

OSIsoft.

REGIONAL SEMINAR

A P A C

THAILAND

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THE WESTIN
GRANDE SUKHUMVIT HOTEL
BANGKOK



PTT NGV Operational Data Management System

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Agenda

- Company Background
- Previous Solution
- Challenges
- Solutions Employed
- Results and Benefits
- Future Roadmap



About “PTT ICT Solutions” Company

- Specializes in Information Technology, Automation and SCADA systems.
- Serving PTT Group of Companies.
- Operating Country-wide and beyond borders.



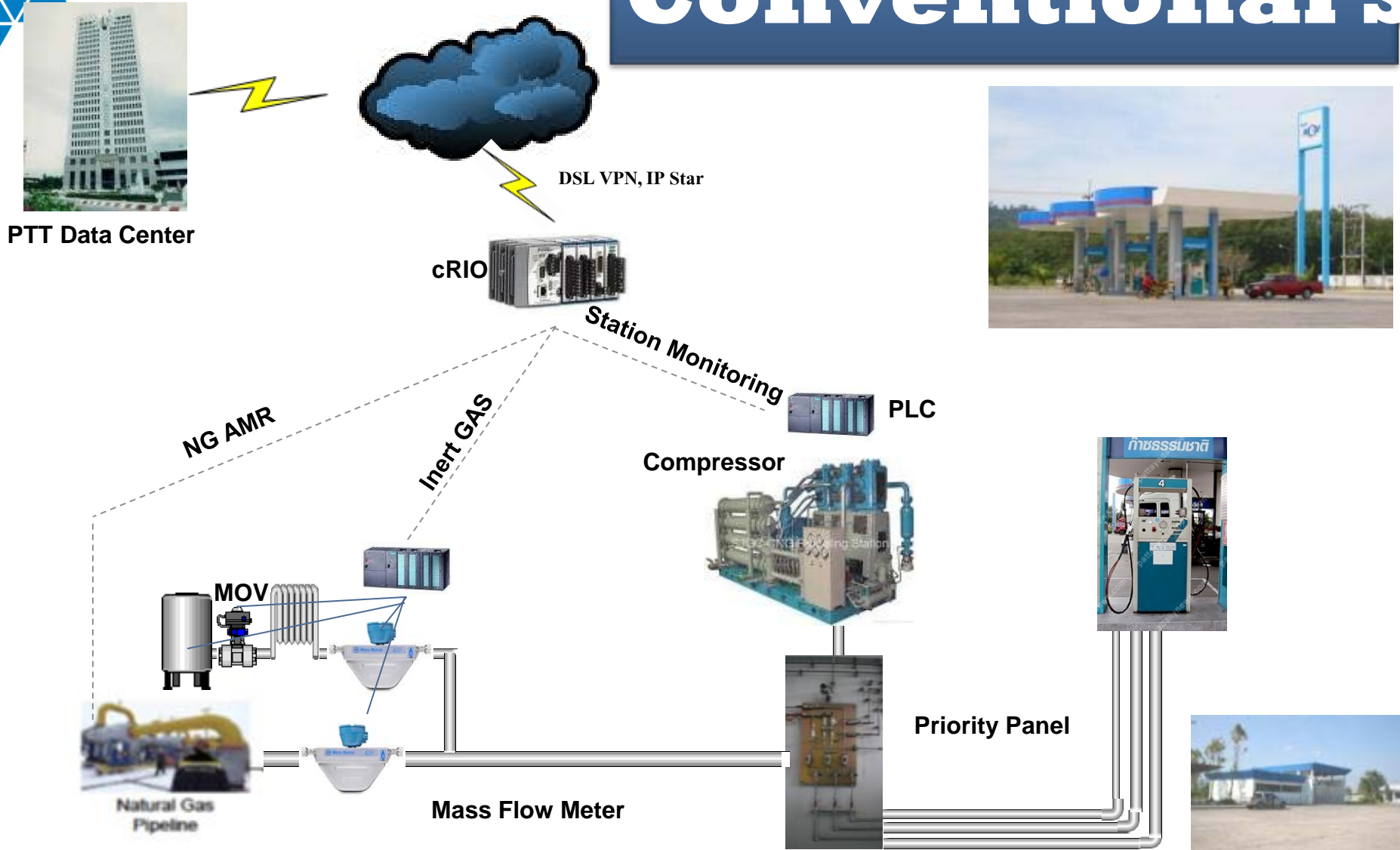
Background

- “NGV” stands for Natural Gas for Vehicle – commercial name
- “CNG” stands for Compressed Natural Gas – generic name
- There are 3 Types of NGV station
 - **Conventional station** – directly connected to the NG pipeline
 - **Mother station** – supplies CNG to daughters by logistic vehicles
 - **Daughter station** – receives CNG from mothers by logistic vehicles



Background

Conventional S

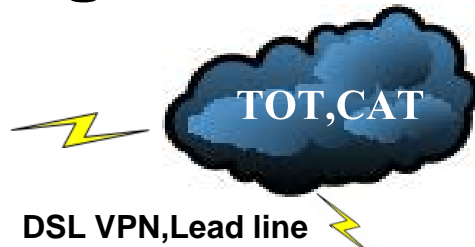


Background

Mother Sta



PTT Data Center



MAS
MAS

MAS

NG AMR

Inert GAS

Compressor

Priority Panel



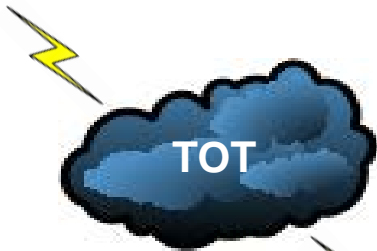
Natural Gas Pipeline

Background

Daughter Station



PTT Data Center



TOT

DSL VPN, IP Star

cRIO



Station Monitoring



PLC

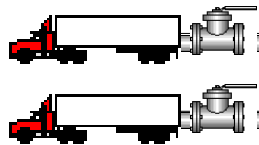
Compressor



Priority Panel



Trailer



LCNG AMR
TPL AMR

PT

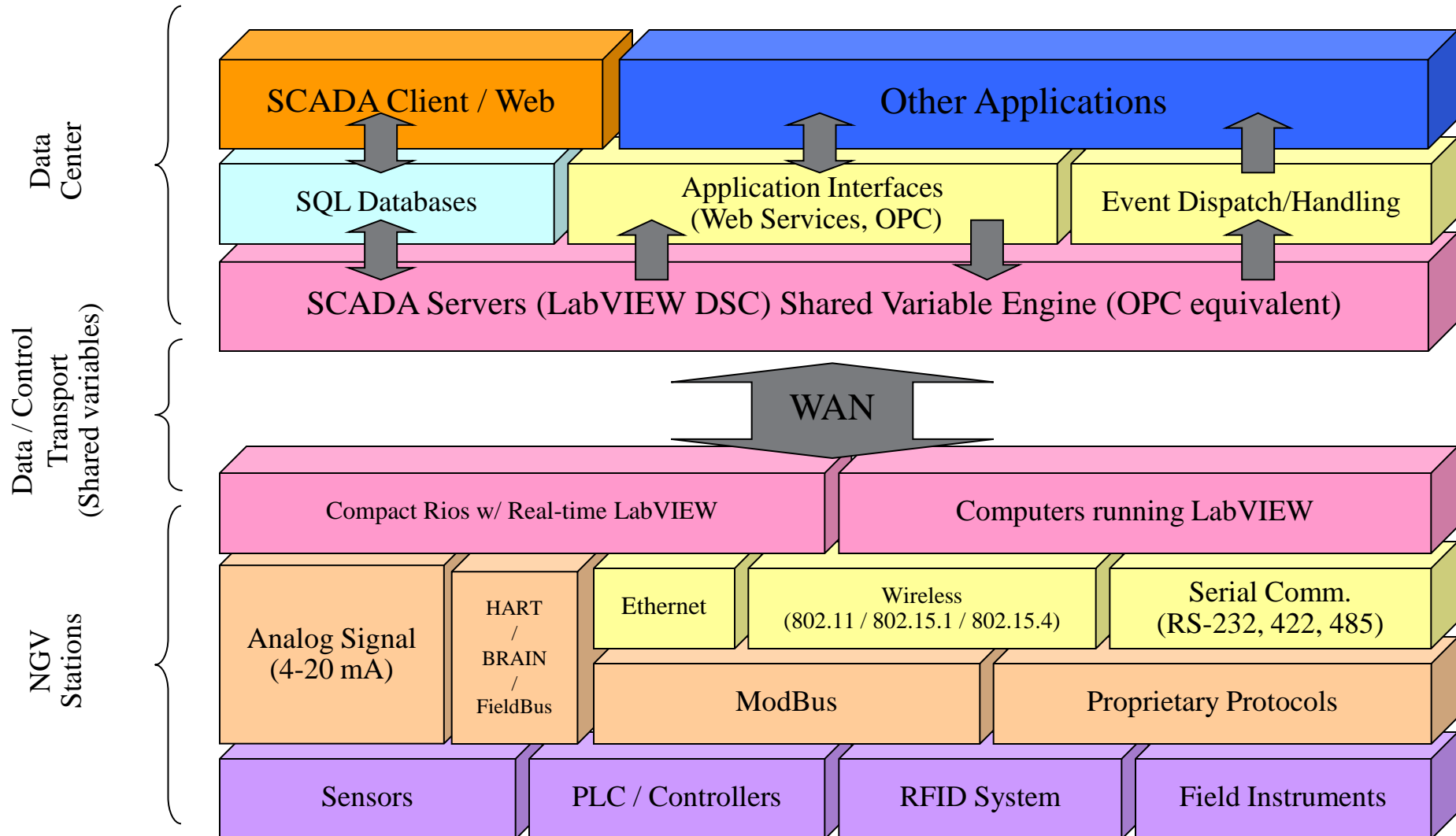


Mass Flow Meter

FCV



Background





Background

Station Process parameters

- Inlet pressure
- Suction pressure
- Stage 1 pressure
- Stage 2 pressure
- Stage 3 pressure
- Stage 4 pressure (Mothers and some daughters)
- Oil pressure
- Stage 1 temperature
- Stage 2 temperature
- Stage 3 temperature
- Stage 4 temperature (Mothers and some daughters)
- Final temperature
- Oil temperature
- Receiver pressure
- High bank pressure (Mothers)
- Medium bank pressure (Mothers)
- Low bank pressure (Mothers)
- Running hour



Background

Additional process parameters at filling bays (mother stations)

- Bay mass flow rates (kg./min.)
- Bay pressures (PSI)
- Bay totalizers (kg.)
- Temperature (Celsius)
- 2D Barcode - Logistic trailer identification

Background

Other AMR (example)

- Pressure Transmitter
- NGV Gas Meter Reading
- FCV %Open
- CO2 Inventory
- N2 Inventory
- LCNG (Liquidified and Compressed Natural Gas) Inventory Monitoring and Meter Reading





Business Challenges/Problems Addressed

- Managing more than 400 NGV Gas Stations.
- Operating more than 25000 Tags.
- Reducing data operation downtime.
- Increasing productivity and efficiency.
- Lack of data storage facilities.
- Low data integrity.



Challenges/problems details

- Huge real-time data load via network to Data Center.
 - More than 30 transaction/second.
- Surging storage demand of Relational Database.
 - Slower access time to Relational Database.
- Unnecessary data stored in previous systems.



Solution

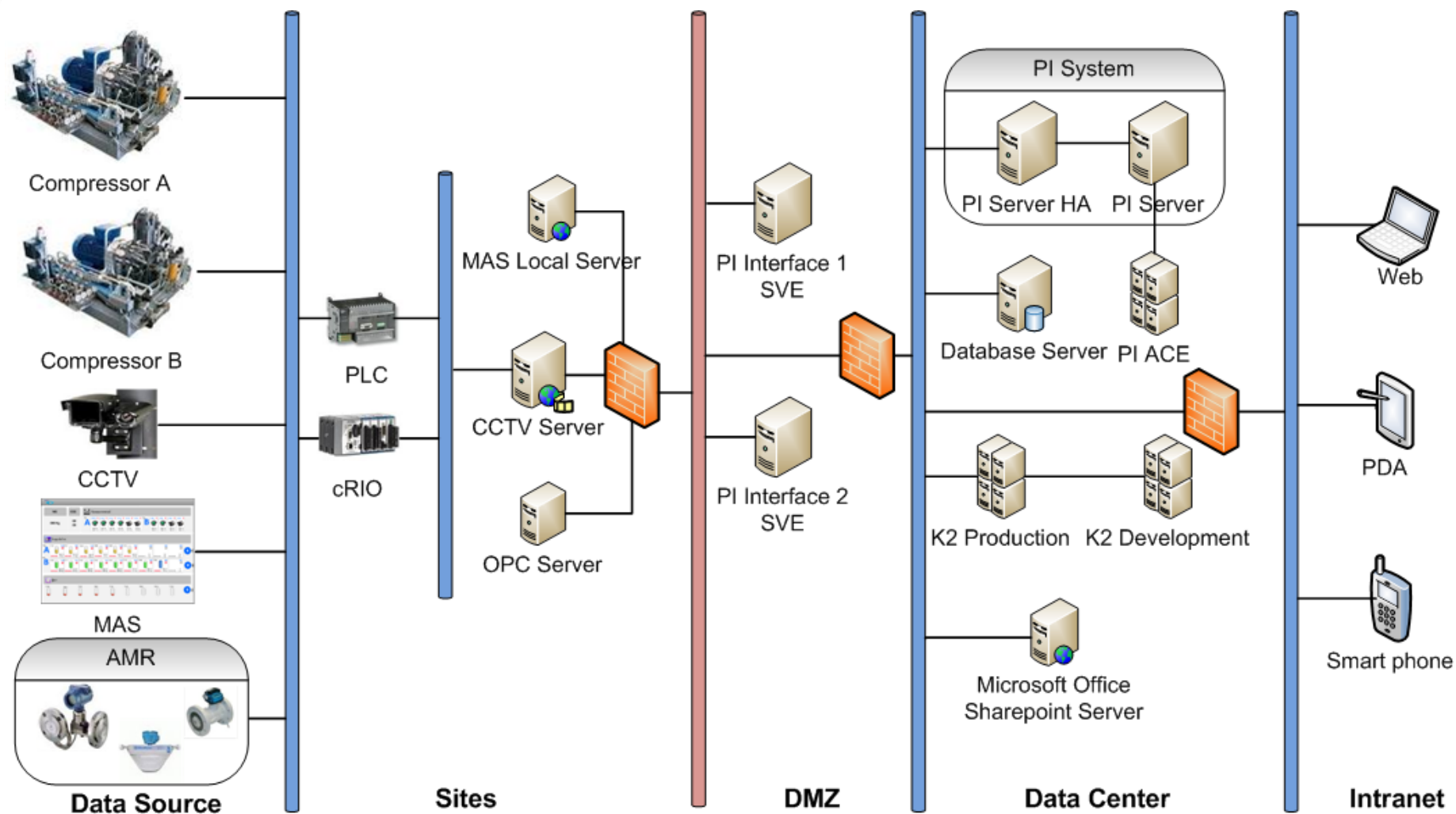
- Replacing Relational Database to PI System.
 - Efficient data logging using the PI compression.
 - Allows data integrity inspection/check
 - User friendly HMI using Process book and Datalink (Excel).
 - Significantly improved data retrieval speeds.
 - Data prediction calculation using PI-ACE.
 - Calculate regression to predict time of empty trailer for NGV Logistic Monitoring.



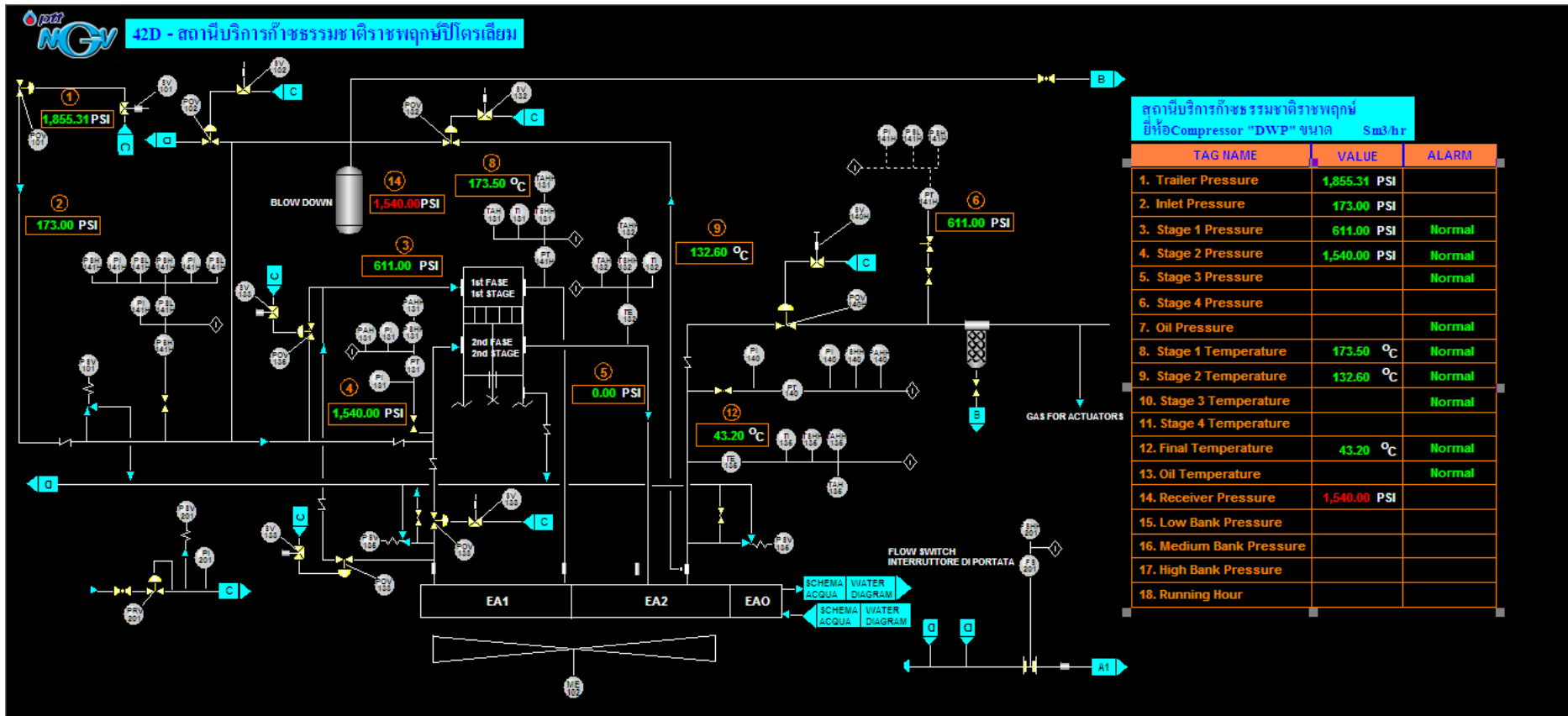
OSIsoft products and services employed

- PI System with HA for 30,000 points
- PI OPC Client
- PI Configuration for 23500 points
- PI ACE
- PI rtWebpart
- PI Datalink
- PI Processbook
- PI OleDB
- PI API
- PI AF

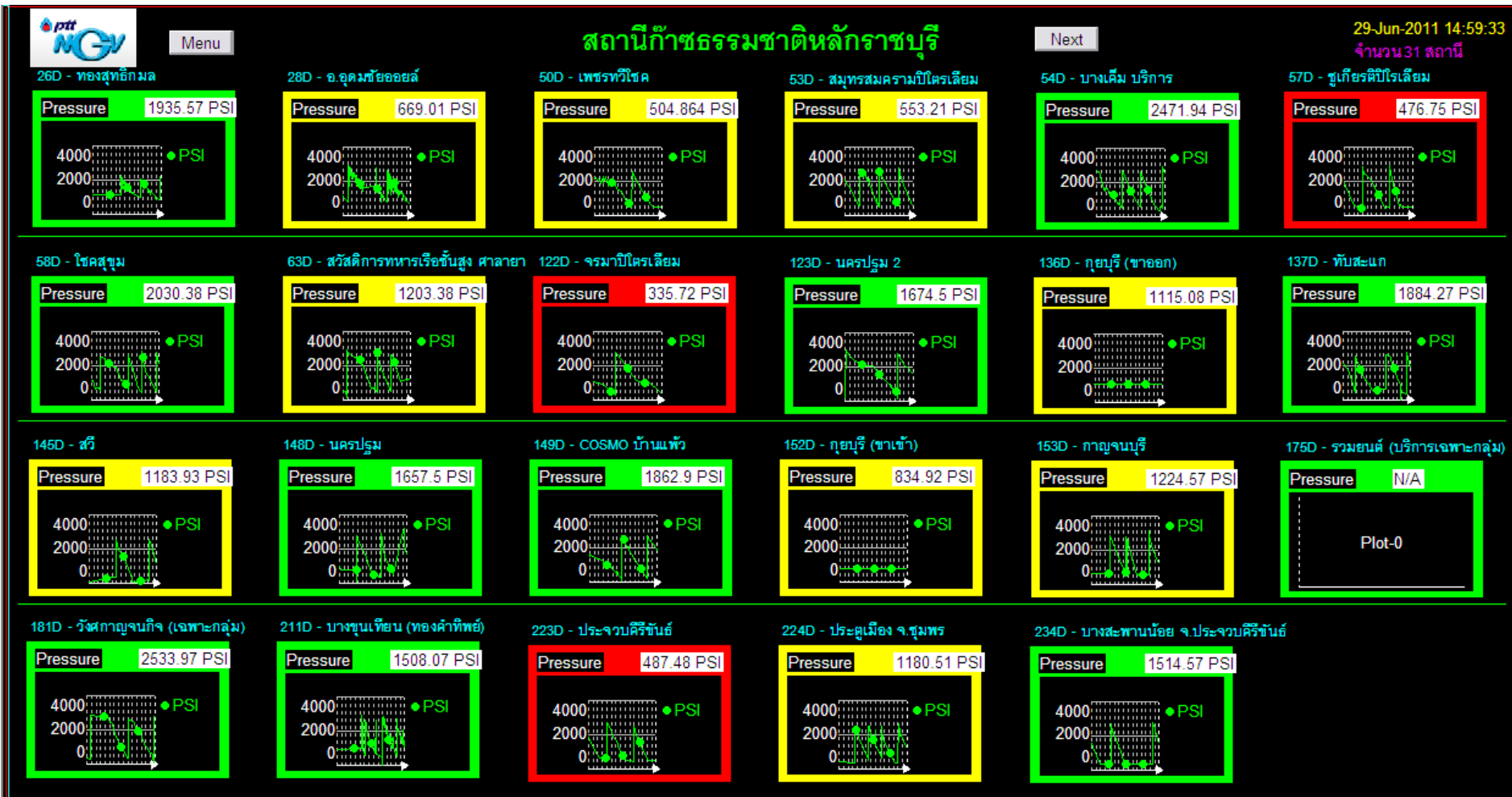
ODMS System Architecture



ODMS Station Monitoring HMI (Example)



ODMS Pressure Monitoring HMI (Example)



ODMS Monitoring Report (Example)

AMR TPL real-time Data.xlsx [Read-Only] - Microsoft Excel													
<div> <div>Home Insert Page Layout Formulas Data Review View Developer Add-Ins PI</div> <div> <div>Clipboard</div> <div>Font</div> <div>Alignment</div> <div>Number</div> <div>Styles</div> <div>Cells</div> <div>Editing</div> </div> </div>													
E1													
A	C	F	H	I	J	K	L	M	N	P	Q	R	S
1	Station	Name	Last Valid Data	Totalizer (Kg)	Meter-From	Meter-To	Midnight Before Last	Last Midnight Meter Read	Yesterday NGV Usage	เวลานี้ขาย NGVได้/Kg	T&F		
2	3	ถนนวิภาวดีรังสิต (หจก.ศรีเจริญภัณฑ์)	25-Jul-11 08:55:55	1236869.25	24 ก.ค. 54	25 ก.ค. 54	1236869.25	1236869.25	0	0			
3	4	กำแพงเพชร 2	25-Jul-11 08:55:35	1636107.63	24 ก.ค. 54	25 ก.ค. 54	1636107.625	1636107.63	0	0			
4	5	พหลโยธิน กม.27	25-Jul-11 08:55:50	655568.875	24 ก.ค. 54	25 ก.ค. 54	655568.875	655568.875	0	0			
5	8	ประชาราชบุรี	25-Jul-11 08:55:39	623426.438	24 ก.ค. 54	25 ก.ค. 54	616932.2714	622016.719	5084.447198	1409.71892			
6	9	พัฒนาการ	25-Jul-11 08:54:57	0	24 ก.ค. 54	25 ก.ค. 54	0	0	0	0			
7	12	ถนนเจริญสุขนิทวงศ์ (บริษัท เพชรดีออยล์)	25-Jul-11 08:55:40	1658116.75	24 ก.ค. 54	25 ก.ค. 54	1636579.26	1653278.82	16699.56451	4837.92508			
8	16	ถนนบางบัวทอง (หจก.แสงเจริญปิโตร	25-Jul-11 08:55:54	2093556	24 ก.ค. 54	25 ก.ค. 54	2073640.023	2089097.49	15457.46598	4458.5111			
9	17	ถนนนาคราย-ไทรน้อย (บริษัท บางไ	25-Jul-11 08:55:40	722458.313	24 ก.ค. 54	25 ก.ค. 54	722458.3125	722458.313	0	0			
10	18	ถนนศรีนครินทร์ (หจก.ไฟบูลย์ปิโตรเลียม	25-Jul-11 08:55:49	1438466	24 ก.ค. 54	25 ก.ค. 54	1438465.872	1438466	0.128481894	0			
11	19	ถนนรามอินทรา (บริษัท โปร 73 จำกัด)	25-Jul-11 08:55:40	766571.563	24 ก.ค. 54	25 ก.ค. 54	766571.5625	766571.563	0	0			
12	20	ถนนจรัลนครนาทบุรี-ปทุมธานี (หจก.เอ	25-Jul-11 08:55:55	1286186	24 ก.ค. 54	25 ก.ค. 54	1263093.125	1263093.13	0	23092.875			
13	23	สุขาภิบาล 2	25-Jul-11 08:55:44	3034318.5	24 ก.ค. 54	25 ก.ค. 54	3034318.5	3034318.5	0	0			
14	24	คลองพระโขนง	25-Jul-11 08:55:45	686507.75	24 ก.ค. 54	25 ก.ค. 54	678587	685568.47	6981.469615	939.280385			
15	27	เดชธาร	25-Jul-11 08:55:50	1371152.38	24 ก.ค. 54	25 ก.ค. 54	1371152.375	1371152.38	0	0			
16	31	ปทุมธานีปิโตรเลียม	25-Jul-11 08:55:50	743600.813	24 ก.ค. 54	25 ก.ค. 54	743600.8125	743600.813	0	0			
17	34	ปทุมธานี 1	25-Jul-11 08:55:55	1687973.13	24 ก.ค. 54	25 ก.ค. 54	1687973.125	1687973.13	0	0			
18	35	ส.เจริญสุขปิโตรเลียม	25-Jul-11 08:55:55	1141278.63	24 ก.ค. 54	25 ก.ค. 54	1141278.625	1141278.63	0	0			
19	41	นาหวงประชาพัฒนา	25-Jul-11 08:55:40	680577.688	24 ก.ค. 54	25 ก.ค. 54	680577.6875	680577.688	0	0			
20	50	เพชรบุรีโชค	25-Jul-11 08:55:49	506010.156	24 ก.ค. 54	25 ก.ค. 54	497862.4792	503900.241	6037.761731	2109.91533			
21	66	สวัสดิ์ศิริ	25-Jul-11 08:55:40	1979312.25	24 ก.ค. 54	25 ก.ค. 54	1958015.154	1974869.37	16854.21273	4442.88342			
22	67	กรมยุทธบริการทหาร	25-Jul-11 08:55:05	1167113.5	24 ก.ค. 54	25 ก.ค. 54	1167113.5	1167113.5	0	0			
23	70	สำนักงานปลัดกระทรวงกลาโหม (ทาง	25-Jul-11 08:55:45	1398426.63	24 ก.ค. 54	25 ก.ค. 54	1398426.625	1398426.63	0	0			
24	79	ถนนพระราม5	25-Jul-11 08:55:45	1100380.5	24 ก.ค. 54	25 ก.ค. 54	1100380.5	1100380.5	0	0			
25	81	ดิวานนท์	25-Jul-11 08:55:40	1153736.5	24 ก.ค. 54	25 ก.ค. 54	1153736.5	1153736.5	0	0			
26	88	สุขุมวิท 55	25-Jul-11 08:52:07	1334815.13	24 ก.ค. 54	25 ก.ค. 54	1334815.125	1334815.13	0	0			
27	92	ลาดพร้าว 4	25-Jul-11 08:55:55	1467285.88	24 ก.ค. 54	25 ก.ค. 54	1467285.875	1467285.88	0	0			
28	100	ที่ฟิโ ถนนพหลโยธิน กม.27	25-Jul-11 08:55:40	1812269.25	24 ก.ค. 54	25 ก.ค. 54	1791584.375	1807322.96	15738.58503	4946.28997			
29	117	สาละกา คลอง3	25-Jul-11 08:55:55	1633640.13	24 ก.ค. 54	25 ก.ค. 54	1633640.125	1633640.13	0	0			



Results

- Reliable data from plants.
- Reduced time to access data.
- Increased data storage using sophisticated compression.
- HMI and report are user friendly.



Tangible benefits

- Improved data management and logging.
- Standard and best practice for data presentation.
- Reduced calculation time for accessing large data, equals more data accuracy.



Intangible benefits

- User friendly interface requires less HMI and report generating time.
- Increased customer confidence in data reliability.
- Increased customer overall satisfaction.



Future Roadmap

- Use PI System for NGV(CNG) Gas Discrepancy Reconciliation.
- Use PI AF for inventory Management.
- Use PI System for CBM (Condition-Based Maintenance).
- Use PI System for Energy Saving from Machine.
- PI System for Green.



Questions

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Thank you