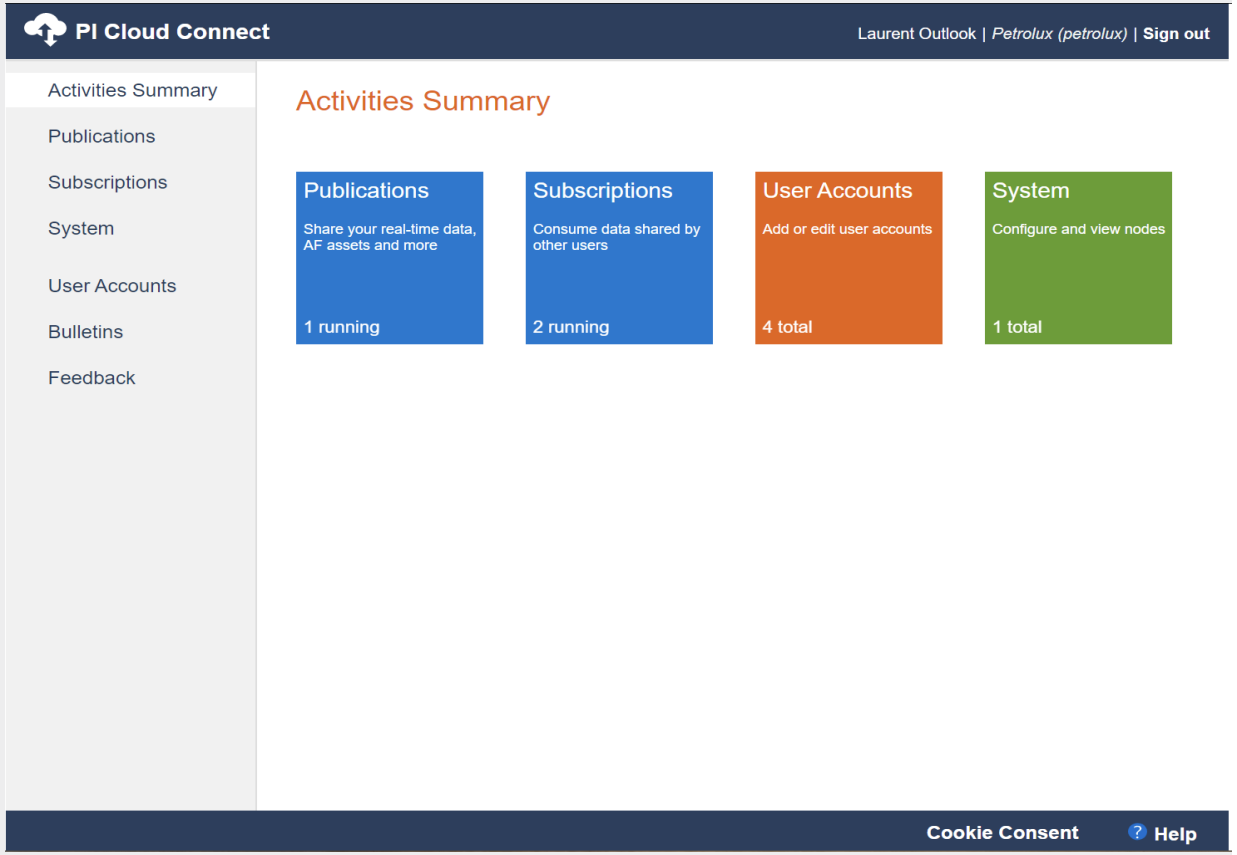
a) Complete your activation.

b) Company alias: to define your company's publication to others (Example: 123Energy).

c) An Azure AD or Microsoft Account (AAD, MSA) (to be used when authenticating to an OSIsoft Cloud Tenant) for "User Account". (Example: User@outlook.com)

d) Service Account

e) Email address(s) for Subscribers of your Publication



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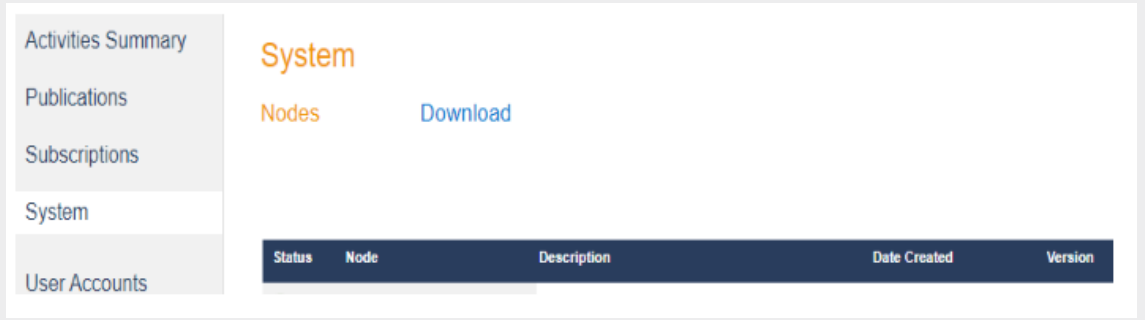
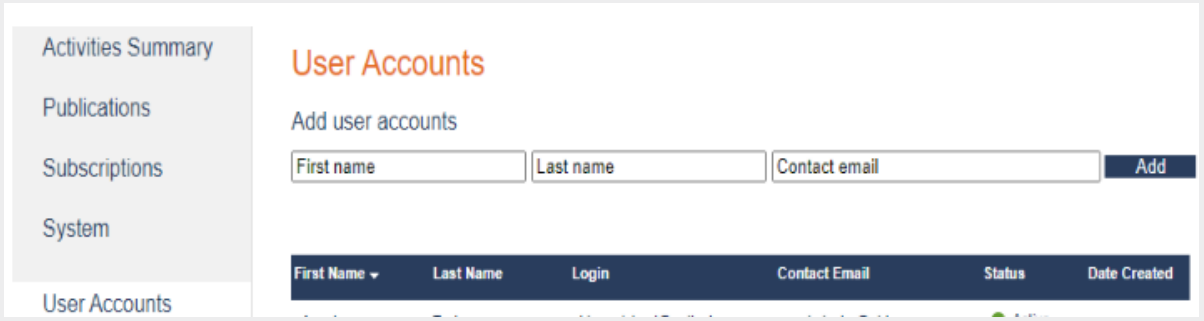
System Accounts and User Accounts

- System is the Node or PI Interface Server



- User Account is your User@outlook.com account.
  - Users have the permissions to manage the portal.



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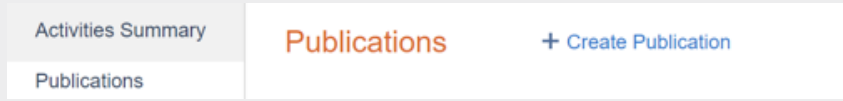
Create a Publication

Once you have defined the AF Structure with Elements, Attributes and the configuration items to share, you are ready to create a Publication.

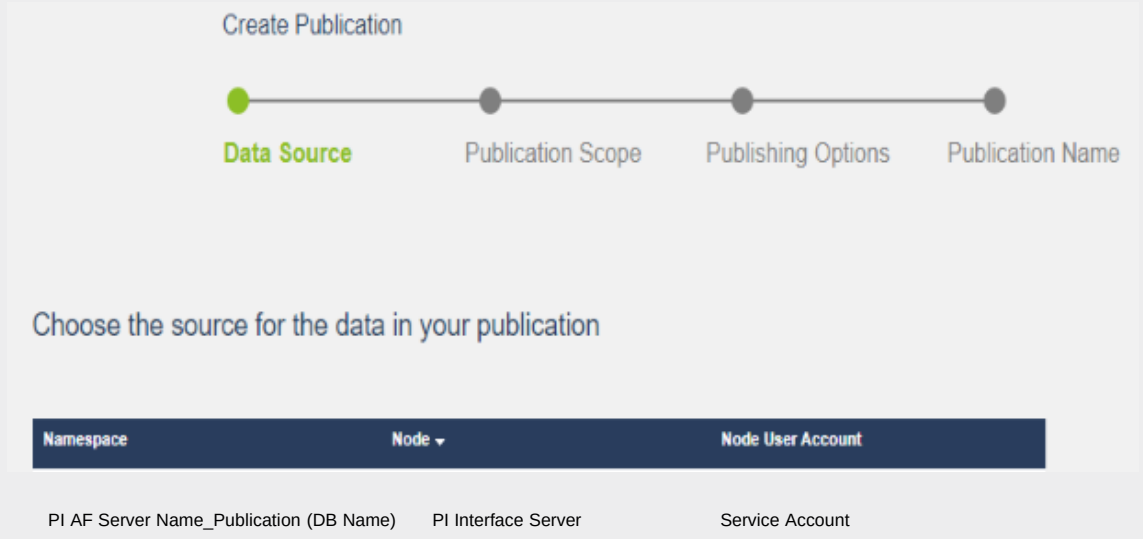
Remember, the entirety of the AF structure will be published.

Recommendation:

Use a Separate AF Server for Publishing and Subscribing or at the very least Create a separate database for this purpose.



- Define your Source



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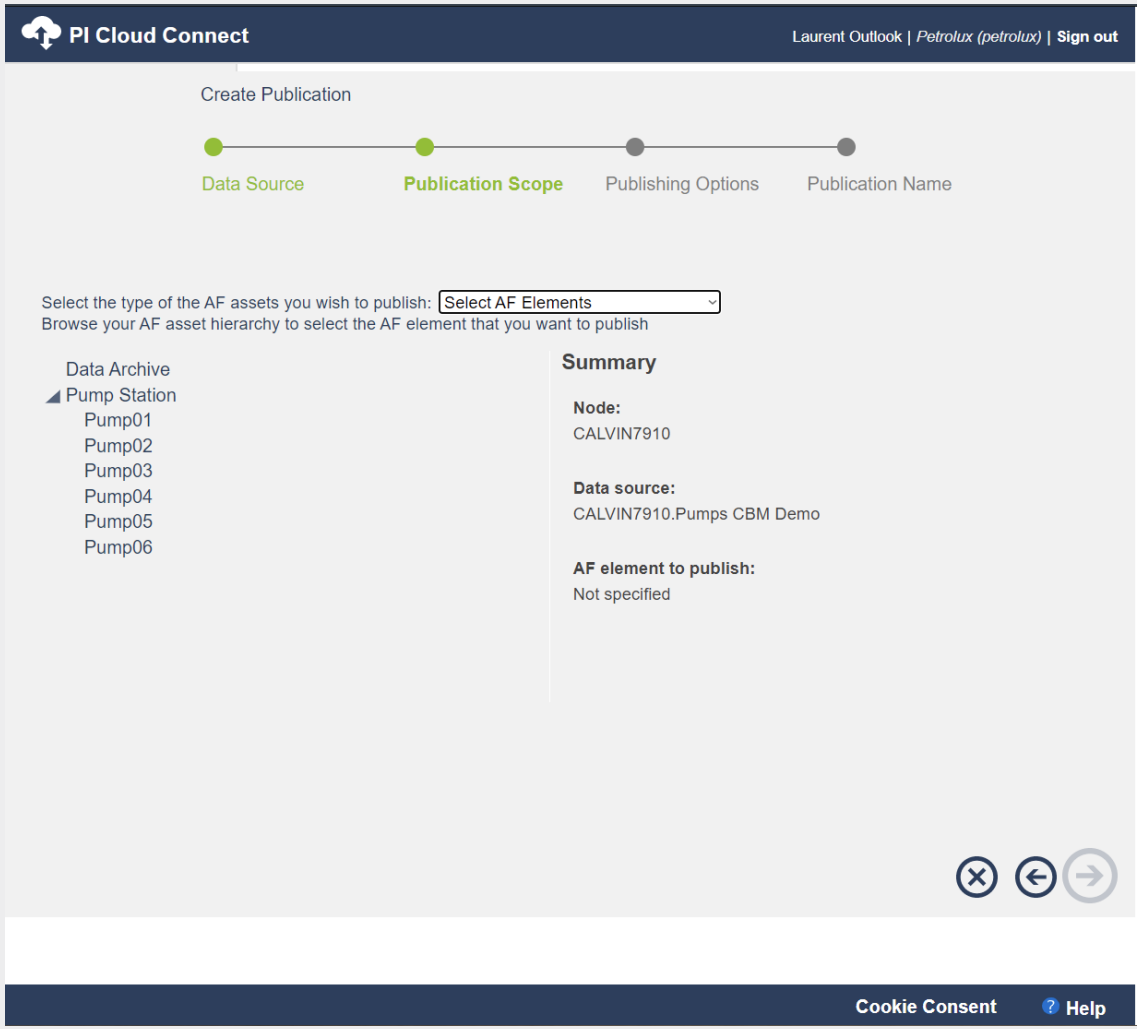
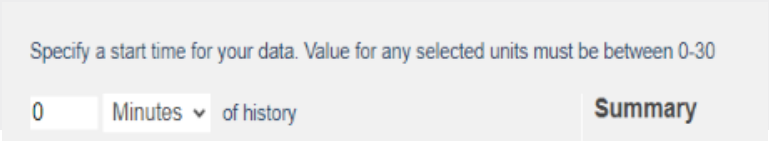
Create a Publication

- Select your AF Elements



- Once AF Elements are selected, your next option is to start the Publication.
  - Start 0 Minutes of history, this point forward.
  - If you want to allow data from a point back in time, you can define it here.



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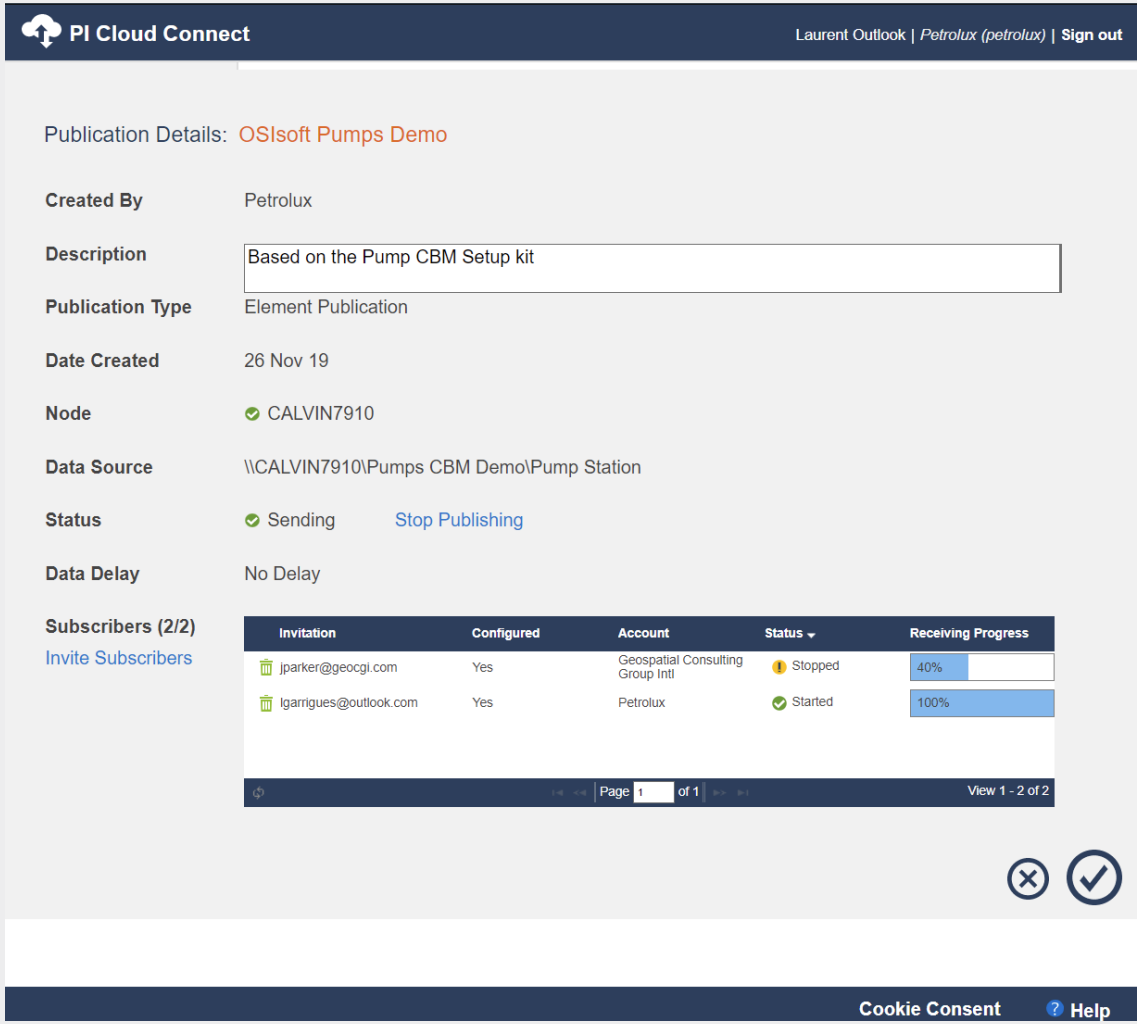
Create a Publication

- Last, Invite your Subscriber(s)



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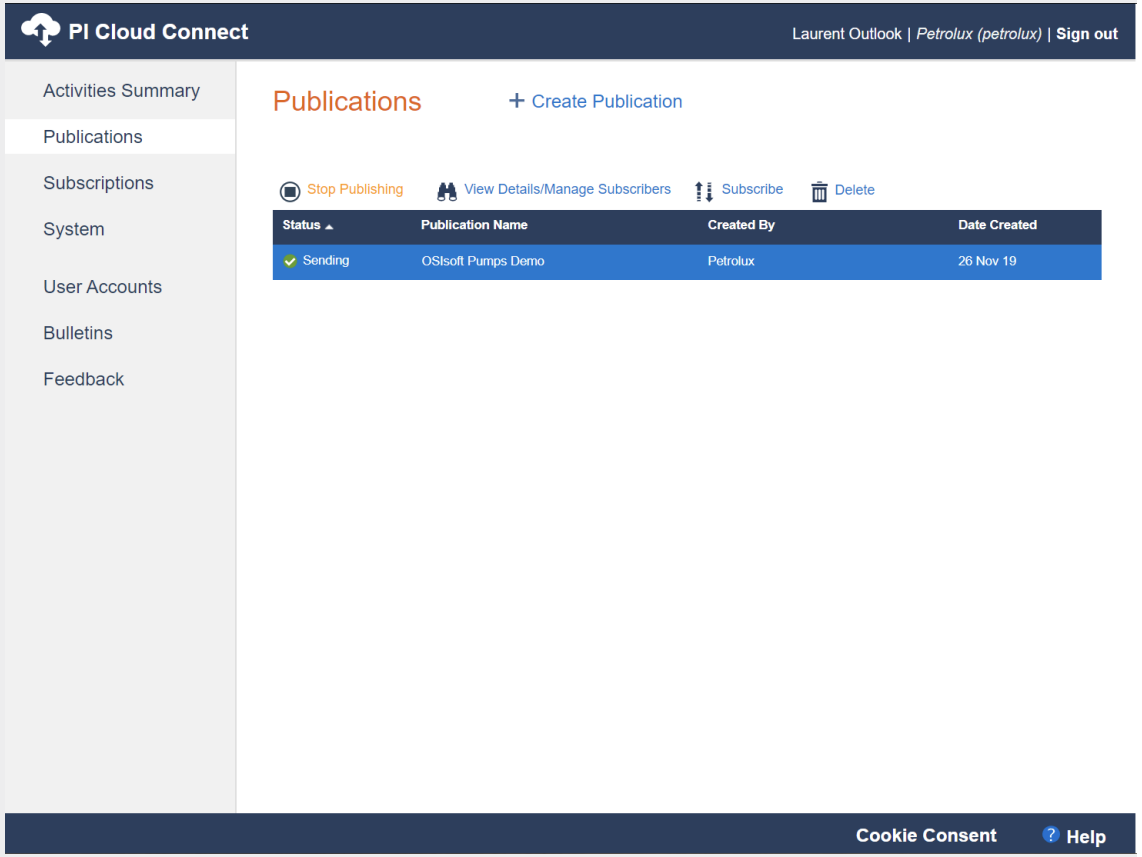
Create a Publication

- Publication is complete



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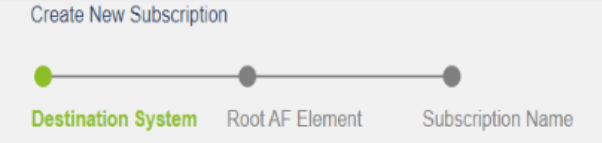
Create a Subscription

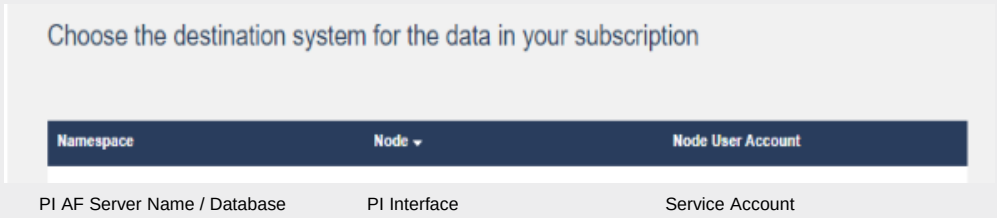
- To Subscribe to a Publication, you choose Publications.
- Click on the Publication you want to subscribe to, then click Subscribe.

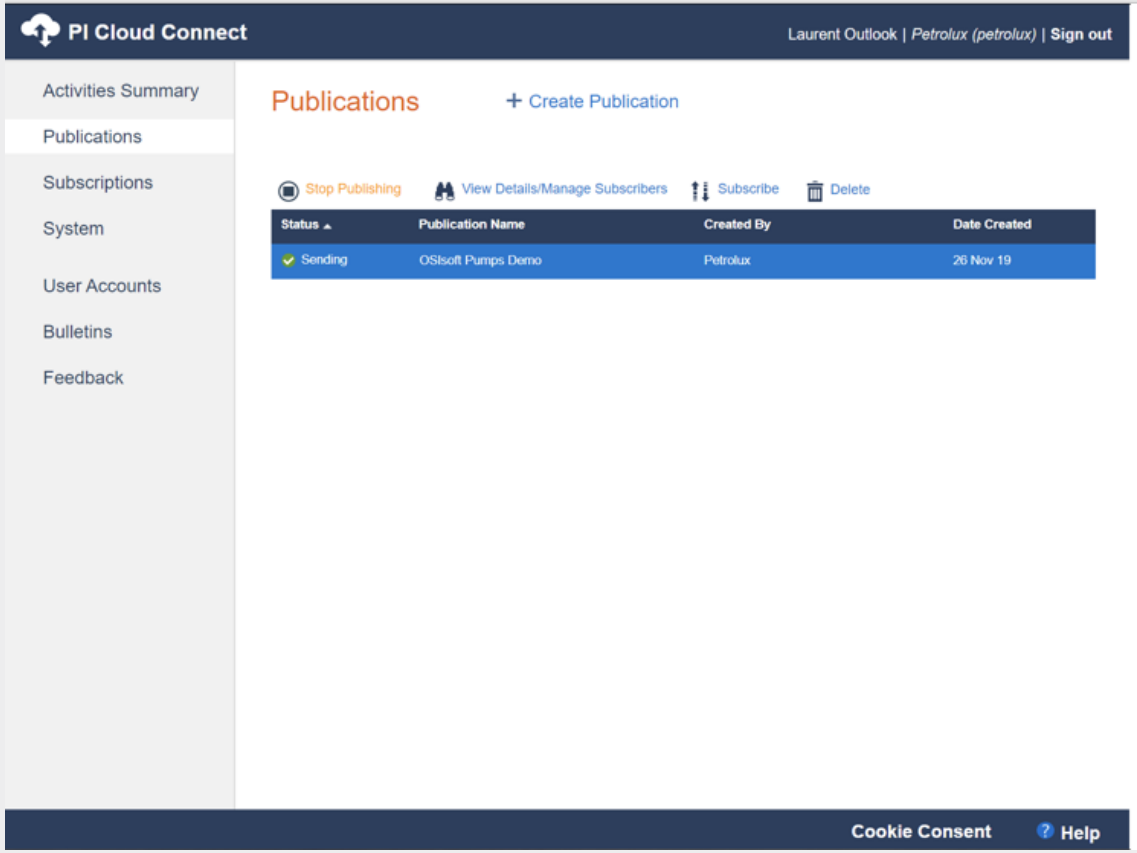


- Choose the AF Server and Database.

  (Create this before Subscribing)

- You can Pre-fix the tags that will be created on your PI Archive.





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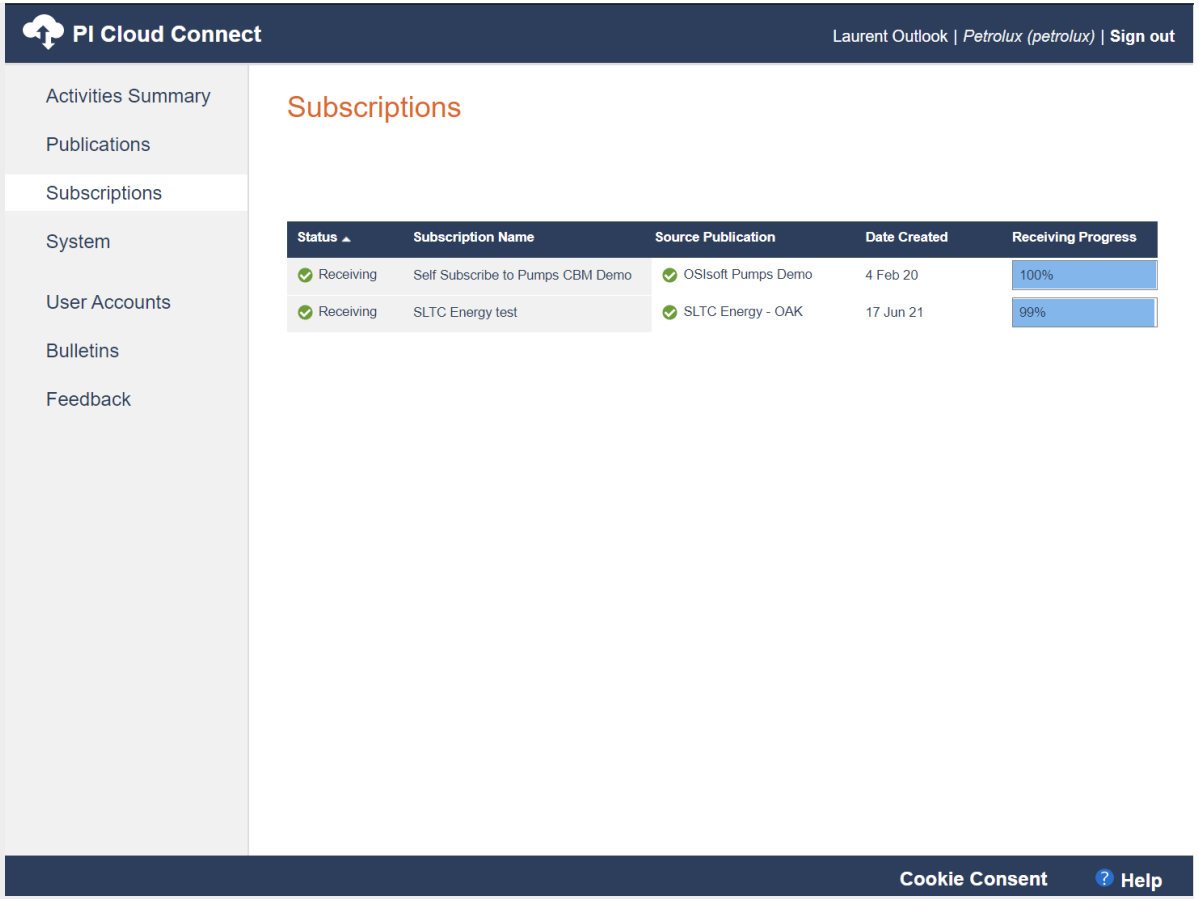
Create a Subscription

- Subscription is complete.



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References

- https://docs.osisoft.com
- OSIsoft Cloud Services
- Onboarding (osisoft.com)
- Playbook – PI Cloud Connect (osisoft.com)

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Questions

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Take your skills and experience to the next level with expanded learning, exclusive speaker opportunities, and recognition of your expertise!

Submit your story idea using Call for Papers

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Share your story!

Benefits of speaking

- Recognition of your expertise as a leader and the success of your team and organization
- Showcase your knowledge with peers in your industry and beyond
- Promote your organization’s success and be recognized as a leader
- Exclusive speaker opportunities (including special events with industry experts)
- Build your speaking skills with expert training and close support from our events team
- Plus, a gift of our appreciation!

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Where does your story fit?

How have AVEVA products and/or the PI System improved your company, workforce, products, and community?

Industry: Focus on implementation and specific use cases in your industry

Analytics: Share your work in AI, data science, and industrial analytics projects

Engineering & Operations – Demonstrate how you've utilized data across enterprise and employed the AVEVA portfolio & PI System alongside other technology.

Development – Breakdown silos in operation and teams. Show innovative use of technologies, Digital Twin, Cloud, or integration of IoT in your business.

Product – Showcase use of products within or across our portfolio

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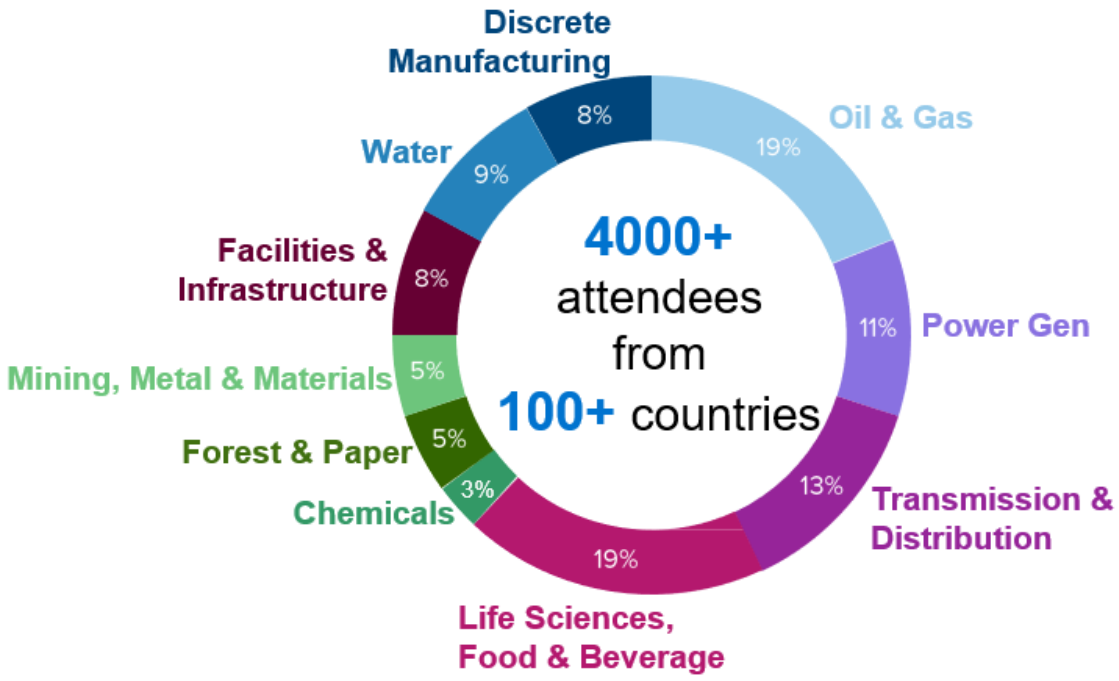
AVEVA PI World 2021 combines PI World & AVEVA World Conference

PI World Online 2020 drew over 4,200 engaged participants worldwide



- **1,300 companies** from a diverse set of industries
- Engaged participants watched an average of **87 minutes** of content
- Participants included: customers, developers, executives, innovators and more!

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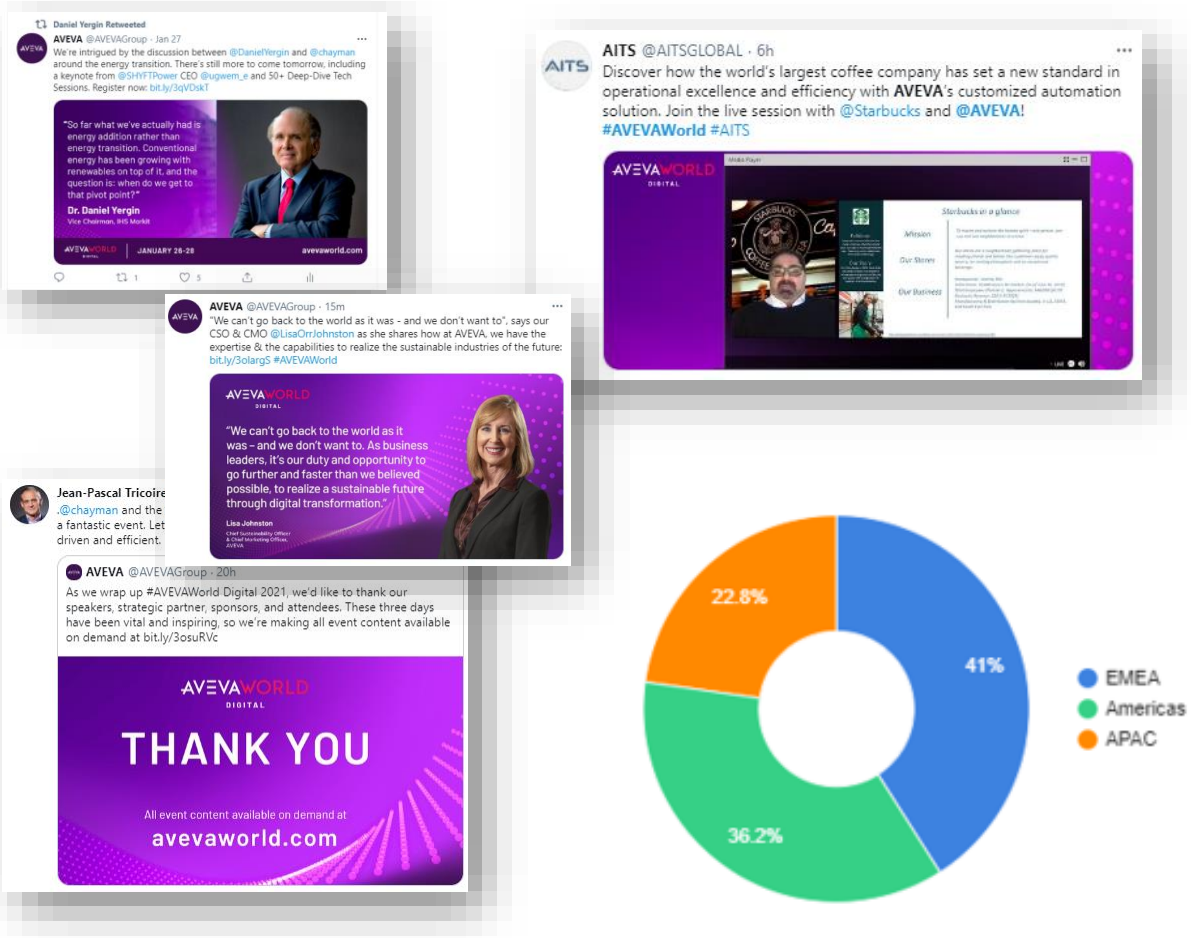
AVEVA PI World 2021 combines PI World & AVEVA World Conference audiences

AVEVA World 3 Digital drew 3,850 attendees



- Over **7,200 registrants**
- Viewership totaled a combined **10,250 hours**; average viewer watched more than **85 minutes** of content
- **7.7 million social media impressions**
- Global audience including partners, customers, prospects, and analysts
- Over **2300 visits** to expo booths

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"Encourage your users to attend PI World; they will find a tool you did not know they needed. That is the way to get adoption."

Chairperson, Life Sciences User Group

"Identify new ways to use the system and meet peers in the industry as well as face to face contact with staff. Excellent conference!"

Director, Power & Utilities agency

"Great opportunity to get your questions answered, take advantage of learning labs, and make new friends all in one setting."

DCS Administrator, Chemicals producer

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