

Visualizando Analíticos Industriais

Anderson Amaral, Engenheiro de Sistemas

Maio/2019

Agenda

- Papel da Visualização no *Analytics*
- Oportunidade para Operações Críticas
- Desafios da Visualização na Análises de Operações
- Como a OSIsoft Apoia a Visualização
- Casos de Uso/Histórias de Sucesso



Papel da Visualização no *Analytics*

A worker in a yellow hard hat and safety glasses is operating a large industrial machine, possibly a CNC lathe, with a laptop. The background is a factory setting with various mechanical components and wiring.

Nós **ACREDITAMOS** que
pessoas com **DADOS**
podem **TRANSFORMAR**
SEU MUNDO

2018 *This Is What Happens In An Internet Minute*



2019 *This Is What Happens In An Internet Minute*



Fonte: <https://www.visualcapitalist.com/what-happens-in-an-internet-minute-in-2019/>



padrefabiodemelo ✓
@pefabiodemelo

Estou há um mês com um cartão
@Bradesco bloqueado. Julgaram
estabelecimento da compra, ué
Acabo de ser recomendado pelo
Conselho amoroso.

5:33 PM · 21 de mai de 2019 · Twitter for iPhone

509 Retweets 17,6 mil Curtidas



Itaú ✓ @itau · 17 h

Em resposta a @pefabiodemelo

Oi, temos interesse

^_^ ||
(ω) ||
/ づ

Também temos cartão de crédito, cartão
longa. Vem de DM 🍷

33

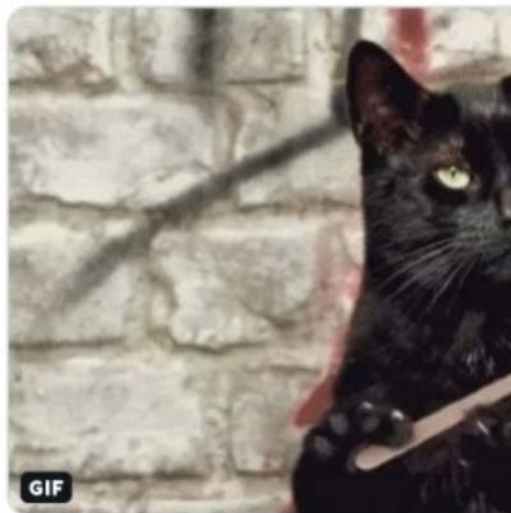
12

236



Santander Brasil ✓
@santander_br

Em resposta a @pefabiodemelo e @Bradesco
De conselho amoroso eu não sei
de crédito, o Claudson Clebson
Vem pra cá, juntos e shallow now



padrefabiodemelo ✓
@pefabiodemelo

Em resposta a @Denise_C01 @Bradesco e @nubank
Como faço para tê-los?

5:41 PM · 21 de mai de 2019 · Twitter for iPhone

15 Retweets 704 Curtidas



Nubank ✓ @nubank · 21 de mai

Em resposta a @pefabiodemelo e @Denise_C01

Padre Fabio cheio de graça, venha conosco, bendita a hora que o antagonista
te pediu paciência, e os clientes a nosso favor te orientaram. Seja bem vindo a
nossa família, olha a DM.





ciência > ambiente equilíbrio e saúde crise do clima

Terraplanistas planejam viagem até a 'borda da Terra' com GPS, invenção da Terra redonda.

Navegação nos oceanos depende de GPS, baseada em um mundo esférico



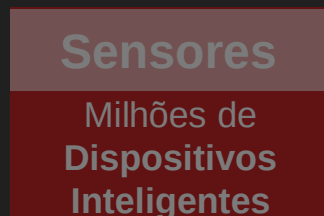
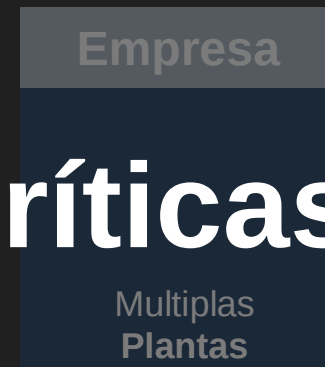
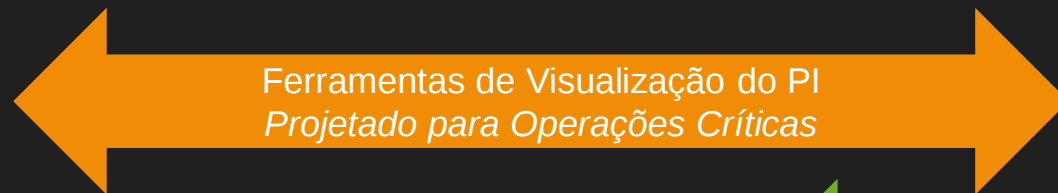
fonte: <https://www.umsabadoqualquer.com/category/mundo-avesso/page/4/>

DATA ANALYST PLATFORMS	DATA SCIENCE PLATFORMS		
Microsoft pentaho alteryx Digital Reasoning guavus AYASDI ATTIVIO Datameer Quid Incorta interana ClearStory Origami Kogni ENDOR MODE Bottlenose switchboard	IBM KNIME dataiku DOMINO rapidminer CONTINUUM ANALYTICS ALGORITHMIA DATAWATCH ANDROS sas		
BI PLATFORMS	VISUALIZATION	MACHINE LEARNING	
Microsoft aws DOMO Wave Analytics looker THOUGHTSPOT ATSCALE ARCADIA DATA Information Builders GoodData MicroStrategy birst	+ tableau Google Cloud Qlik Periscope Data ZEPL VIZOMDATA CHARTIO TOUCAN FOC SAP LUMINA celonis plotly	aws Google Cloud DataRobot gamalorn ELEMENT AI VISENZE deepargilo H2O AI VERSIVE bonsai	
COMPUTER VISION	HORIZONTAL AI	SPEECH & NLP	
Microsoft Azure Amazon Rekognition clarifai EVER AI deepomatic twentybn neurala	IBM Watson Cortana Face++ 可视 sentient Voyager Labs iAffective Numenta nara.io BLUE VISION PROPHESIE CognitiveScale PETUUM LEADER INTELLIGENCE CURIOUS AI OSARO	Google Cloud twilio amazon alexa narrative science semantic machines Mobvoi PRIMER SoundHound Inc. VOCERA NUANCE snips yycorp	
SEARCH	LOG ANALYTICS	SOCIAL ANALYTICS	WEB / MOBILE / COMMERCE ANALYTICS
elasticsearch EXALEAD COVEO Lucidworks ATTIVIO swiftype algolia alphasense MAANA omni:us SINEQUA	splunk sumologic LOGGLY TIMBER kibana logz.io	Hootsuite sprinkr NETBASE synthesio simplereach bitly predata SimilarWeb	Google Analytics mixpanel AMPLITUDE sumall Airtable RESCI SIGOPT granify custora

[illegible]

<https://graphaware.com/graphaware/2019/02/01/graph-technology-landscape.html>



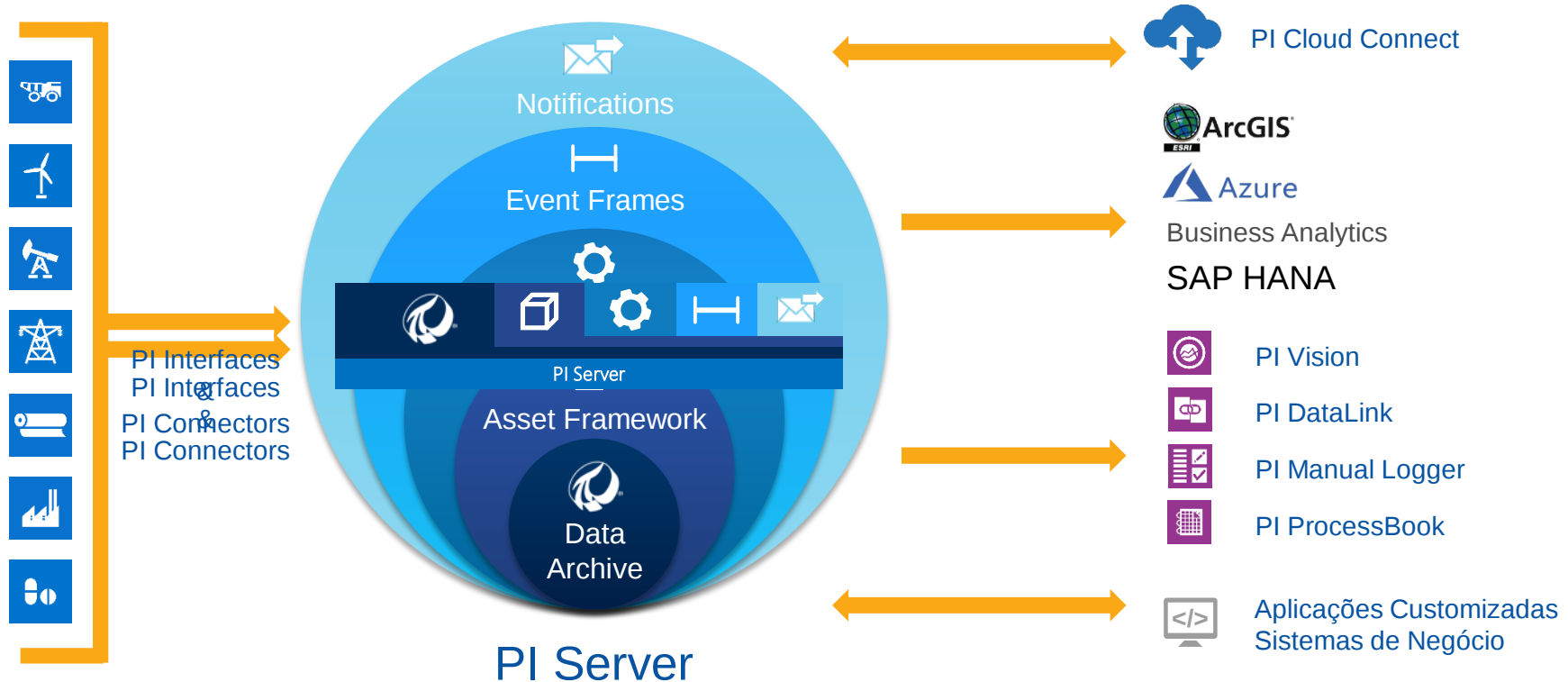


Operações Críticas

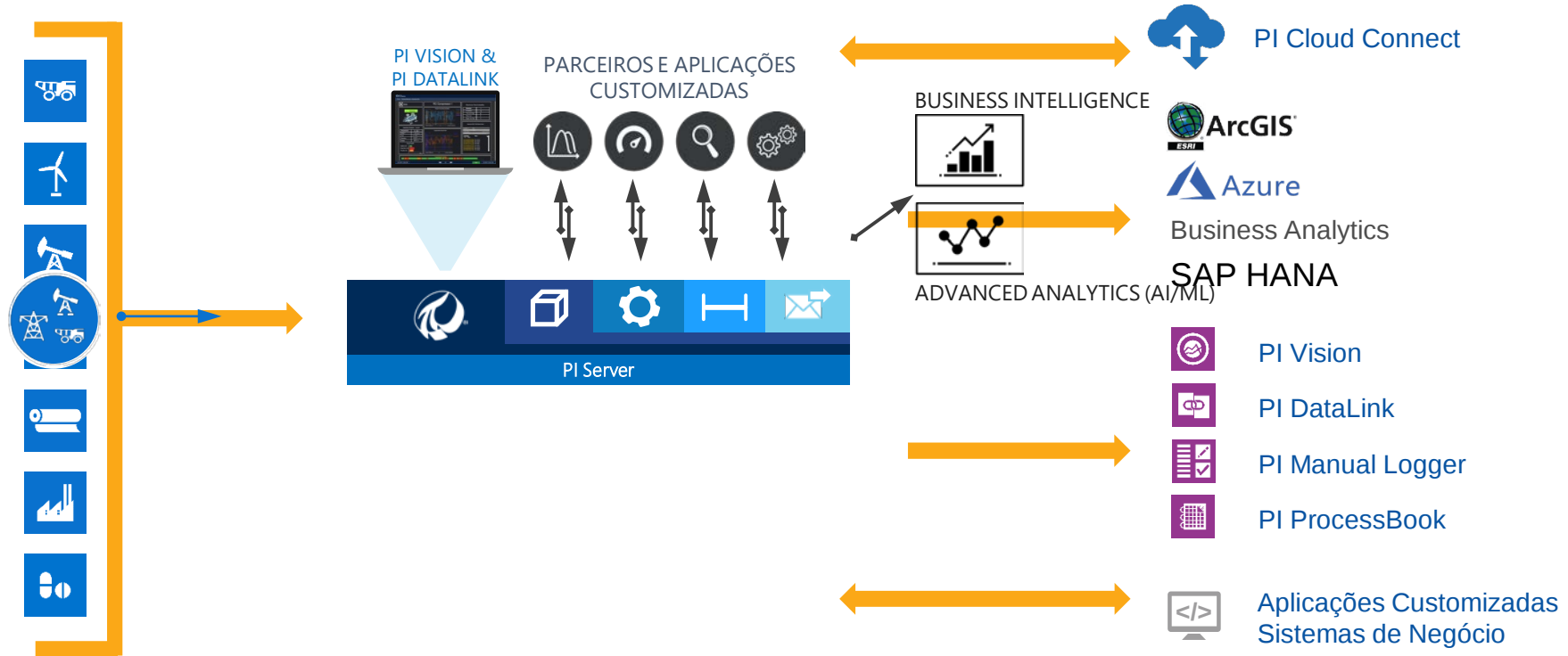
A photograph of an industrial refinery or chemical plant. The scene is filled with complex machinery, including several tall distillation columns, a network of pipes, and structural steel frameworks. A crane is visible on the right side of the image. The sky is clear and blue. A semi-transparent blue rectangular box is overlaid on the right side of the image, containing white text.

Oportunidade para Operações Críticas

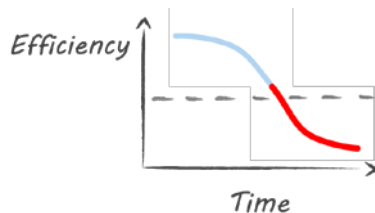
PI System



PI System



Análise de Ativos



Template: Pump maintenance

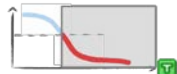
Expression

`'Pump Efficiency' < '75'`

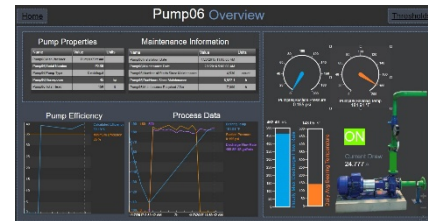
True for
10 min

PI Notification

Event Frame



Recipient(s)



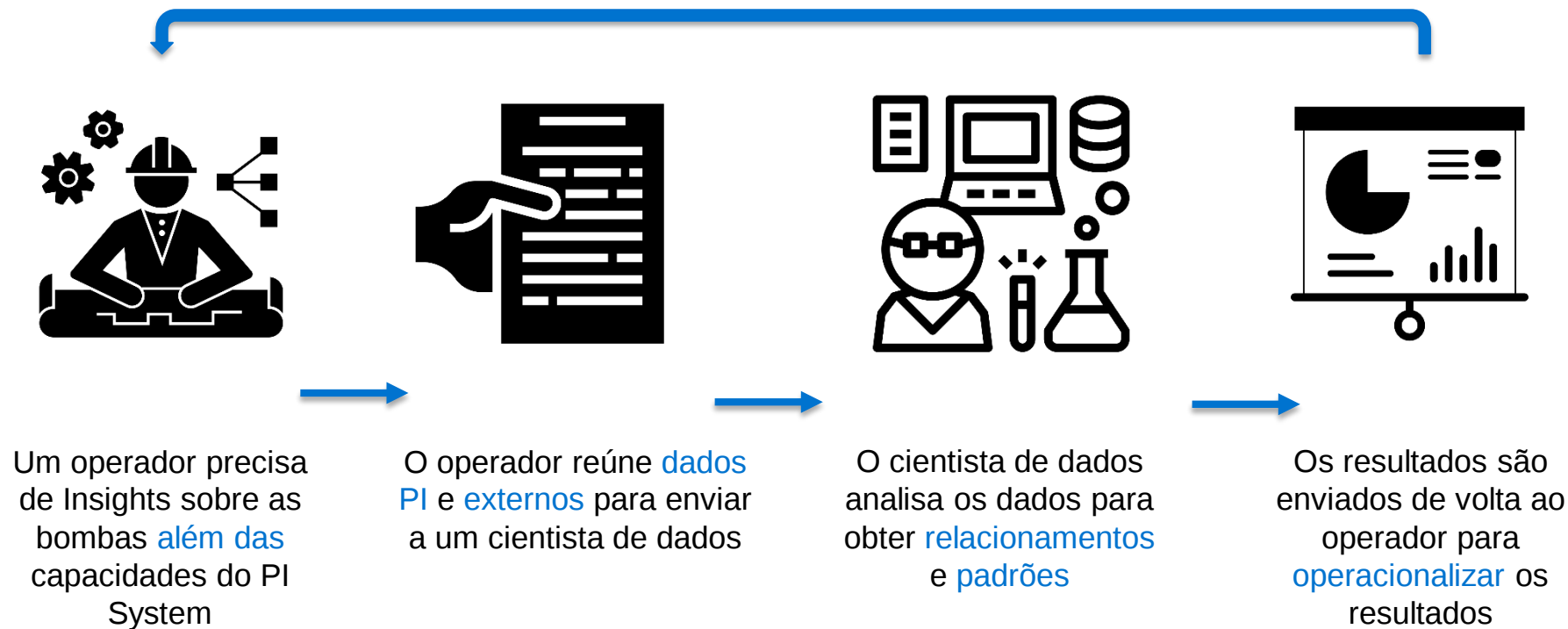
Os operadores precisam visualizar facilmente a **Eficiência** de suas bombas

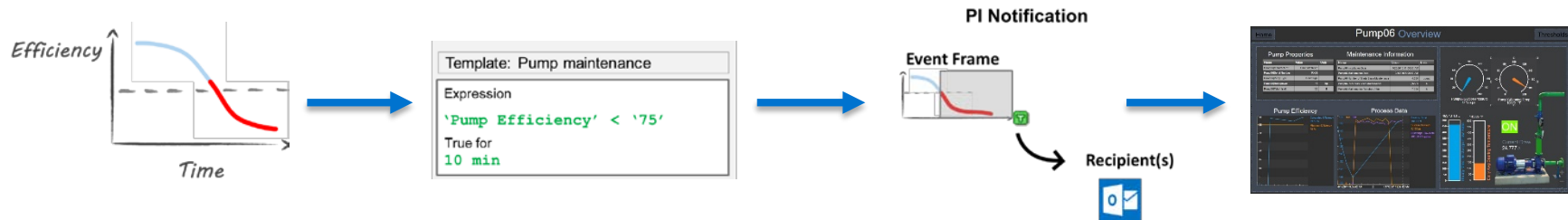
Criar **Análise de Ativos** no Asset Framework

Criar **Notifications** para alertar quando a eficiência está abaixo de um limite

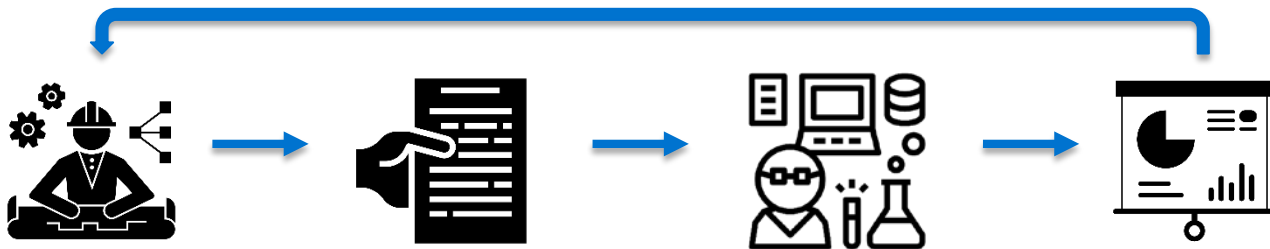
Criar um display do **PI Vision** para monitorar a eficiência da bomba em tempo real

Ciência de Dados





A Oportunidade para Operações Críticas é combinar a
Análise de Ativos com Ciência de Dados



A close-up photograph of several black chess pieces on a chessboard. The pieces are in sharp focus in the foreground, while others in the background are blurred. A semi-transparent blue horizontal band is overlaid across the middle of the image, containing white text.

Desafios da Visualização na Análises de Operações

Desafios

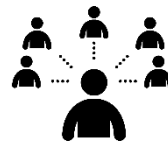
Dados compreensíveis em vista da operação e processo

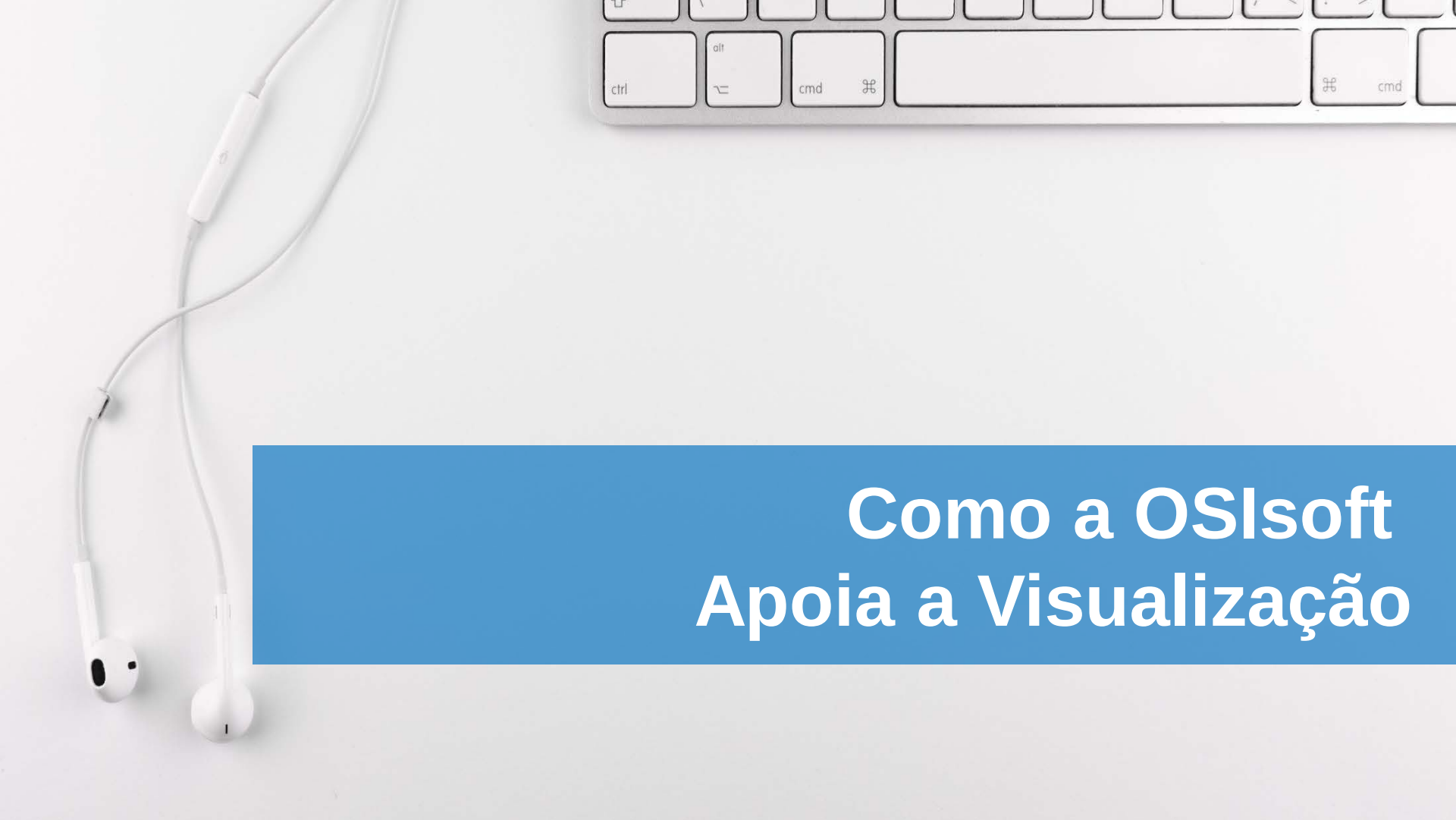
Aguardar que a TI forneça resultados

Acessar análises no campo

Dimensionamento e compartilhamento de Insights

De alertas reativos à alertas proativos



A white Apple keyboard is partially visible at the top of the frame. To the left, a pair of white Apple EarPods with a white inline remote is coiled on the surface. A solid blue horizontal bar spans the lower half of the image, containing white text.

**Como a OSIssoft
Apoia a Visualização**

A experiência tem mostrado que *Analytics* é uma Jornada

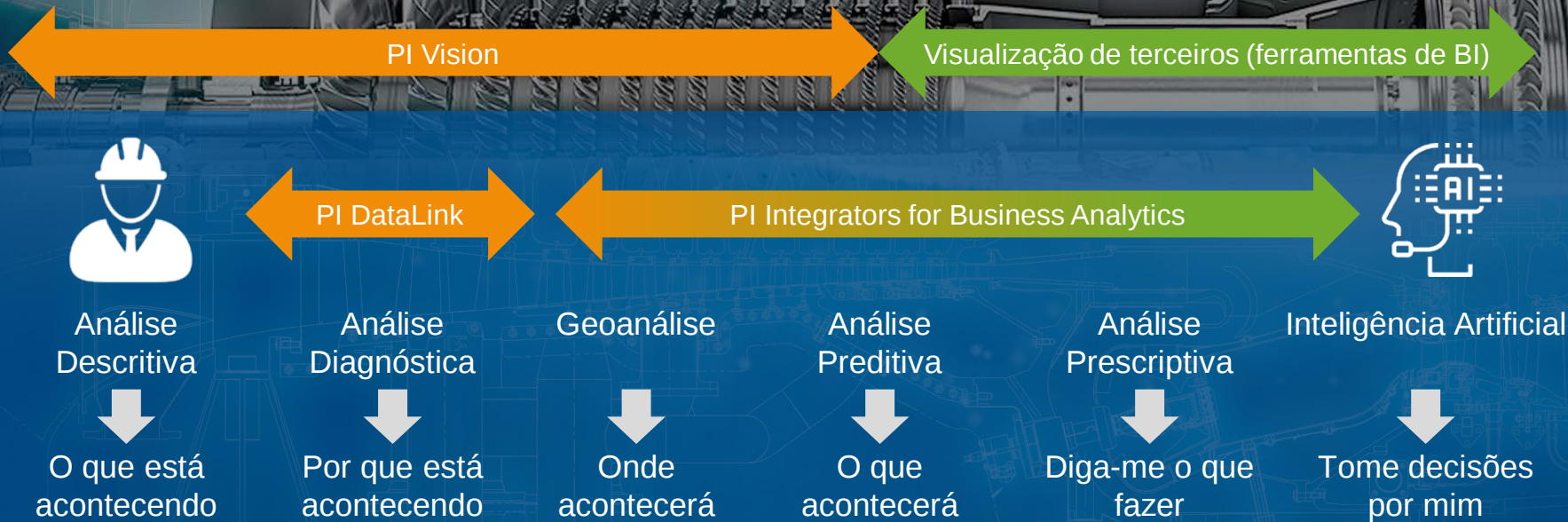


Tabela Comparativa

 PI Vision	 PI DataLink	 Ferramentas de BI
• Monitoramento do processo em tempo real • Construção <i>self-service</i> de telas • Tendências e comparações entre ativos • Contexto do AF para construção de telas otimizadas	• Recursos do Excel • Relatórios automatizados • Cálculos pontuais em linha, formato de coluna • Pacotes estatísticos que podem ser comparados com o PI Data • Análise dos dados históricos	• Combinando Dados Operacionais com Dados Corporativos • Encontrar correlações e Análise Multi-dimensional • Criação de matrizes de variáveis para ver como elas se correlacionam com uma variável dependente

PI Vision

A maneira mais rápida e fácil de visualizar dados do PI System

- Uma solução **fácil de usar**, *self-service* e escalável
- Acesse dados de qualquer navegador Web, incluindo navegadores de **dispositivos móveis**
- **Organize e compartilhe** displays por toda a sua organização



Wind Turbine Detail Asset: GE06

Ad Hoc Display



← GE06

**Capacity**
48,93 %**Operating State**
Load Operation**Efficiency**
14,401 %**Overheat Alarm****Turbine Availability**
31,875 %

Links

[Thermal Details](#)
[High Turbine Temp](#)

About

Name ▲	Value
GE06[Gearbox Serial Number]	4800000-0000-0
GE06[Gearbox Type]	WindEnergy
GE06[Manufacturer]	Truvale
GE06[Model]	T95-2MW
GE06[Power Rated]	1 500
GE06[Serial Number]	M000000

Nacelle

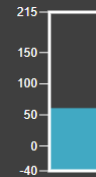
Blade Total Error
0,076527 °

Hydraulic Pressure

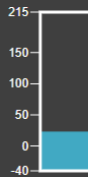


Temperatures

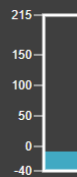
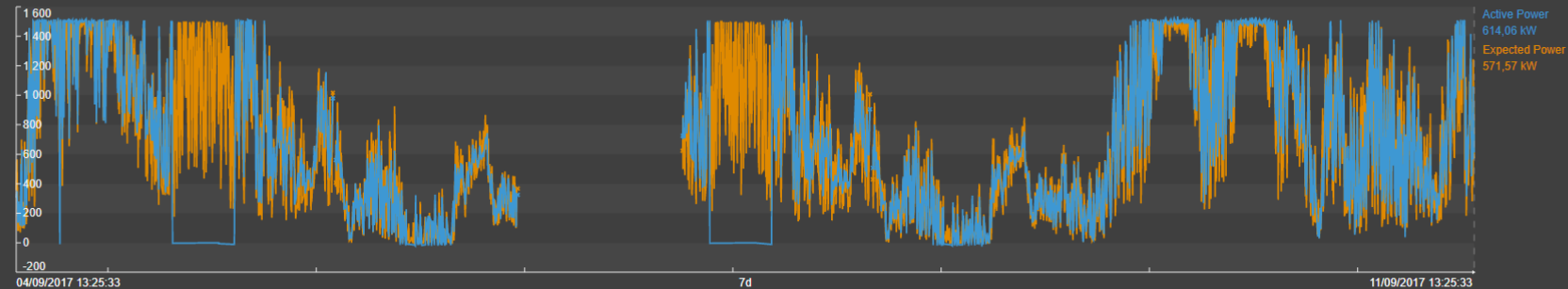
Gearbox



Generator



Nacelle

Current L1
668,9 ACurrent L2
661,9 ACurrent L3
1 337 AL1-N Voltage
320,6 VL2-N Voltage
318 VL3-N Voltage
322,4 V

04/09/2017 13:25:33

7d

Now

11/09/2017 13:25:33

← GE06



Capacity
48,93 %

Operating State
Load Operation

Efficiency
14,401 %

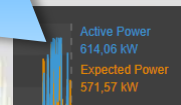
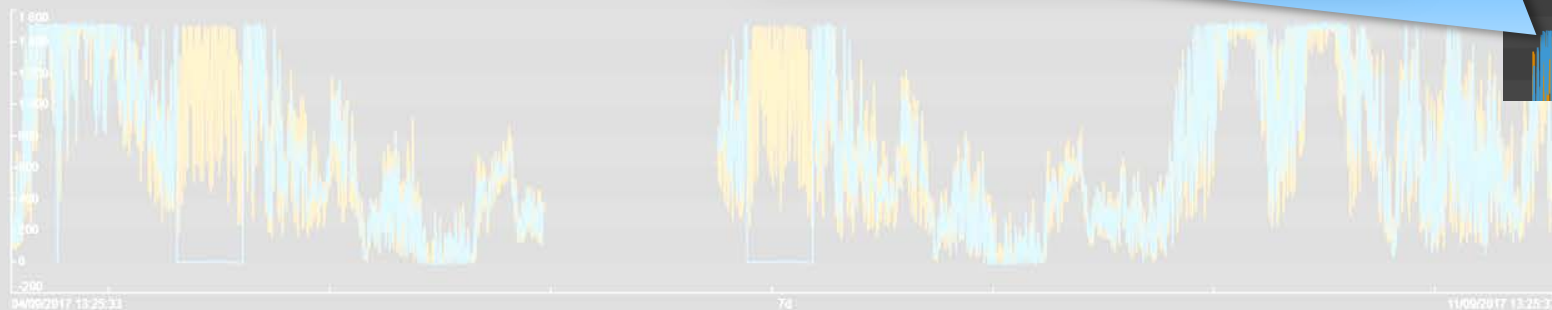
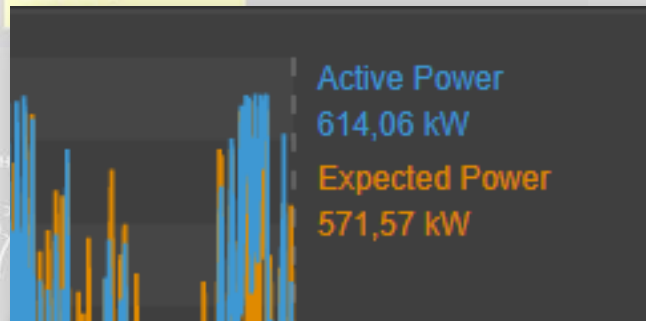
Overheat Alarm

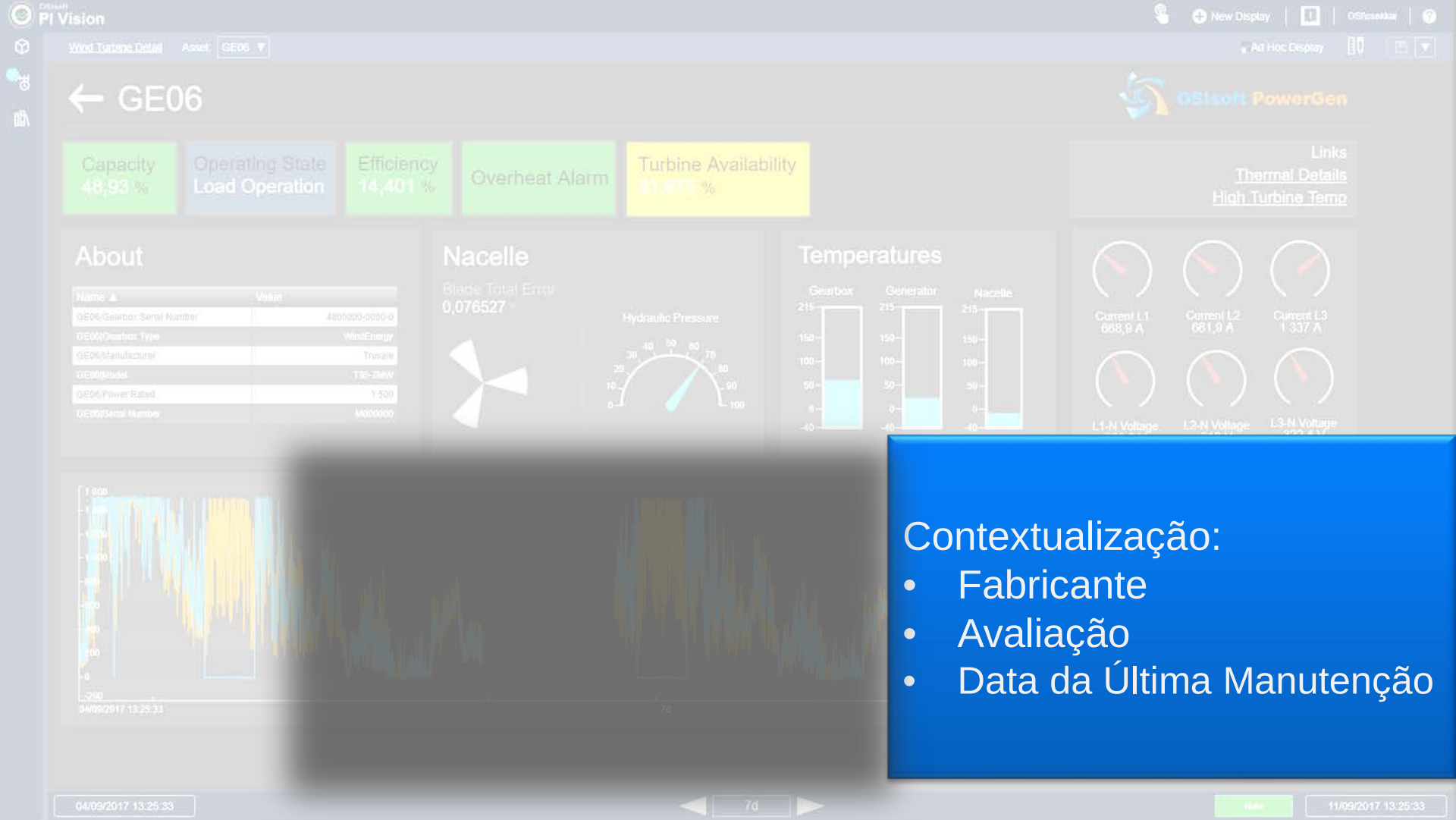
Turbine Availability
91,975 %

Links

[Thermal Details](#)
[High Turbine Temp](#)

- Leituras em Tempo Real
- Modelos Preditivos





← GE06



Capacity
48,93 %

Operating State
Load Operation

Efficiency
14,401 %

Overheat Alarm

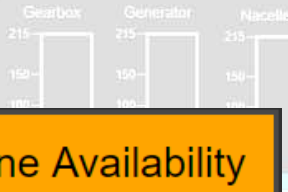
Turbine Availability
31,875 %

Links
[Thermal Details](#)
[High Turbine Temp](#)

About

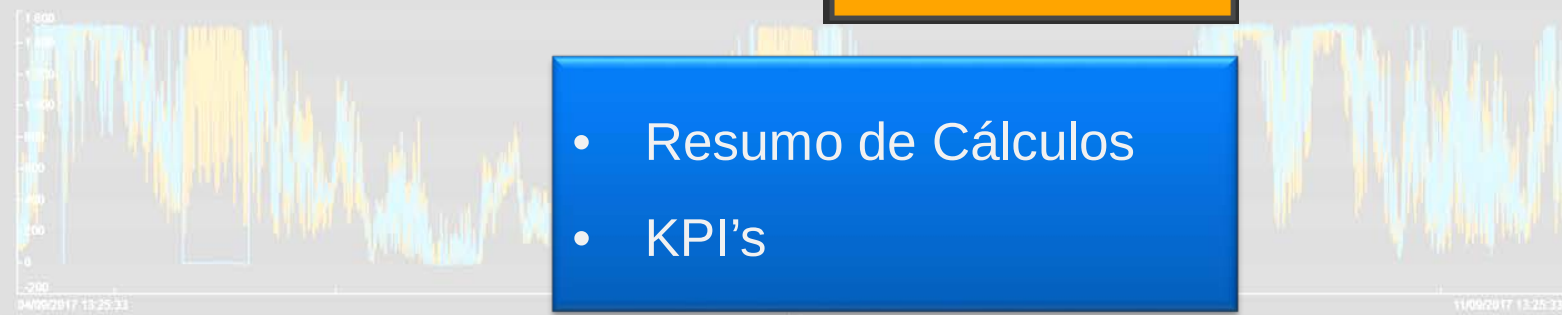
Name	Value
GE06/Gearbox Serial Number	4800000-0000-0
GE06/Gearbox Type	WindEnergy
GE06/Manufacturer	Toshiba
GE06/Model	TAE-200V
GE06/Power Rating	1.500
GE06/Serial Number	14000000

Temperatures



Turbine Availability
31,875 %

- Resumo de Cálculos
- KPI's



Wind Turbine Detail Asset: GE06 ▾

Ad Hoc Display

← GE06

Capacity
48,93 %Operating State
Load OperationEfficiency
14,401 %

Overheat Alarm

Turbine Availability
31,875 %[Links](#)
[Thermal Details](#)
[High Turbine Temp](#)

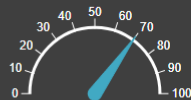
About

Name ▲	Value
GE06[Gearbox Serial Number]	4800000-0000-0
GE06[Gearbox Type]	WindEnergy
GE06[Manufacturer]	Truvalle
GE06[Model]	T95-2MW
GE06[Power Rated]	1 500
GE06[Serial Number]	M000000

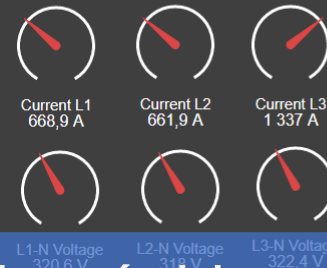
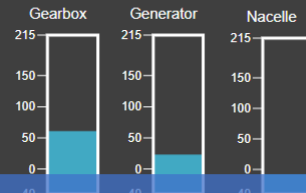
Nacelle

Blade Total Error
0,076527 °

Hydraulic Pressure



Temperatures



O PI Vision fornece uma maneira rápida e fácil de visualização para sua **Análise de Ativos em Tempo Real**



04/09/2017 13:25:33

7d

Now

11/09/2017 13:25:33

PI Vision 2019



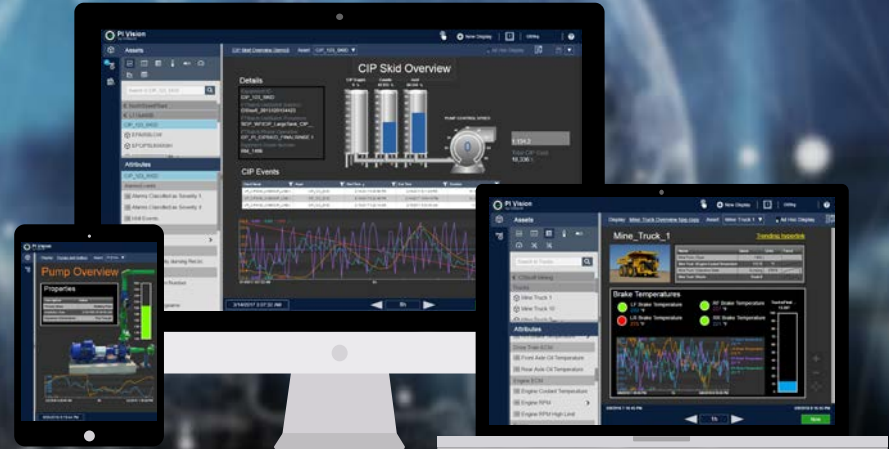
Ad Hoc Trending



Migração do PI ProcessBook



Segurança Otimizada para os
objetos XY Plot e Events Table



Ad Hoc Trending

Aprofunde sua investigação em tempo real

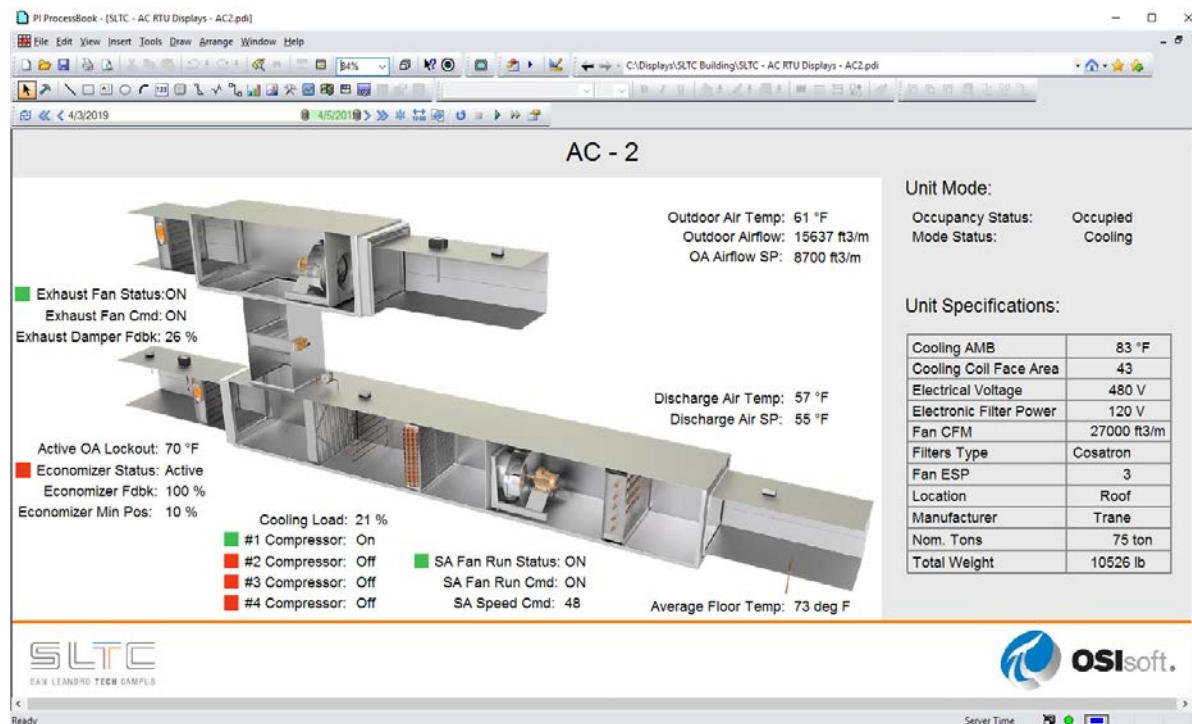
Selecione os Dados Relevantes

Plote e Explore

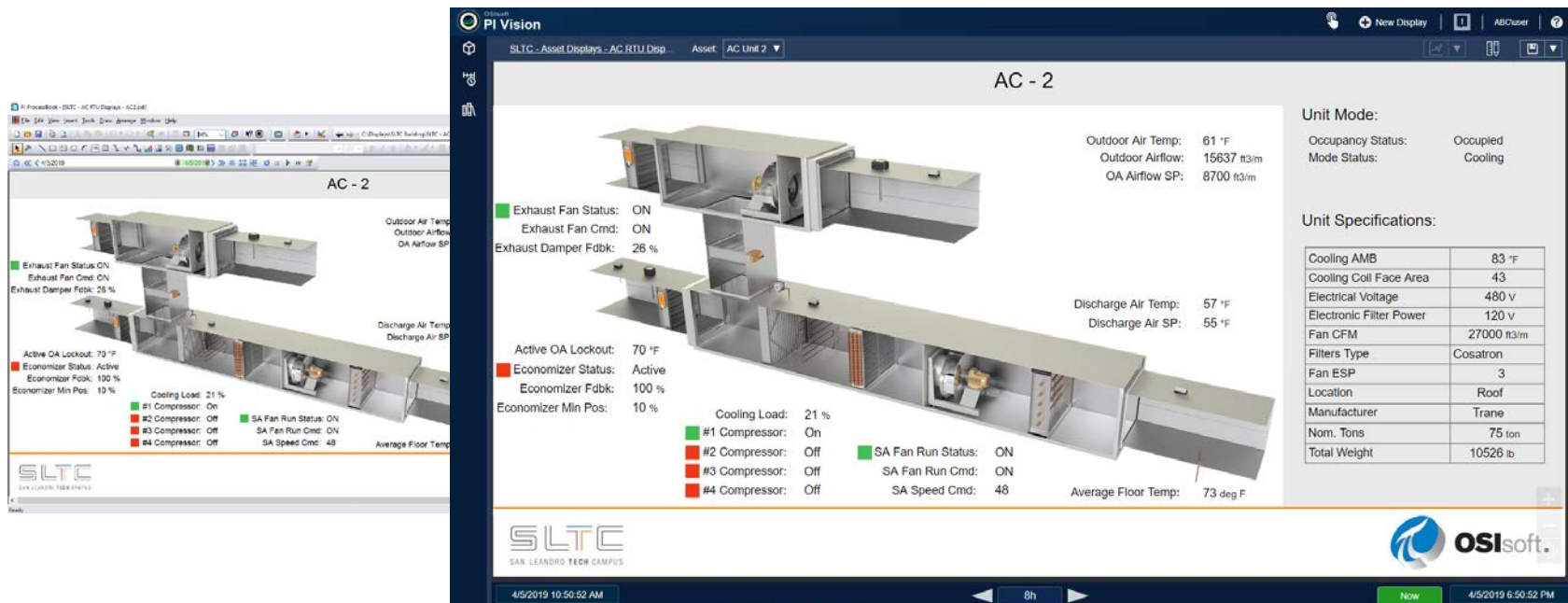
Descubra Insights



Migração do PI ProcessBook



Migração do PI ProcessBook



Acelere em sua jornada com a ferramenta de visualização mais recente

Migração do PI ProcessBook

1

Files and Folders	
+ Add Files	v
Path/FileName	Date Modified
☒ C:\Displays	
☒ C:\Displays\Process Monitoring	
☒ C:\Displays\Process Monitoring\Animation #1.PDI	4/5/2019 2:34 PM
☒ C:\Displays\Process Monitoring\Animation #2.PDI	4/5/2019 2:35 PM
☒ C:\Displays\Process Monitoring\Batch Reactor #1.PDI	4/5/2019 2:44 PM
☒ C:\Displays\Process Monitoring\Batch Reactor #2.PDI	4/5/2019 2:44 PM
☒ C:\Displays\Process Monitoring\Kamyr.PDI	4/5/2019 2:28 PM
☒ C:\Displays\Process Monitoring\Main Column Bottom.PDI	4/5/2019 2:18 PM
☒ C:\Displays\Process Monitoring\Paper Machine.PDI	4/5/2019 2:18 PM
☒ C:\Displays\Process Monitoring\Particulate Removal System.PDI	4/5/2019 2:59 PM
☒ C:\Displays\Process Monitoring\PI Expressions.PDI	4/5/2019 2:42 PM
☒ C:\Displays\Process Monitoring\PI Summary.PDI	4/5/2019 2:43 PM
☒ C:\Displays\Process Monitoring\Process Display.PDI	4/5/2019 2:18 PM
☒ C:\Displays\Process Monitoring\Pulp Prep #1.PDI	4/5/2019 2:18 PM
☒ C:\Displays\Process Monitoring\Pulp Prep #2.PDI	4/5/2019 2:18 PM
☒ C:\Displays\Process Monitoring\Trends #1.PDI	4/5/2019 2:28 PM
☒ C:\Displays\Process Monitoring\Trends #2.PDI	4/5/2019 2:28 PM
☒ C:\Displays\Process Monitoring\Trends #3.PDI	4/5/2019 2:21 PM
☒ C:\Displays\SLTC Building	
☒ C:\Displays\SLTC Building\SLTC - AC RTU Displays - AC2.pdi	4/5/2019 1:48 PM
☒ C:\Displays\SLTC Building\SLTC - Device View - VAVCO.pdi	3/18/2019 10:05 AM
☒ C:\Displays\SLTC Building\SLTC - Energy Management Overview.pdi	4/5/2019 2:41 PM
☒ Select All 19 files listed 19 files selected	
Remove From List Run Analysis	

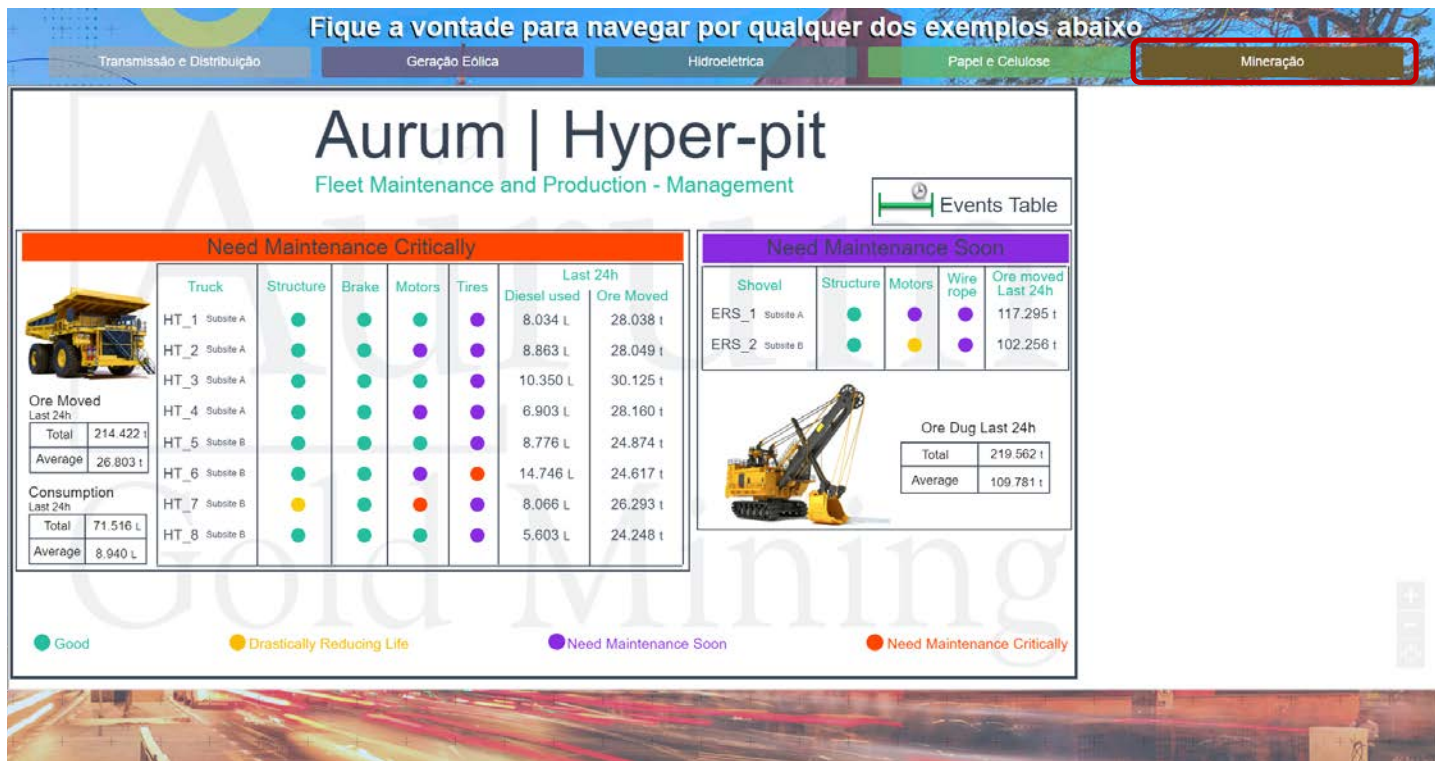
2

Analysis Results	
☒ Summary	☒ Tree View
Path/FileName	Issue Tags
☒ Can be Fully Migrated	
☒ Displays\Process Monitoring\Animation #1	
☒ Displays\Process Monitoring\Animation #2	
☒ Displays\Process Monitoring\Batch Reactor #1	
☒ Displays\Process Monitoring\Batch Reactor #2	
☒ Displays\Process Monitoring\Kamyr	
☒ Displays\Process Monitoring\Main Column Bottom	
☒ Displays\Process Monitoring\Paper Machine	
☒ Displays\Process Monitoring\PI Expressions	
☒ Displays\Process Monitoring\PI Summary	
☒ Displays\Process Monitoring\Process Display	
☒ Displays\Process Monitoring\Pulp Prep #1	
☒ Displays\Process Monitoring\Pulp Prep #2	
☒ Displays\Process Monitoring\Trends #1	
☒ Displays\Process Monitoring\Trends #2	
☒ Displays\SLTC Building\SLTC - AC RTU Displays - AC2	
☒ Displays\SLTC Building\SLTC - Device View - VAVCO	
☒ Can be Partially Migrated	
☒ Displays\Process Monitoring\Particulate Removal System	
☒ Displays\Process Monitoring\Trends #3	
☒ Displays\SLTC Building\SLTC - Energy Management Overview	
☒ Select All 19 files listed 19 files selected	
View Reports Migrate Displays	

3

Analysis Results		Summary		Tree View	
Path/FileName		Status	Issue Tags	Progress	
	Displays				
	Process Monitoring				
	Animation #1			Migrated	
	Animation #2			Migrated	
	Batch Reactor #1			Migrated	
	Batch Reactor #2			Migrated	
	Kamyr			Migrated	
	Main Column Bottom			Migrated	
	Paper Machine			Migrated	
	Particulate Removal System			Migrated	
	PI Expressions			Migrated	
	PI Summary			Migrated	
	Process Display			Migrated	
	Pulp Prep #1			Migrated	
	Pulp Prep #2			Migrated	
	Trends #1			Migrated	
	Trends #2			Migrated	
	Trends #3			Migrated	
	SLTC Building				
	SLTC - AC RTU Displays - AC2			Migrated	
	SLTC - Device View - VAVCO			Migrated	
	SLTC - Energy Management Overview		DS	Migrated	
Select All					
19 files listed 19 files selected					
View Reports				Migrate Displays	

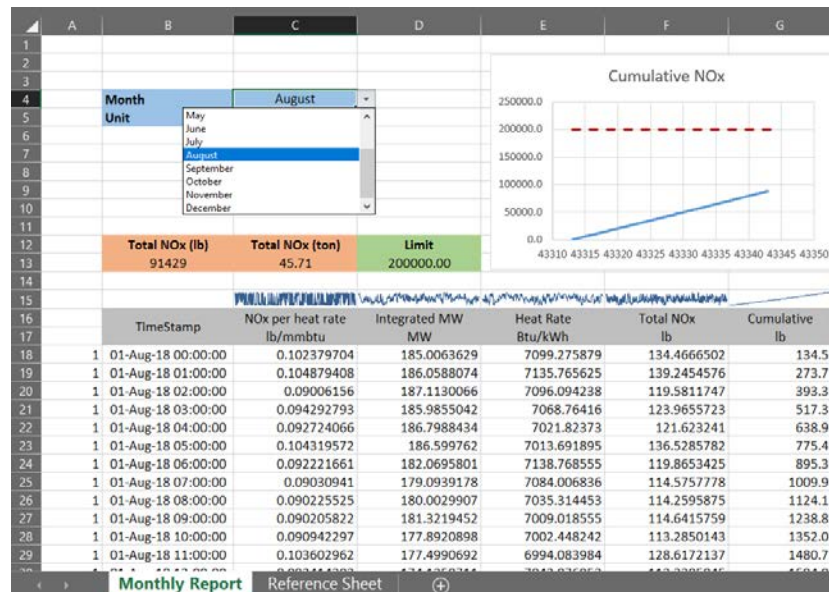
Estandes



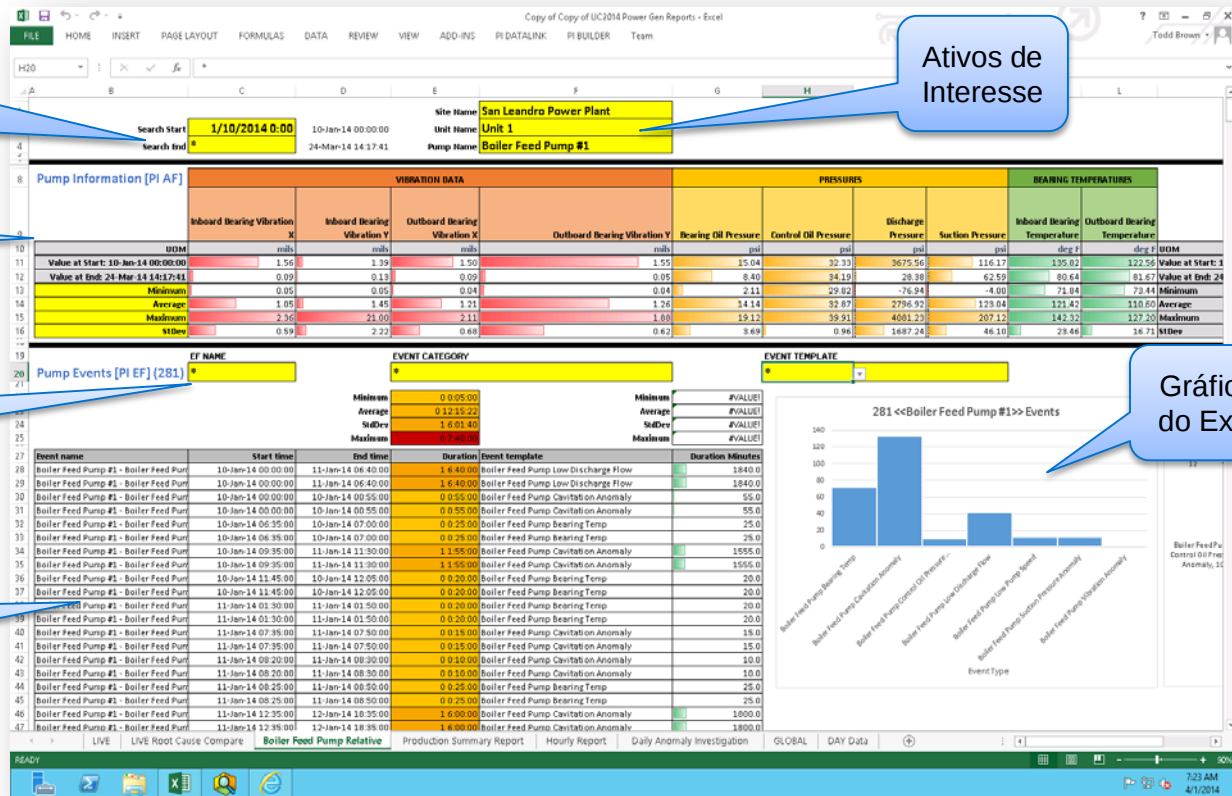
PI DataLink

Obtem dados para planilhas

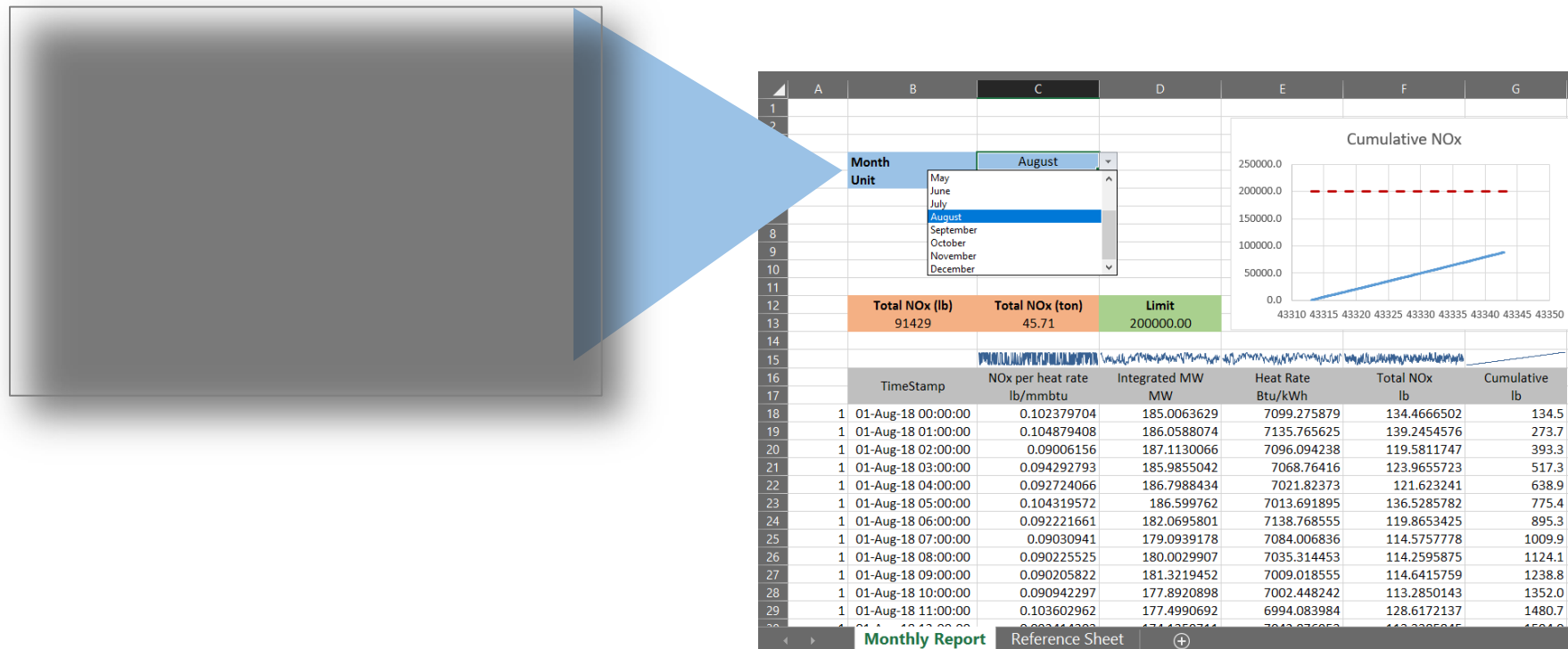
- Monetização dos dados do PI System para descobrir o verdadeiro **custo e valor** das decisões de operação
- Criação de relatórios interativos que facilmente **comparam e analisam** recursos
- Sumarização de **dados históricos** ao lado de dados em tempo real



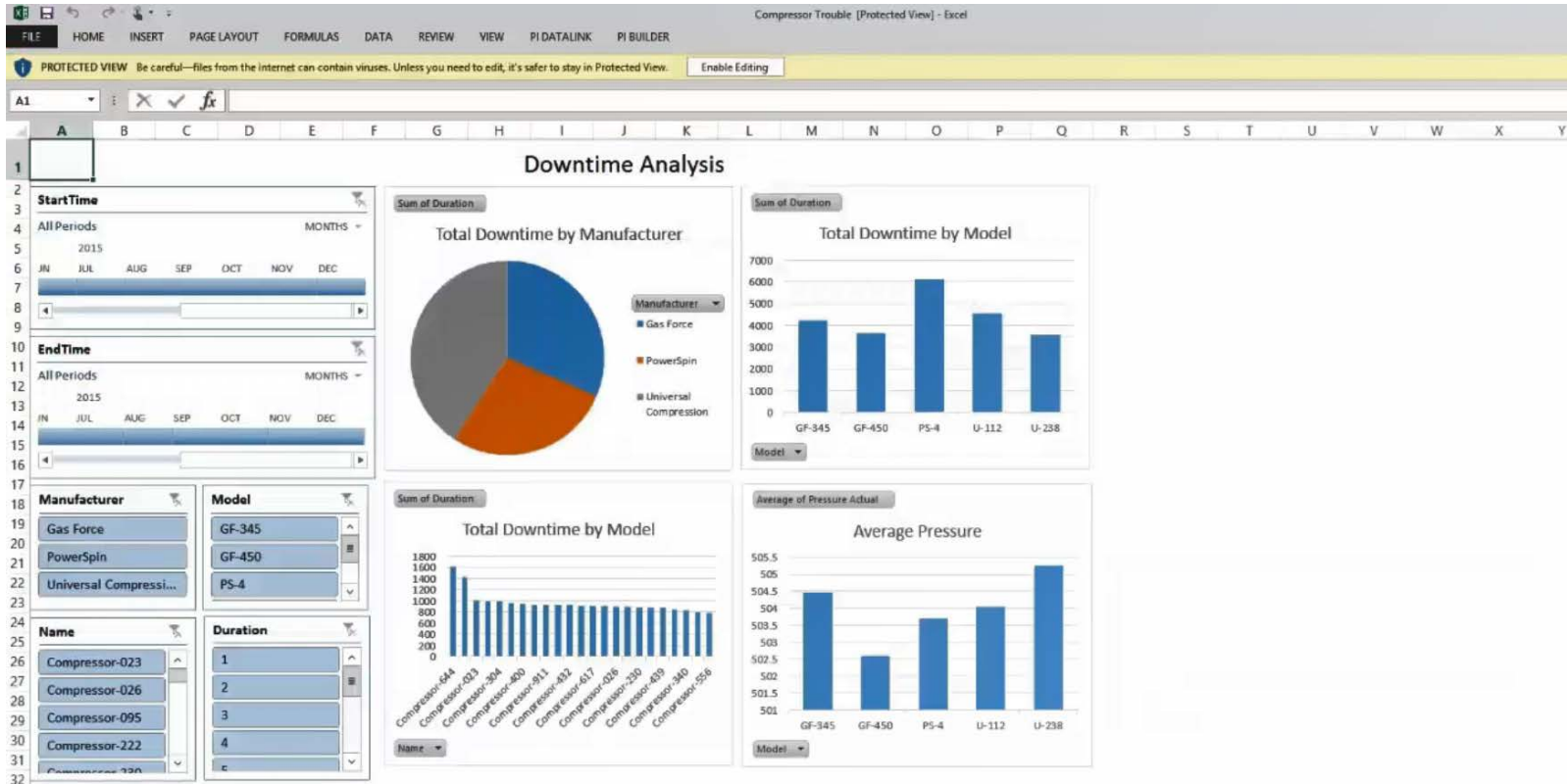
Relatório de Monitoramento



Relatórios no Excel com o PI DataLink

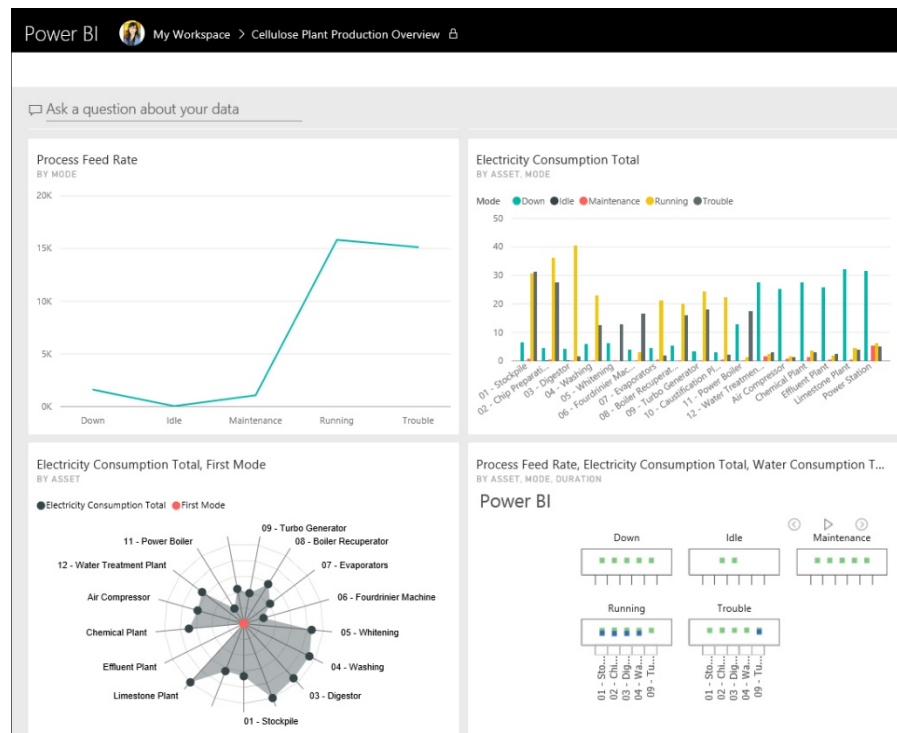


Dashboards no Excel com PI DataLink



Ferramentas de Business Intelligence

- Combine **dados do PI System** com **Dados Corporativos**
- Tendência com **Variáveis Diversas** além do Tempo no Eixo x
- **PI Integrators** estruturam os Dados do PI System para as Ferramentas de BI

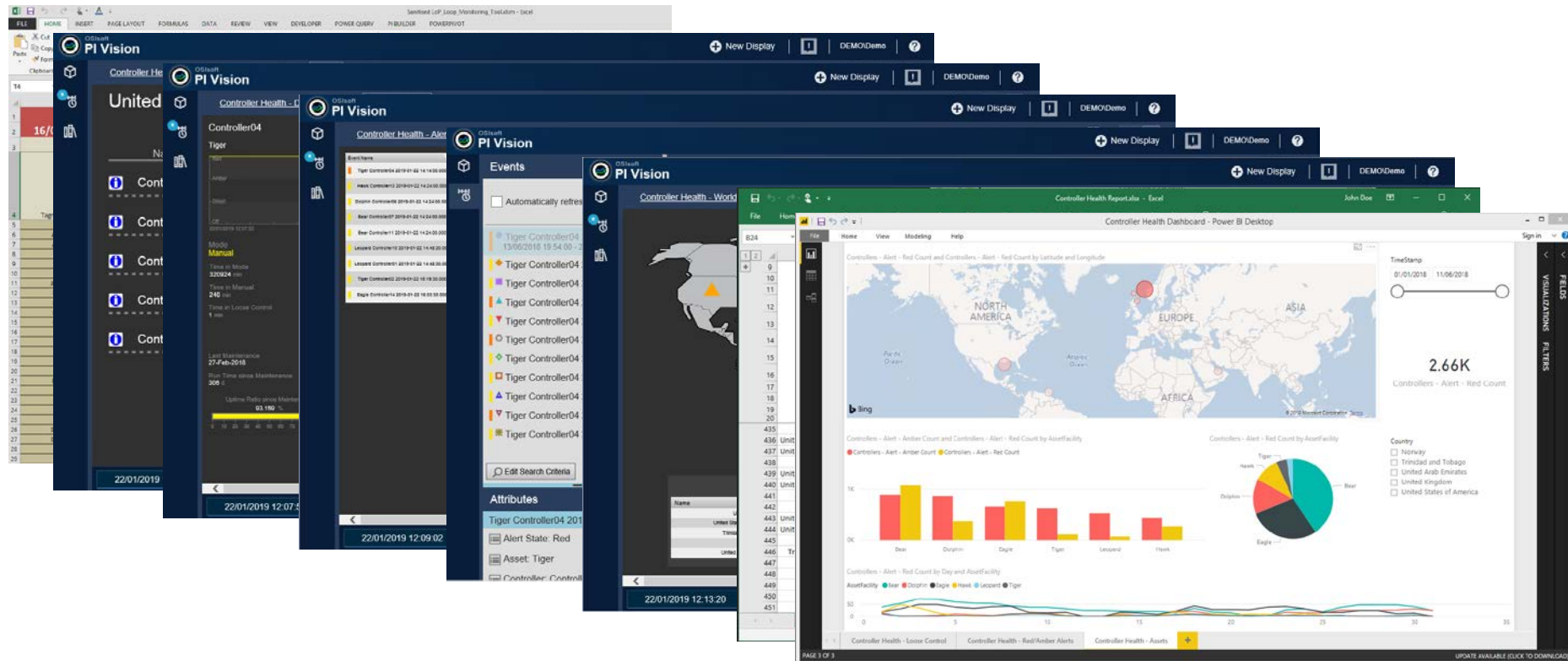




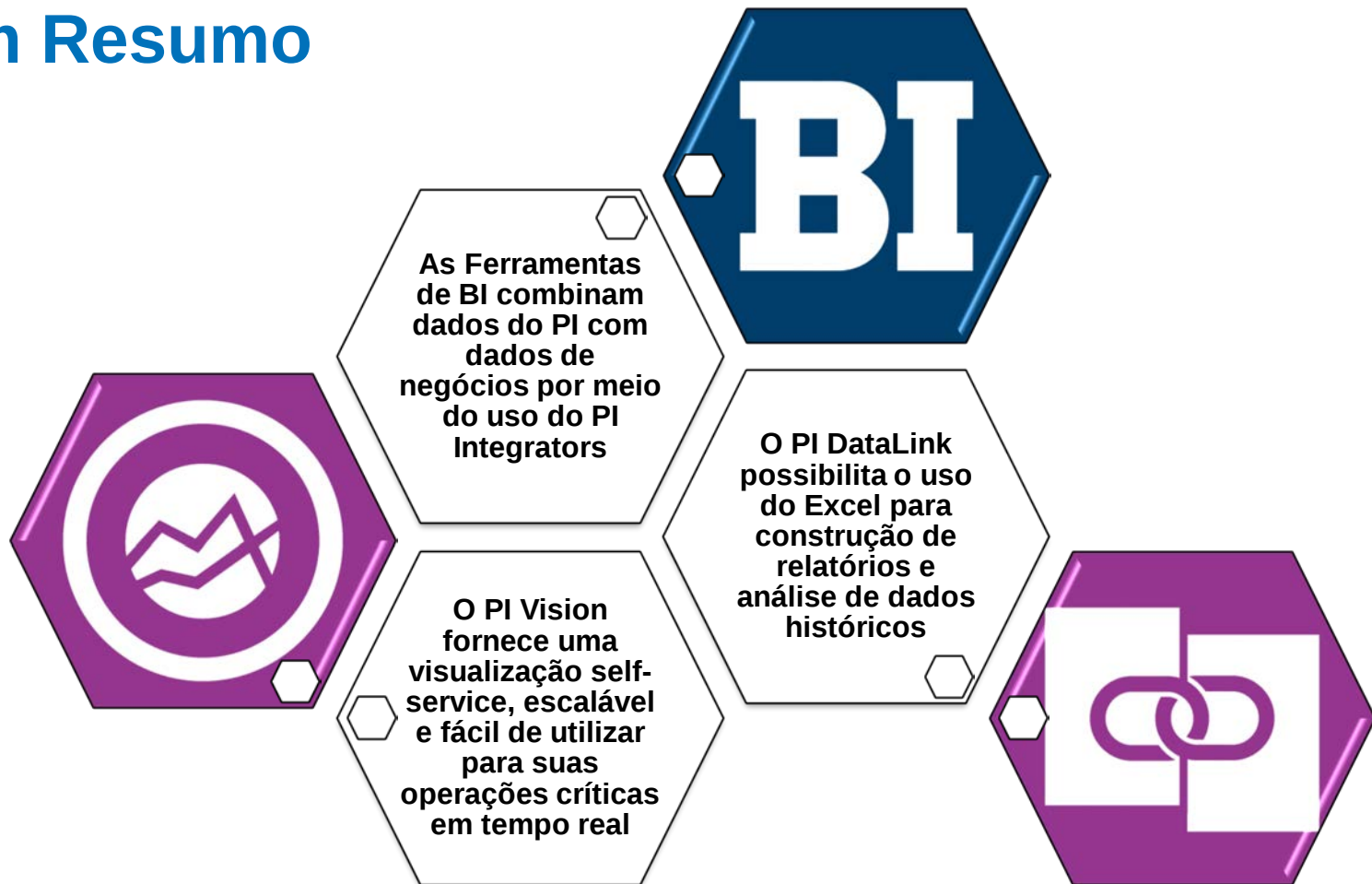
Casos de Uso/ Histórias de Sucesso

Suas Ferramentas de Tempo Real

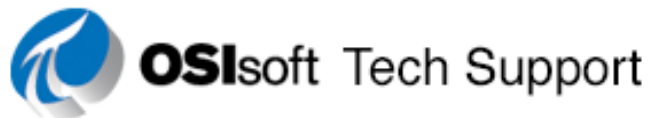
Baseadas em sua estrutura de Ativos



Em Resumo



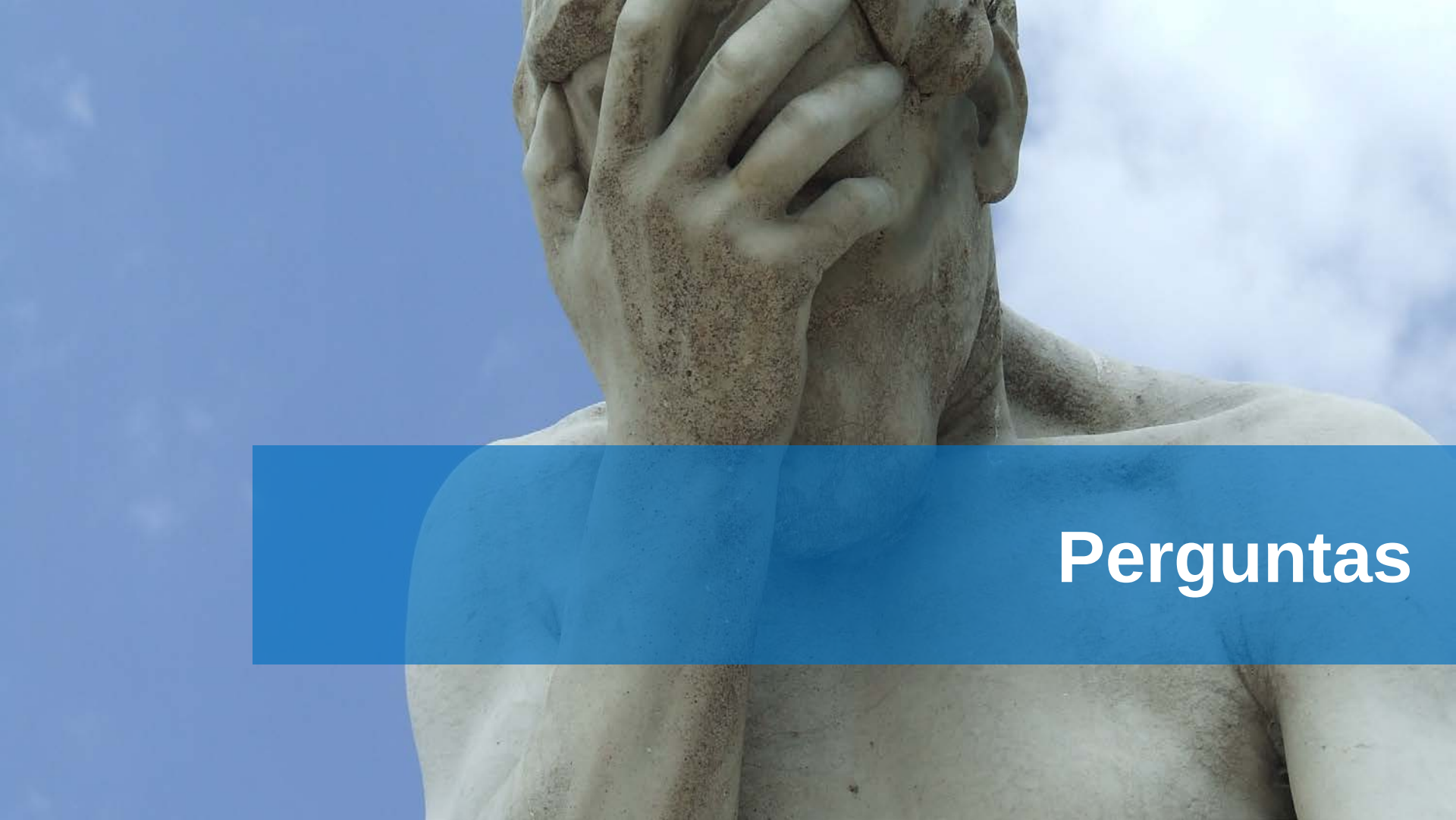
Recursos Online



O AF é a base para a sua solução de
Análise de Ativos

A Ciência de Dados precisa ser Operacionalizada

A oportunidade para Operações Críticas
é combinar Análise de Ativos
com Resultados de Ciência de Dados

A close-up photograph of a marble statue, likely Michelangelo's 'David', showing the figure's hands covering their face in a gesture of distress or contemplation. The statue is set against a clear blue sky with some light clouds. A solid blue horizontal band is superimposed across the middle of the image, containing the word 'Perguntas' in white text.

Perguntas

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