Building a Robust Data Acquisition System

Ulises Vich

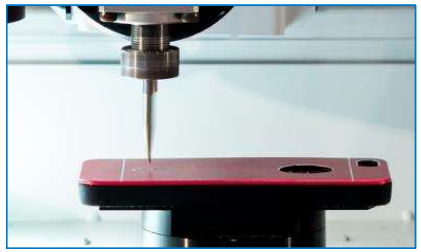
System Architecture Manager

Industry trends and drivers affecting manufacturing and automation

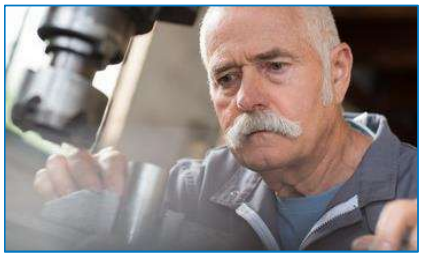
Local production for local consumption

Consistent worldwide quality assurance

"Ultra" high precision assembly



Growing shortage of skilled workers



Rapid launching of equipment startup

Consumer demands driving need for flexible manufacturing

Surging labor costs in emerging countries

Does anyone have one of these devices?

1990’s

2000’s

2010’s

Future?

What is the Difference Now ???

IIOT Terminology

Industry 4.0 (I4.0)

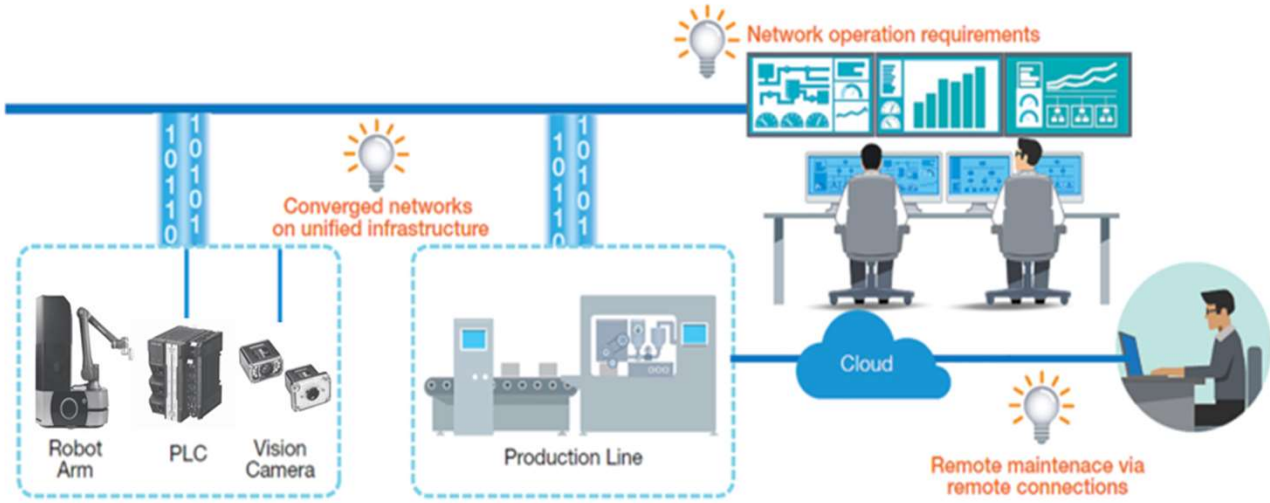
The movement of businesses into data driven decisions.

Digital Transformation

The digitization of the business. Unified and Real-time.

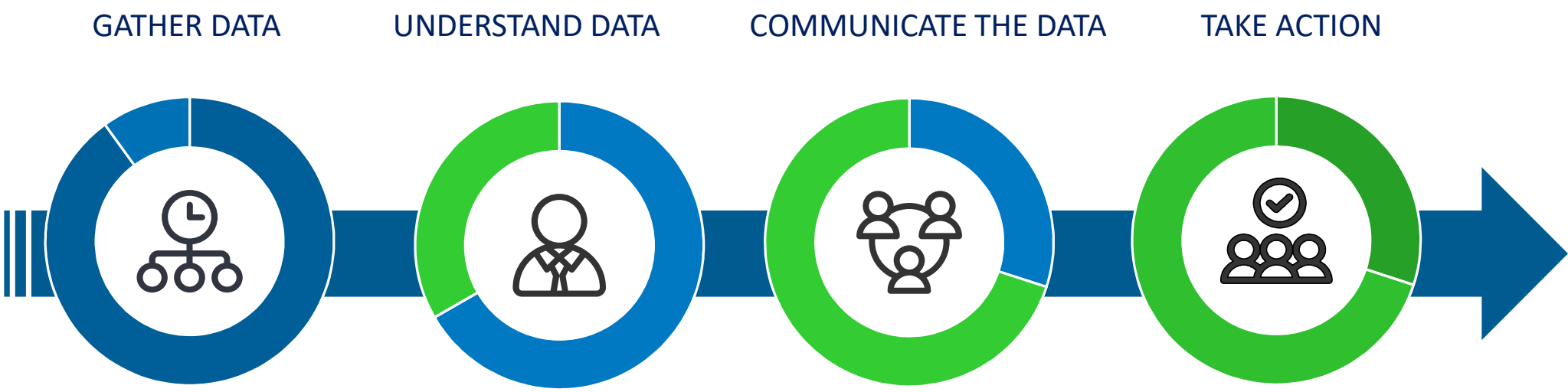
Industrial Internet Of Things (IIOT)

The result, the information people need, where when and how they need it. Perfect analogy is the iPhone for industry.



Three tips on getting industrial IoT networks ready for the future (designworldonline.com)

The value chain of information



Smart Manufacturing and Information

International Society of Automation **ISA 95** Smart Factory

- Report
- Find Patterns
- Predict Outcomes
- Solve Problems

Reporting and Response

Data is Transformed into valuable business information.

- Analyze
- Visualize

Delivery and Presentation

Data needs to go to the right people, at the right time, in the right format.

- Connect
- Collect
- Store

Source

Intelligent assets in operations hold hidden data needed to make critical business decisions…

Smart Manufacturing and Information

Real-time Data

Voltage, Kwh, Running Time, Temperature

CONTEXTUALIZATION
Energy/Product, OEE

ANALYTICS
Predict bearing will fail in 10 hours

OPTIMIZE
More efficient process workflows

Analysis Evolution

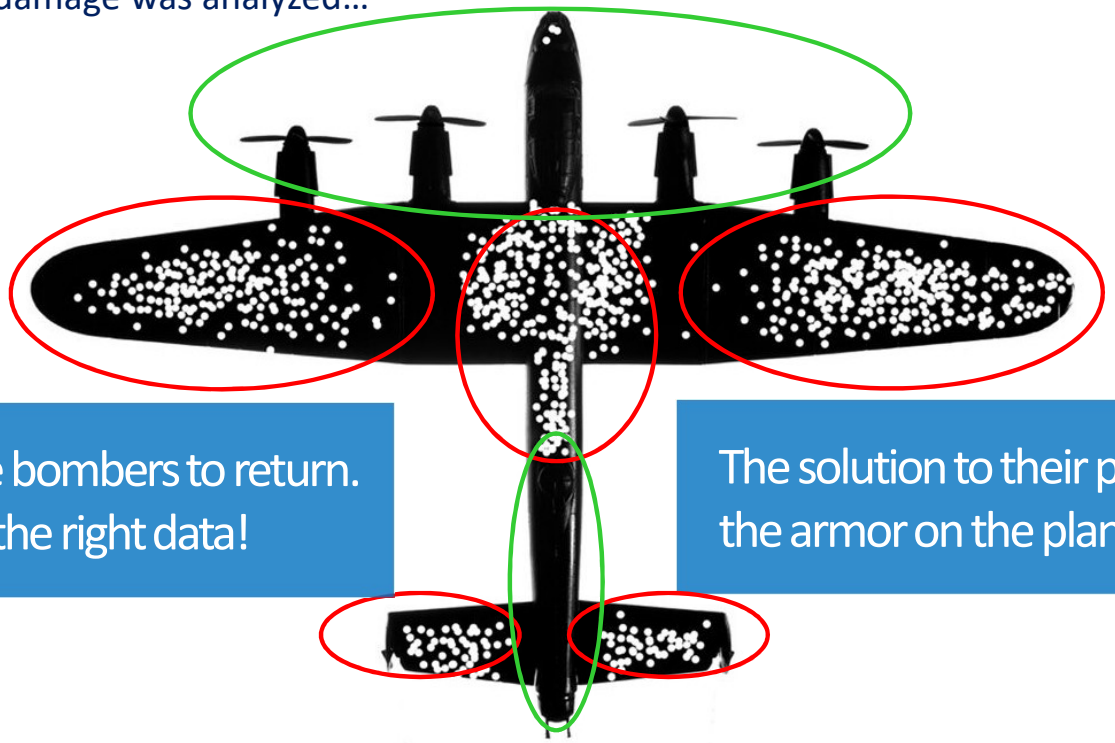
DESCRIPTIVE	DIAGNOSTIC	PREDICTIVE	PRESCRIPTIVE
What Happened?	Why Did it Happen?	What Will Happen?	What Should I Do?

Contextualization

Pay attention to the right information

Analytics

- Researchers at the Center for Naval Analysis faced a critical problem.
- Many bombers were getting shot down on runs over Germany.
- The **returning** bombers damage was analyzed…



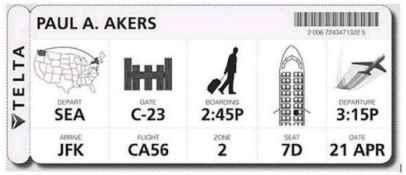
These areas allowed the bombers to return. Focus your analytics on the right data!

The solution to their problem was clear. Increase the armor on the plane's wings and body.

Optimize

THIS IS A BOARDING PASS:

THIS IS A LEAN BOARDING PASS:



WHICH OF THE TWO MAKES MORE SENSE TO YOU?

Utilize statistical information to improve processes and production.

Two key pillars of digital transformation

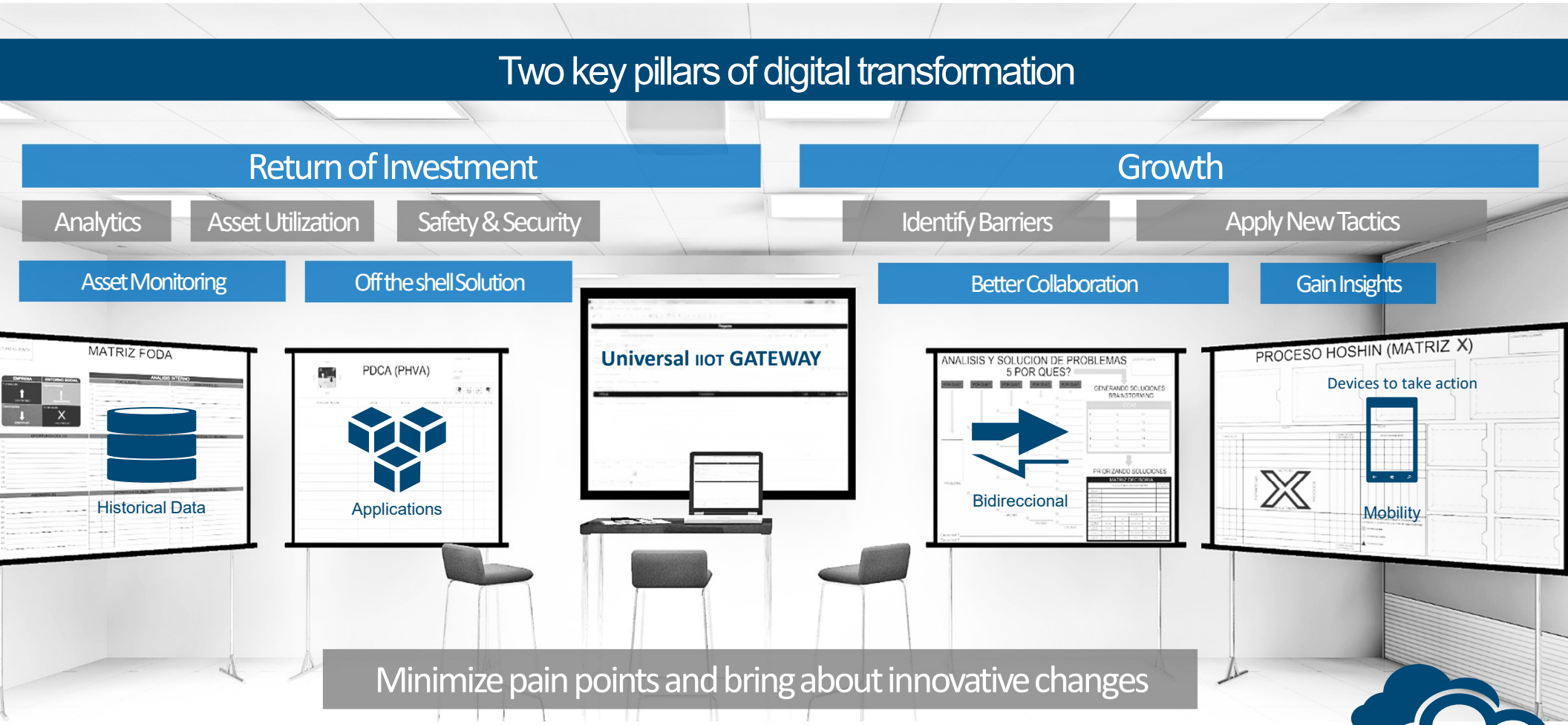
Return of Investment

- Analytics
- Asset Utilization
- Safety & Security

Growth

- Identify Barriers
- Apply New Tactics

- Asset Monitoring
- Off the shell Solution
- Better Collaboration
- Gain Insights

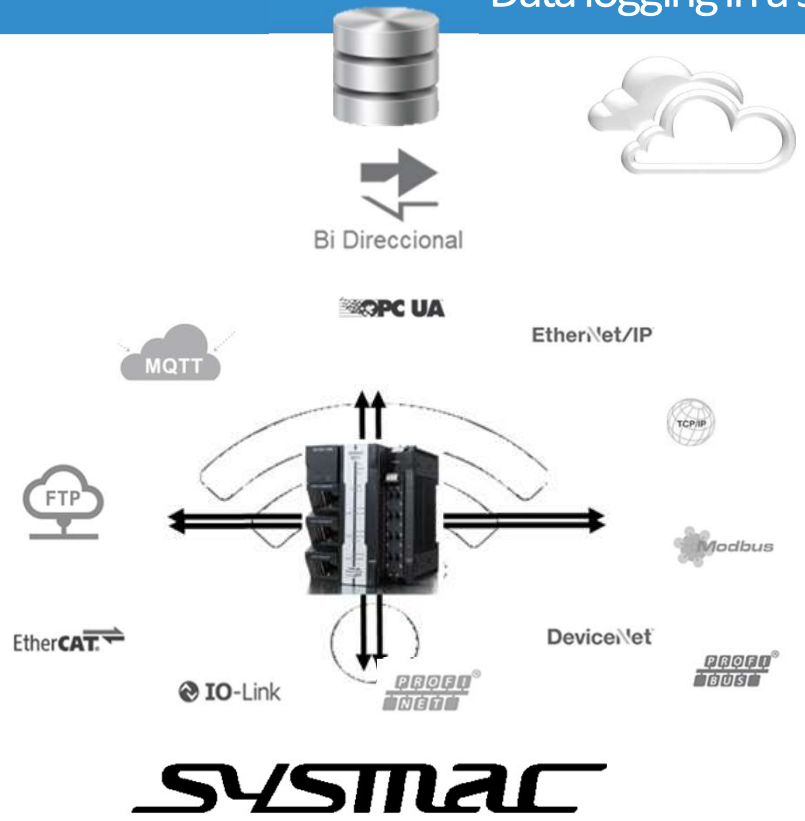


Minimize pain points and bring about innovative changes

- Understanding of real time data
- Utilize Relational Data

Universal IIOT GATEWAY

Data logging in a secure industrial-grade solution

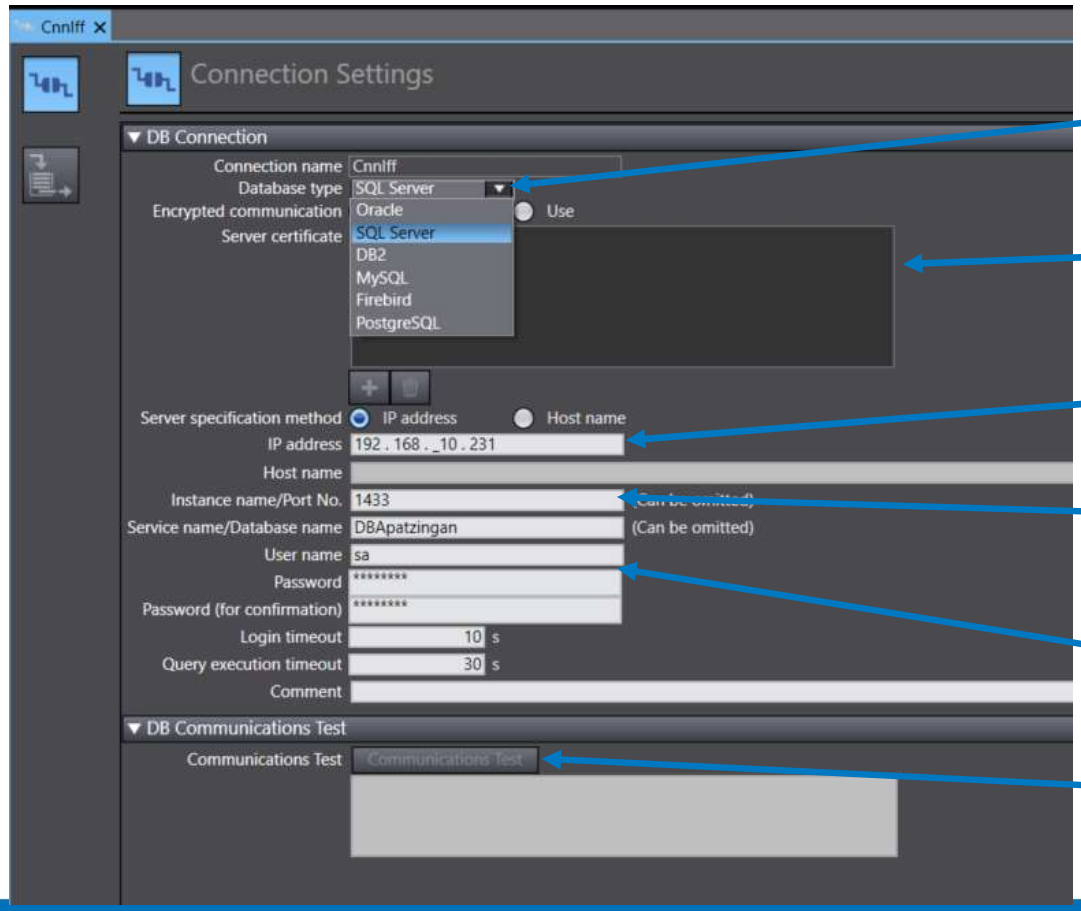


Total Connectivity

Easy Integration

Cost Effective

Simple and secure connection



DB Selection

Encryption /
Server Certificate

IP Address SQL

Communication Port

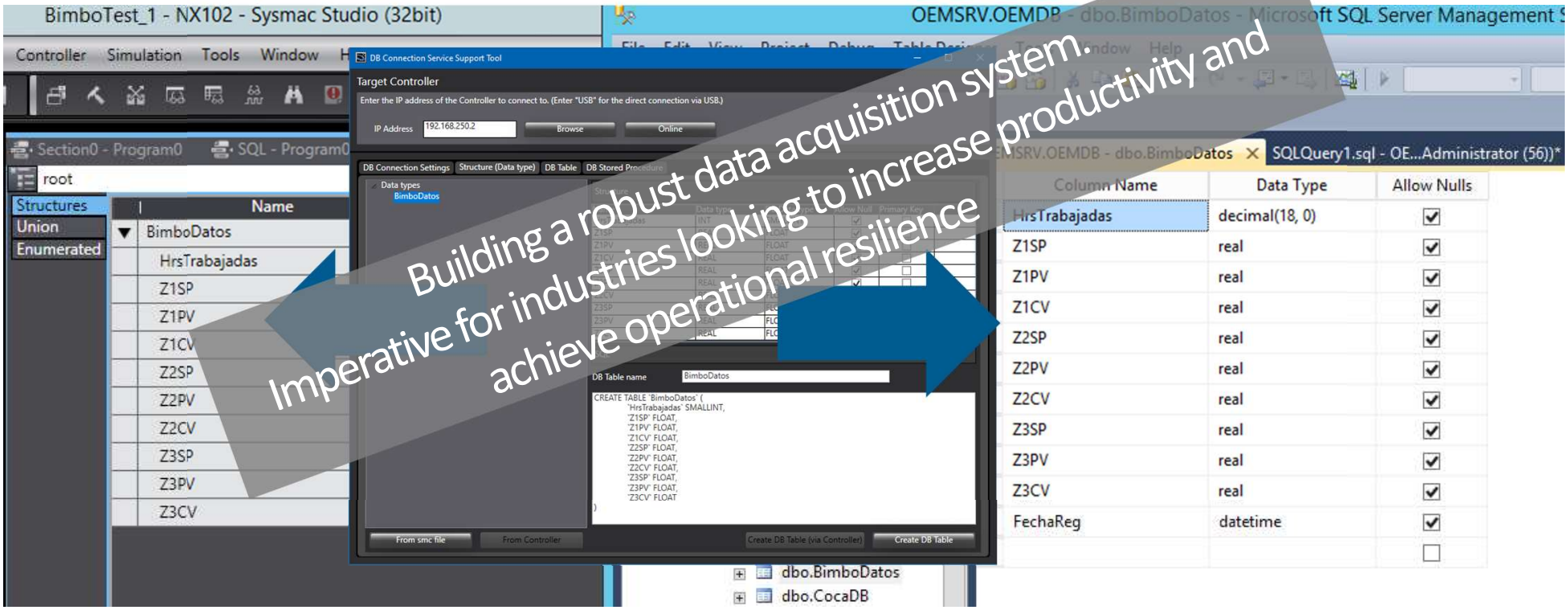
User & Password

Communication DB Test

Building your own report structure

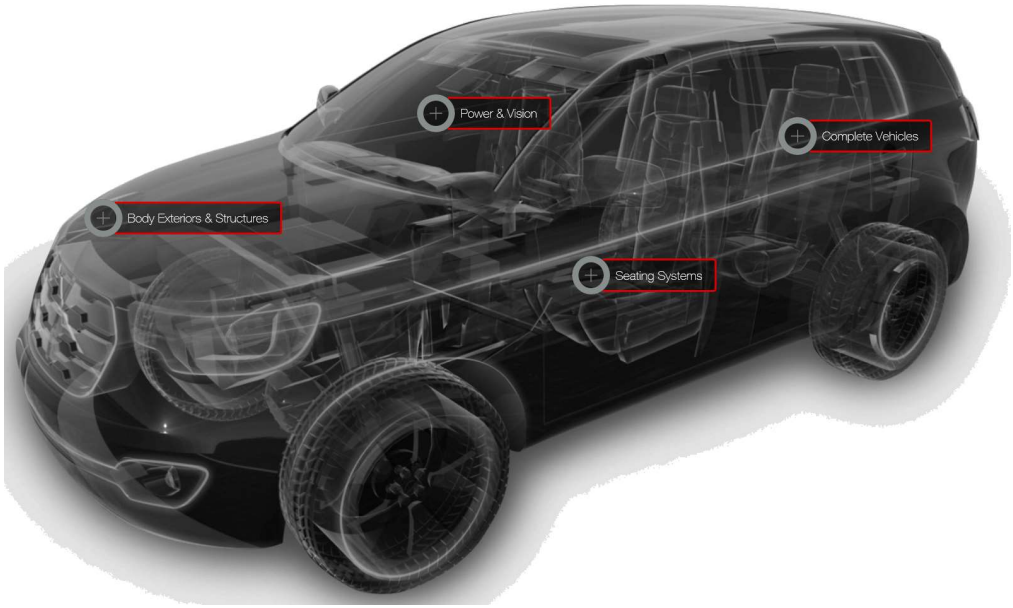
Sysmac OMRON

DB SQL



Building a robust data acquisition system.
Imperative for industries looking to increase productivity and achieve operational resilience

Success Story 1 - Tier 1 Global Supplier



Pain Points

Corporate

- Organizational alignments.
- Technology Adoption.
- Locked into one vendor.

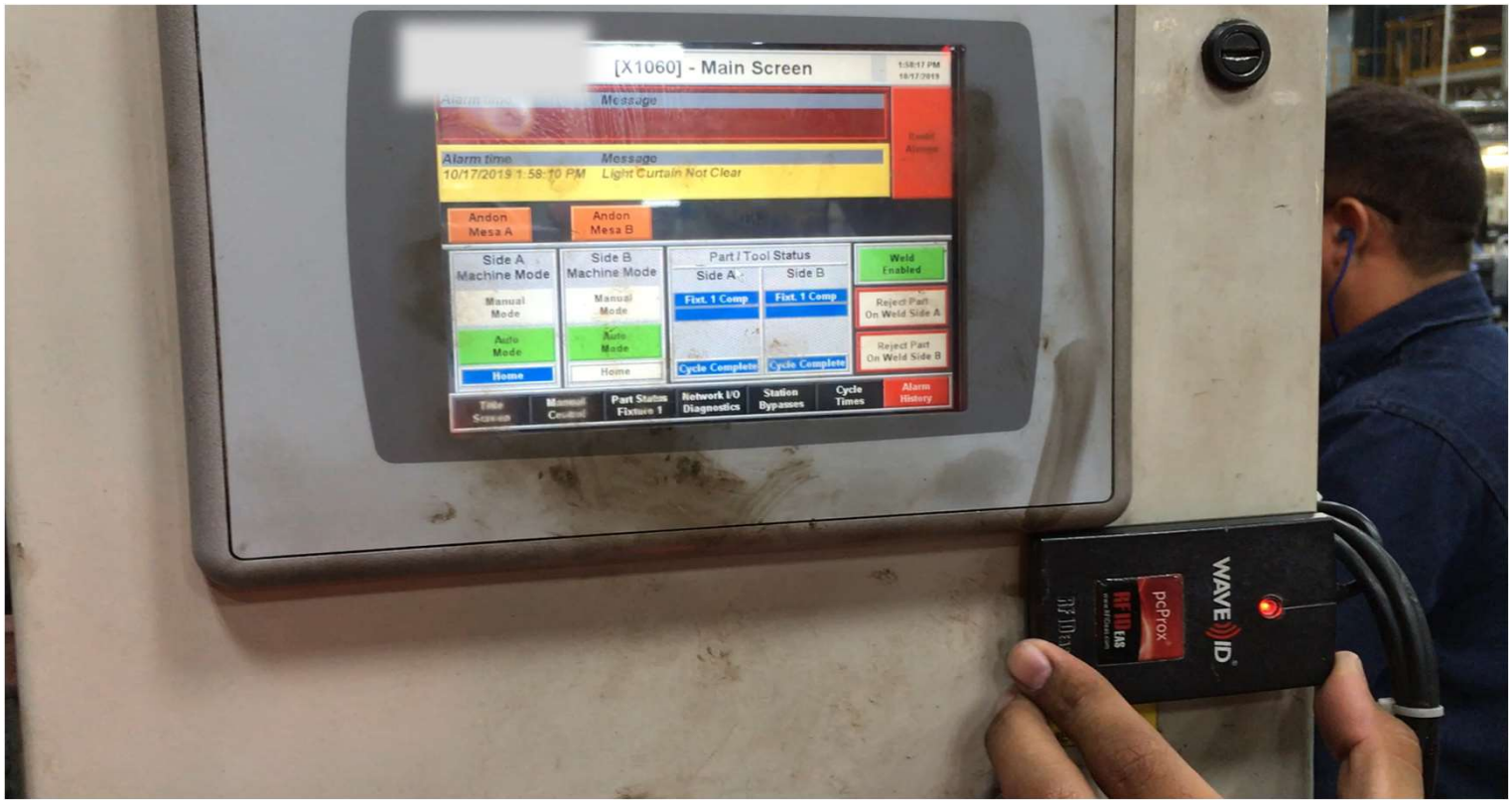
IT

- No communication with OT or Manufacturing.
- Communication Restrictions.

Production

- Low adoption of information technology from the floor shop to the control center.
- Poor communication between areas.

Shop Floor Process



Maintenance Dashboard

Tier 1 Automotive Supplier

Key Performance

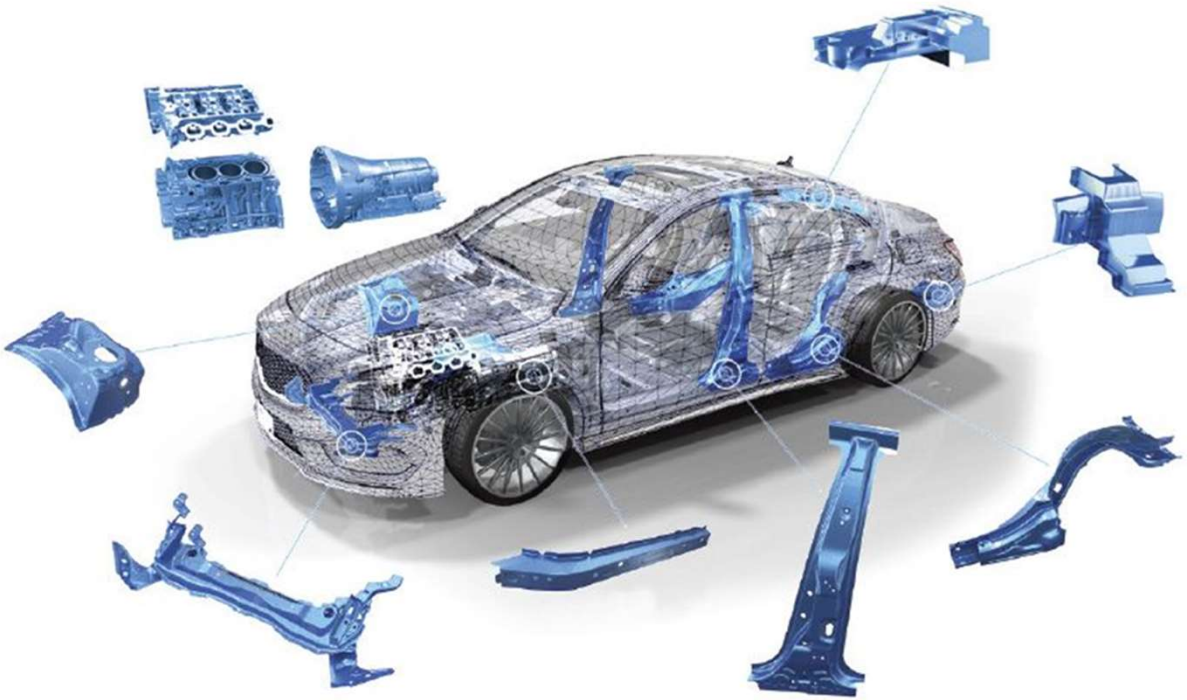
OMRON

Maintenance	Supply chain	Quality	Production	IT	Total	SAM UVL
38	51	106		16	211	

Fecha	Depa	Causa	Tiempo Paro	Hora Fina	Hora Inicio	Usuario
10/17/19	Mantenimiento	Robot Pegado			13:38:48	Juan Guerrero
10/17/19	Mantenimiento	Robot Pegado			13:38:18	Juan Guerrero
10/17/19	Mantenimiento	Robot Pegado			13:02:36	Juan Guerrero
10/17/19	Materiales	Robot Pegado		13:02:35	13:02:13	Juan Guerrero
10/17/19	IT	Robot Pegado		13:02:11	13:01:55	Juan Guerrero
10/17/19	Calidad	Robot Pegado		13:01:31	13:01:09	Juan Guerrero
10/17/19	Calidad	Funcionabilidad	-01:02:29.4000000	12:36:18	12:35:44	Juan Guerrero
10/17/19	Materiales	Falta de Material	-01:03:16.9000000	12:35:31	12:35:02	Juan Guerrero
10/17/19	Calidad	Robot Pegado	-01:05:24.7000000	12:33:23	12:32:33	Juan Guerrero

Reduce 4% of the Down Time per Day.
Increase the production parts by 2 per hour.
From 38 to 40

Success Story 2 - Tier 1 Global Supplier



Pain Points

Corporate

- Locked into one vendor.

IT

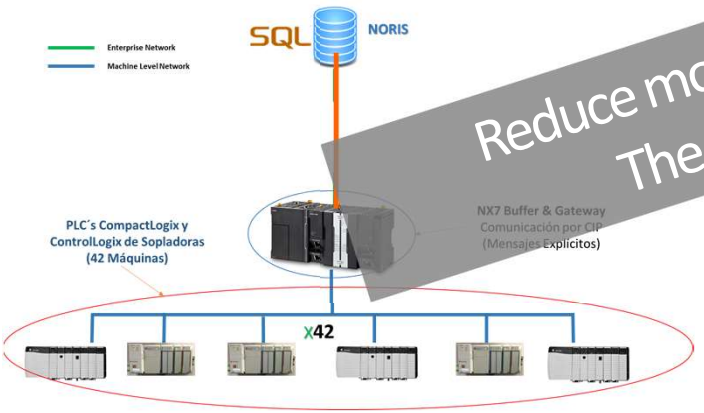
- Customer Developed their own Real-time Information System
- Poor communication with Manufacturing.
- Communication Restrictions and not flexible in the network infrastructure.

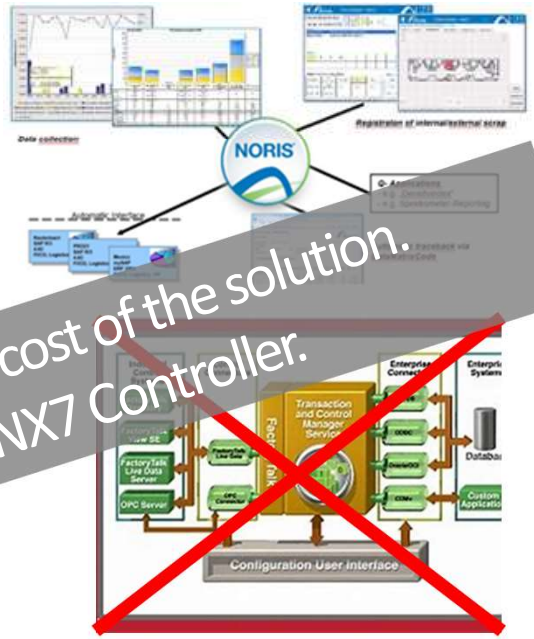
Production

- The system was already running a Solution (2 years already).
- Poor communication between areas.
- no controls programing standards

Tier 1 Global Supplier

Noris: N. Operation Real-time Information System





Reduce more than 60% the cost of the solution.
The main interface is NX7 Controller.

Software Database Connectivity

Plants Amplification: Plant 3&4, CDT, 5&6, 12
Phase 2: Plant 1&2 and Machined

Visualization is the KEY!!!

7	4	7	7	5	5	2	7	4	7	1	7
2	4	9	2	5	7	7	2	6	1	7	2
7	1	7	6	9	3	4	7	5	1	2	7
4	5	1	6	3	3	8	4	8	6	6	4
8	6	5	6	4	9	3	8	9	1	9	8
3	3	8	1	5	2	2	3	6	3	9	3
7	4	6	4	5	6	3	7	7	9	1	7
3	9	1	3	3	6	1	3	3	1	8	3
8	8	1	1	8	7	5	8	1	7	4	8
3	3	6	9	2	8	9	3	7	5	7	3
2	4	4	4	2	8	2	2	9	2	8	2

Visualization is the KEY!!!

7	4	7	7	5	5	2	7	4	7	1	7
2	4	**9**	2	5	7	7	2	6	1	7	2
7	1	7	6	**9**	3	4	7	5	1	2	7
4	5	1	6	3	3	8	4	8	6	6	4
8	6	5	6	4	**9**	3	8	**9**	1	**9**	8
3	3	8	1	5	2	2	3	6	3	**9**	3
7	4	6	4	5	6	3	7	7	**9**	1	7
3	**9**	1	3	3	6	1	3	3	1	8	3
8	8	1	1	8	7	5	8	1	7	4	8
3	3	6	**9**	2	8	**9**	3	7	5	7	3
2	4	4	4	2	8	2	2	**9**	2	8	2

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Hands-on Skill Builder

SYSMAC
INTRODUCTION
IIOT CAPABILITIES

In this 3-day training we will focus on the configuration and controller programming using Sysmac Studio software. Overview Sysmac Introduction IIOT Capabilities, Ethernet I/P Connectivity, Data base and a lot more.

23 - 25
August 2022

9:00 - 17:00
CST

2801 Rochelle Road,
Suite 100, Dallas.

HANDS ON SKILL BUILDER

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JSON

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Safety over EtherCAT

{ REST:API }

XML

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CIP Safety

We deliver impactful results

BEGIN WITH A PLAN TO SUCCEED!!

System Architecture Team

ulises.vich@omron.com

Thank you