ADB

iaTech 2018

Embracing Digital Technology in Internal Audit

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Industry 4.0: What Internal Auditors Need to Know

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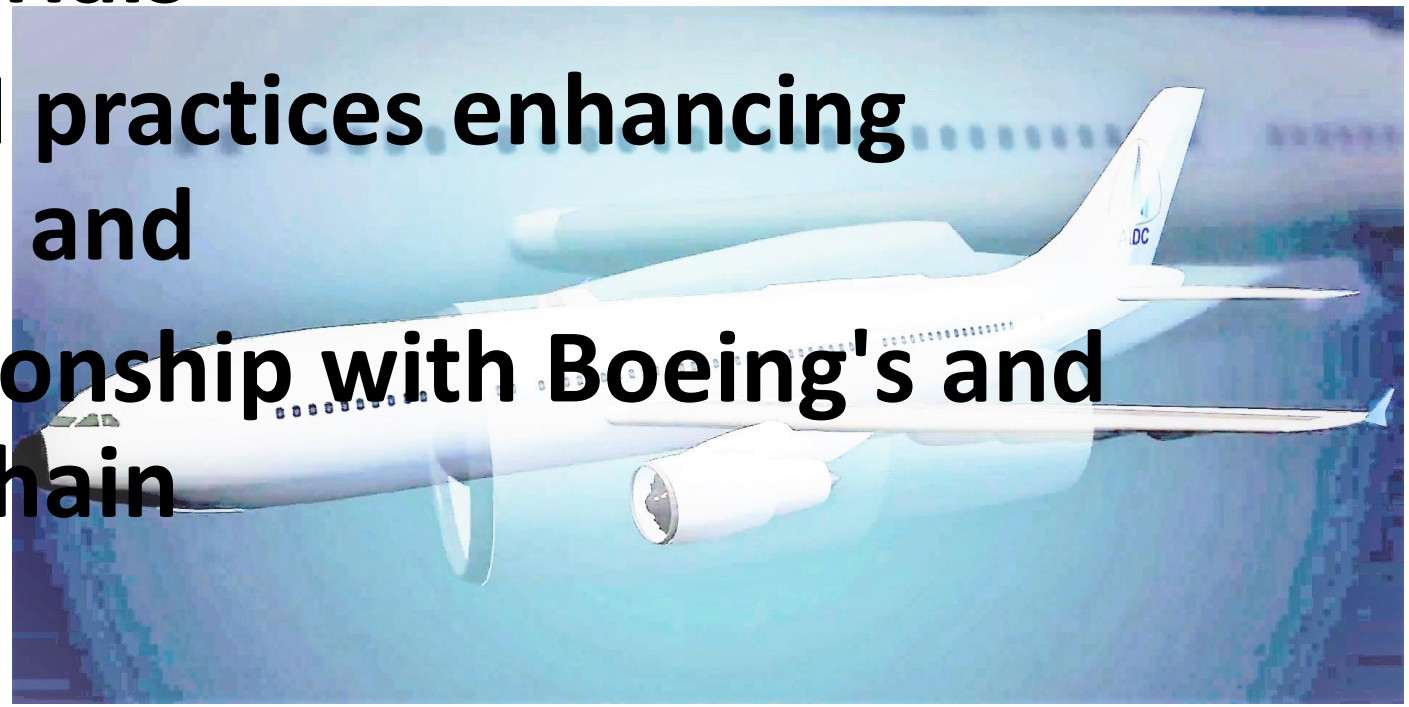
Session Summary

- **Enterprise sustainable momentum**
  - **Tech transfer improve technology-based services**
  - **Industrial processes integrated systems**
  - **Continuing R & D**
- **MC thru OLRT and innovative AI**
  - **Migrated BPR, ERP …**
  - **Transit continuing audit technologies, ❸→❶**
  - **Robots detects machinery errors early warnings**
- **Company's competitiveness focused on LC**
- **Contract auditor plays role in Supply chain**

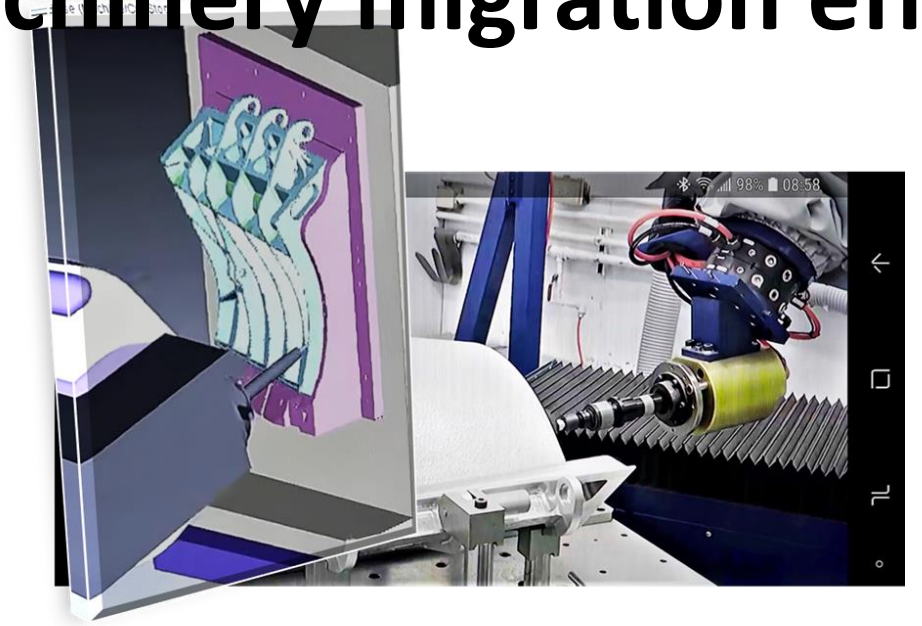
Contents

1. Monitoring control under Industry 4.0 of aerospace industrials
2. Demo cases of AI practices enhancing competitiveness; and
3. Strengthen relationship with Boeing's and Airbus’s supply chain



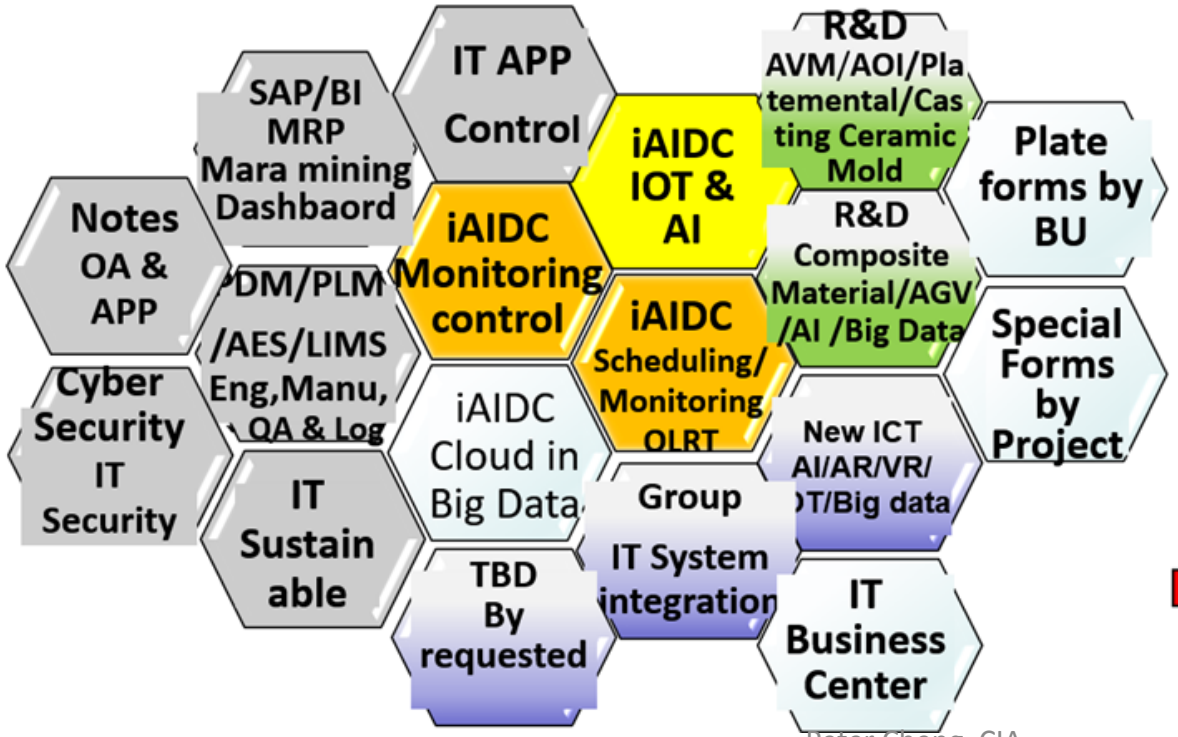
1. Monitoring control under Industry 4.0

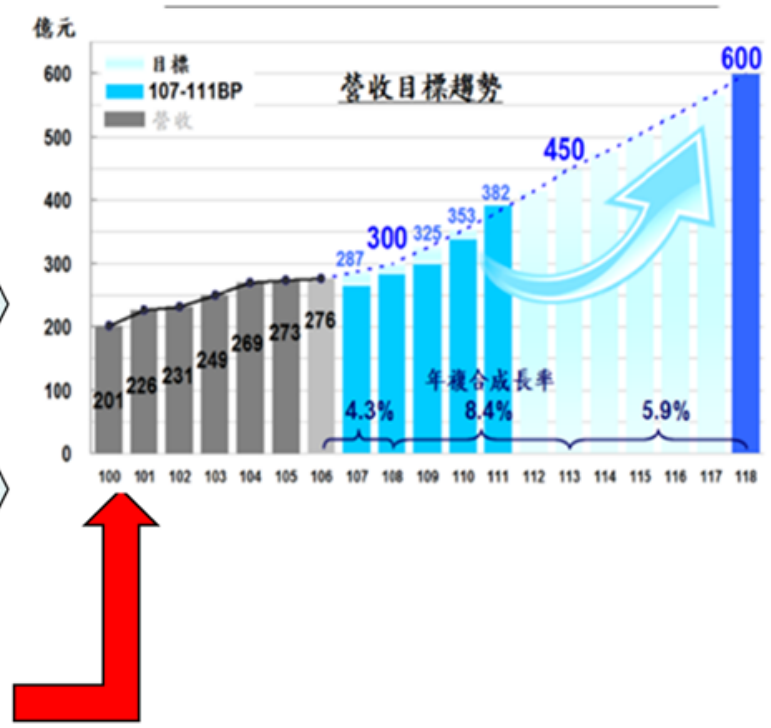
- Audit tech transitioned to Monitor Control
- OLRT monitoring control under 4.0
- Intelligent machinery migration effective



Industry 4.0 system embedded

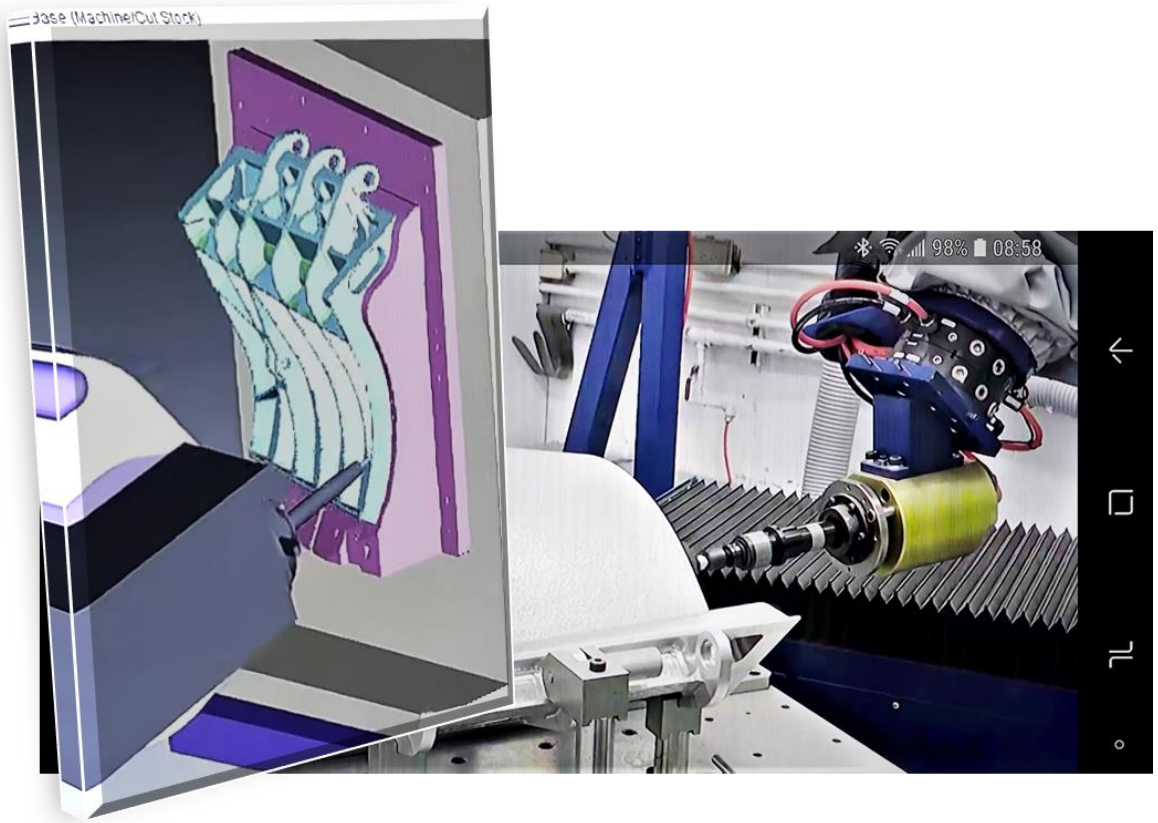
AIDC develops its own iAIDC integrated system, invest innovative R&D to introduce new technologies and applications, and provide sustainable momentum.





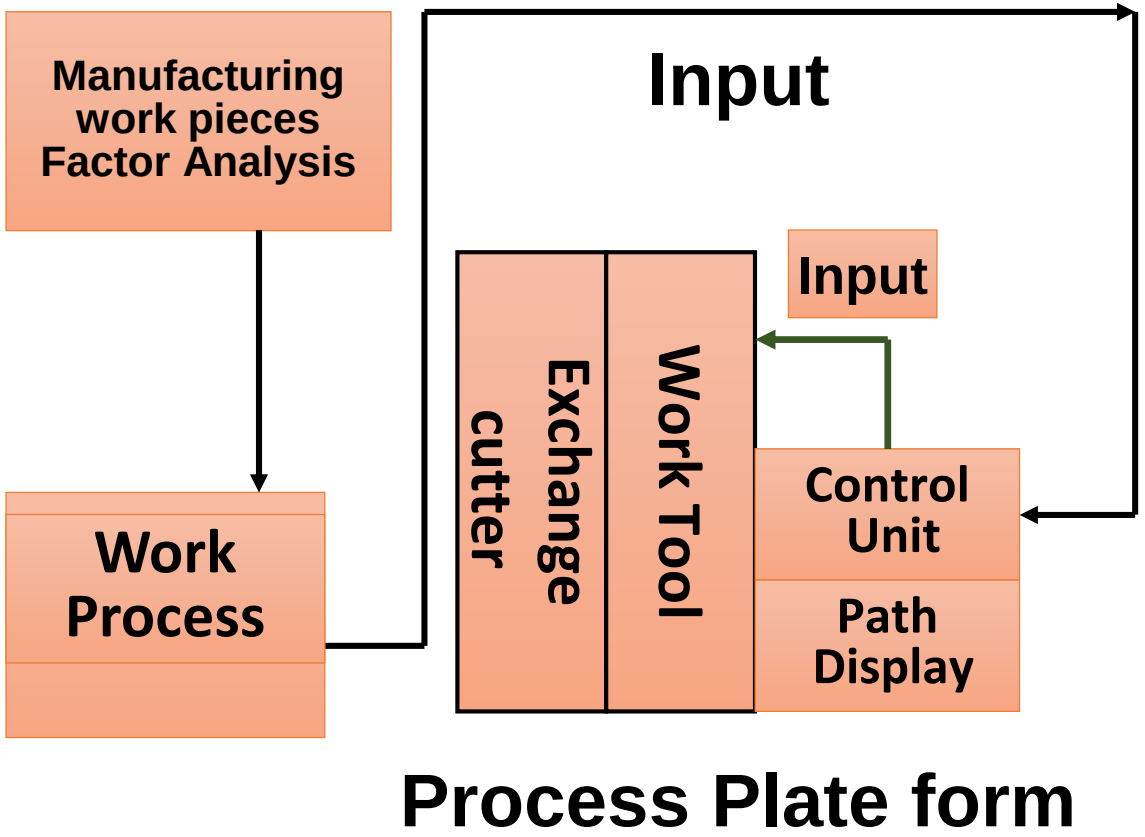
OLRT monitoring control under 4.0

iAIDC Monitoring control



- QA by OLRT measurement
- Robot detects machinery error on line.
- TQ reliability promoted.
- Methodologies：
  - Keep cutting tool usage Hrs
  - Optimize the Hrs As Possible

Audit tech transitioned to M Control



- Instead of traditional off-Line with virtual measurement
- change product inspection to the current OLRT QA.
- Detect the abnormal generated by the workpiece OLRT during the Robot process.
- Total quality reliability assurance.

Innovative manufacturing
Artificial Intelligent

iAIDC
IOT &
AI

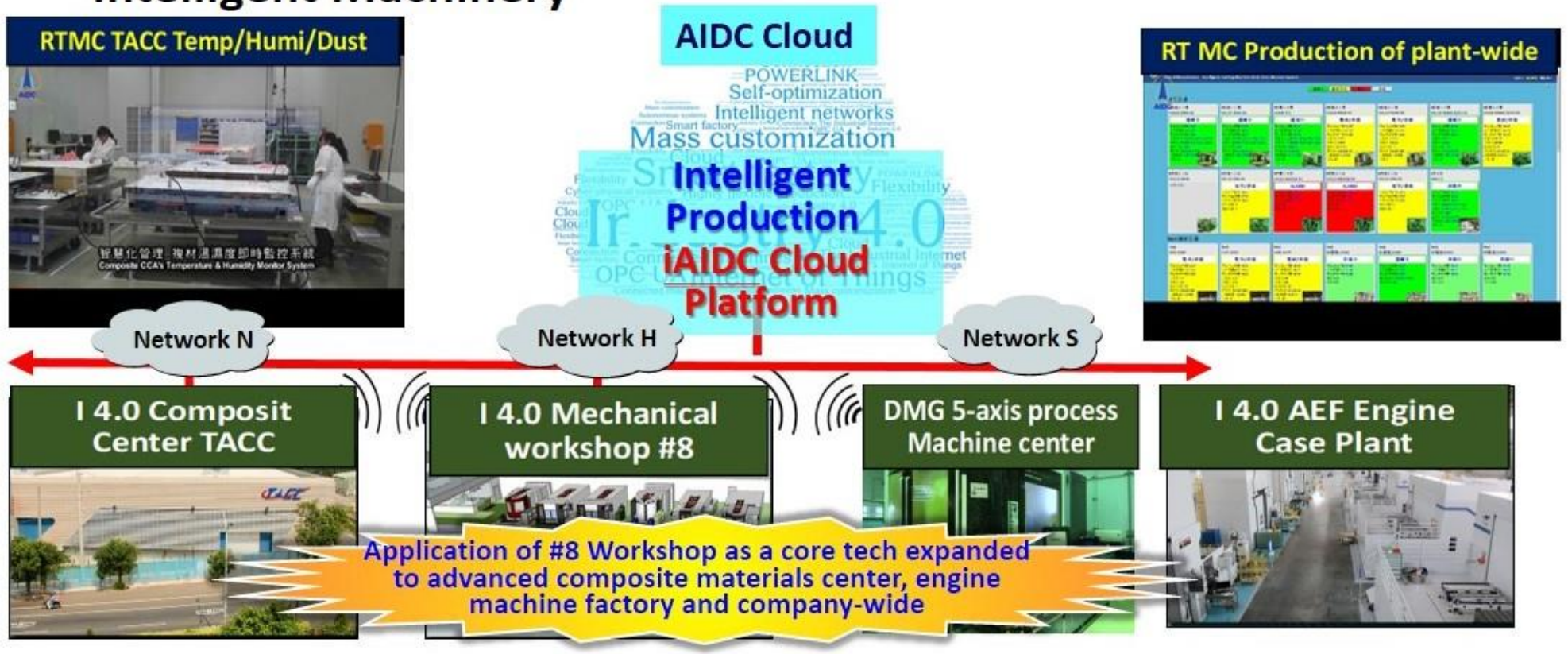
- IOT streamline stations
- Work AI with IP
  - ✓Early Warning
  - ✓Error prevention
  - ✓Products forecast

iAIDC Platform

- Information integrated real time monitoring
- Operation & Management effective promoted
- Decrease error producing, hours, and cost
- In the past, the Master diagnosed by listening, now, we let the robots speak.

Intelligent Machinery

- Machine Networking => Internet of Things + Cloud + Big Data => Intelligent Machinery

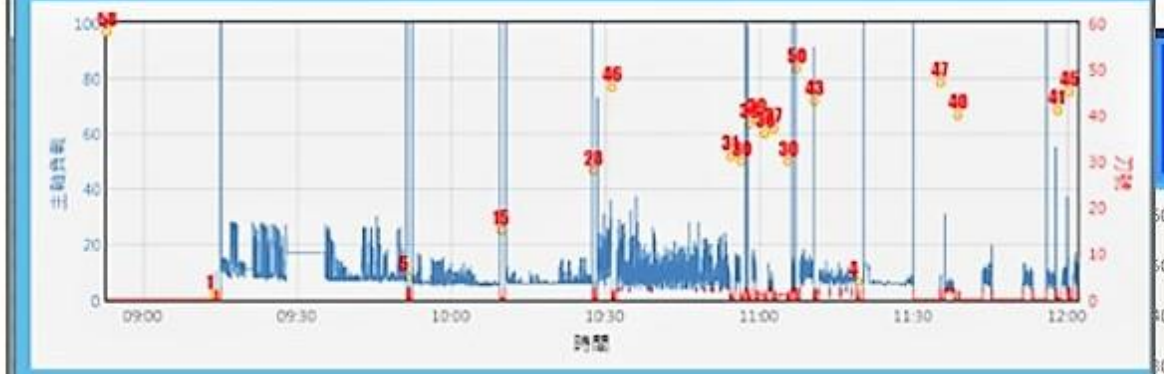


Macro Monitoring
Plant-wide production efficiency

Micro Monitoring
Optimize utilization/shift and efficiency

Utilization Rate has increased 20%
Costs Down 20% by end 2018

NC Program Efficiency Control



整體切削率	整體空刀率
71.62%	28.38%

刀號	使用時間	切削率	空刀率
T58	1268 秒	0%	100%
T1	2252 秒	61.81%	38.19%
T5	1091 秒	69.59%	30.41%

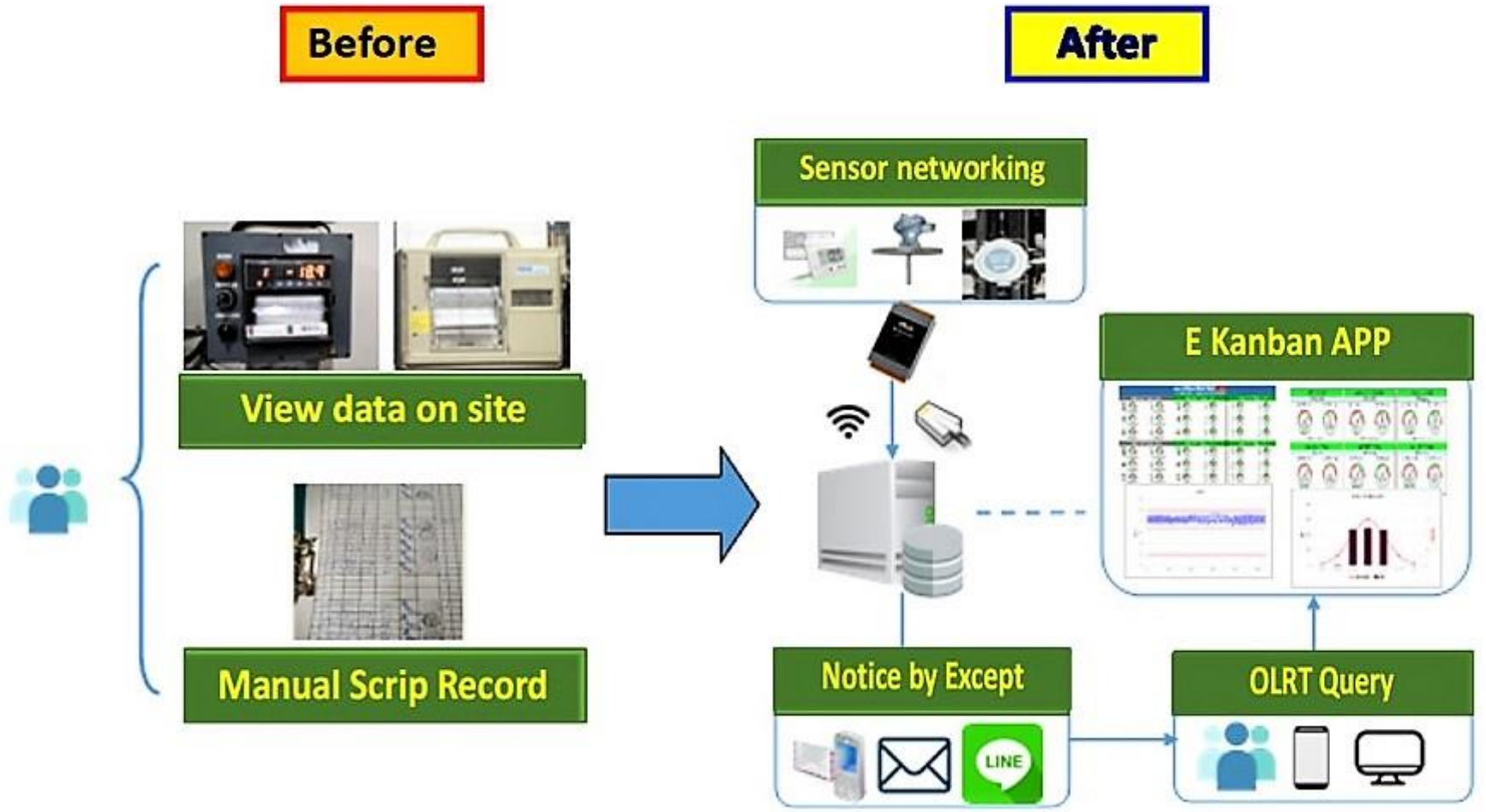
Priciple Axis Temp Control

Kanban Monitor Control

- kanban to display 136 nodes such as
  - temperature, humidity, pressure, speed, PH value and liquid level…
- Will help controlling working environment
  - to meet customer needs and
  - construction quality

136 nodes Kanban Display

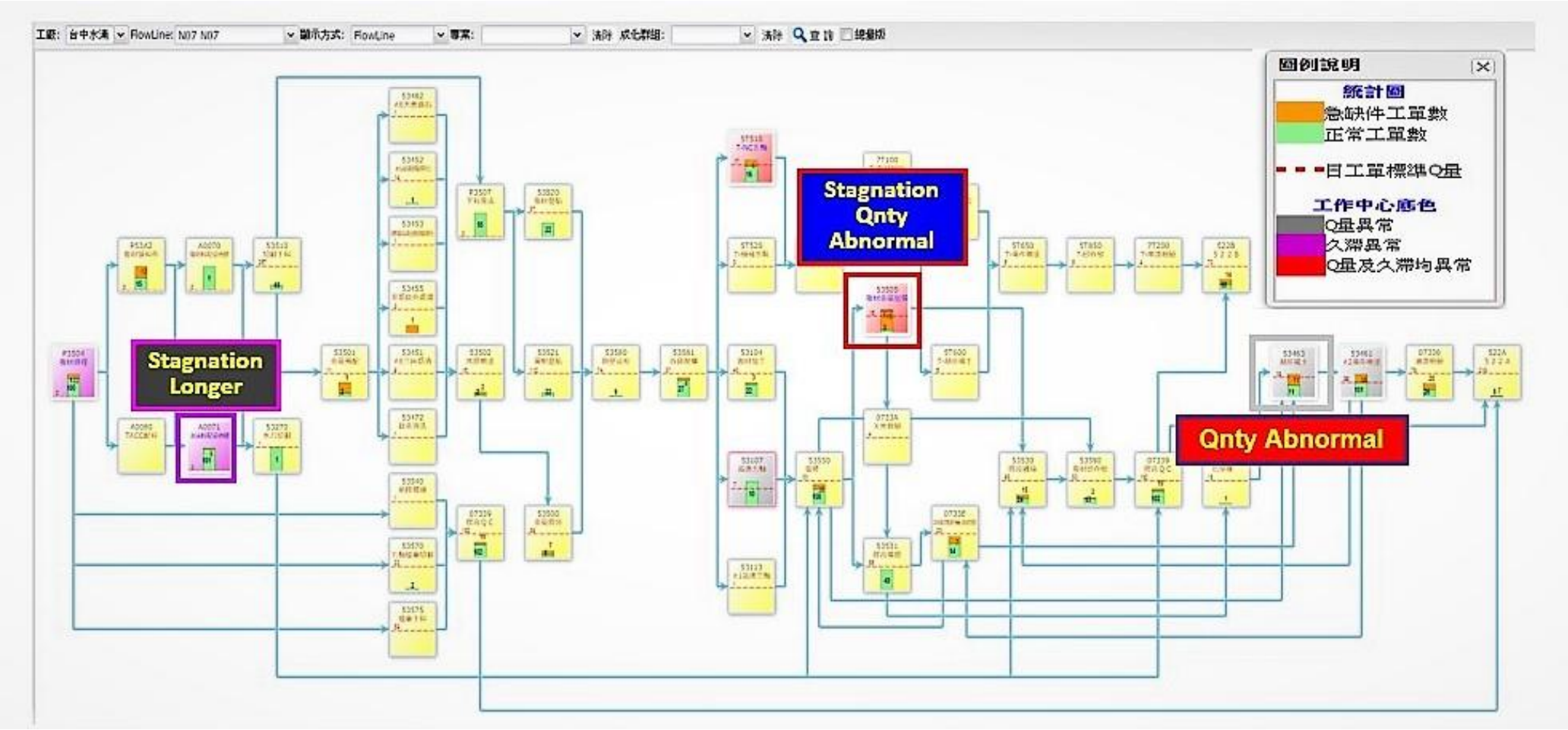
136 nodes Kanban Display



Streamlined Monitoring Control

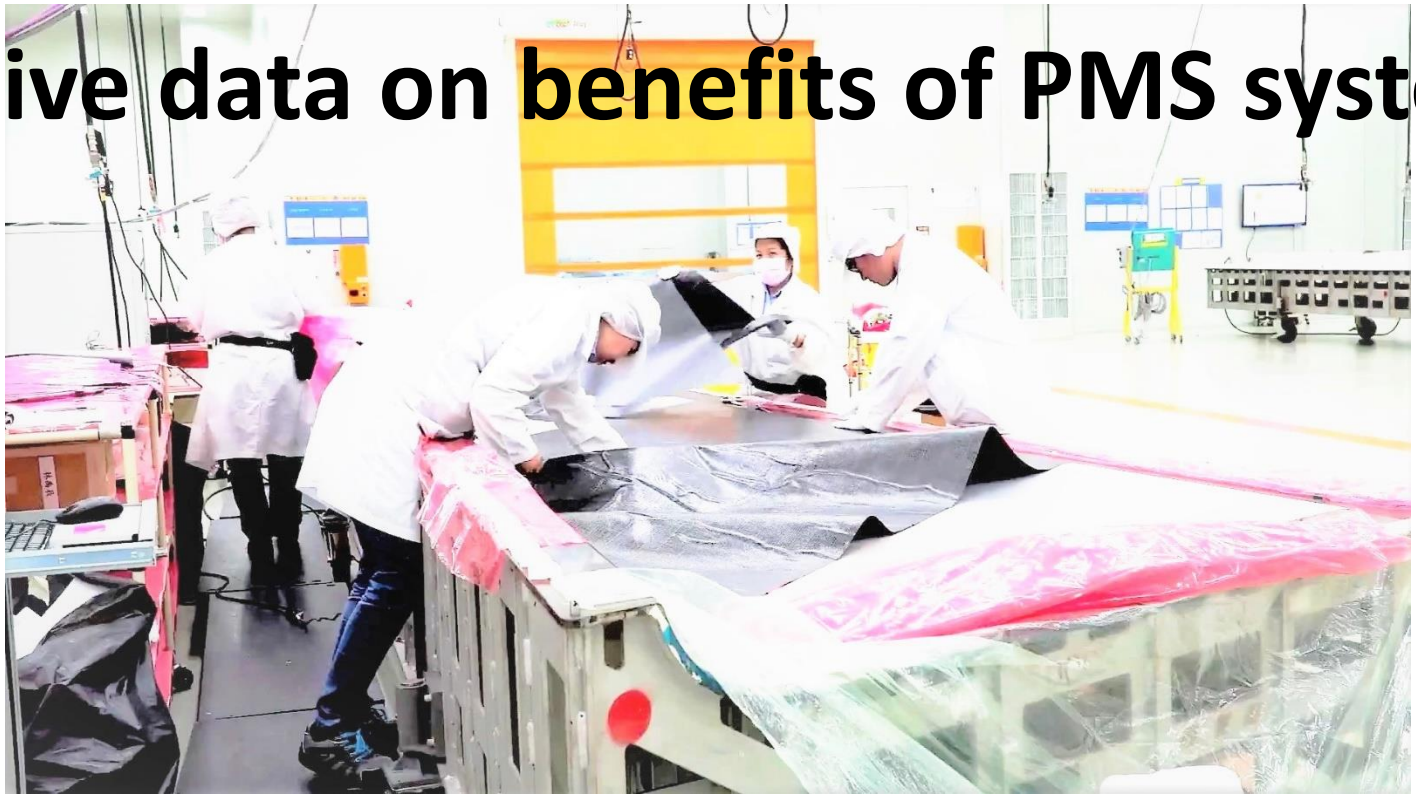
- **Digitalized each part production schedules, shows the flow direction of parts, reviews the information of each work center ONRT, Such as：**
  - ✓ **current work order stagnation**
  - ✓ **stagnation time longer**
  - ✓ **daily production targets**
- **Controller can quickly find out then eliminate abnormality to reduce the cycle time of the parts**
  - ✓ **Stagnation Qty & Hours are higher.**

Cycle Time parts reduced 26 to 20 days



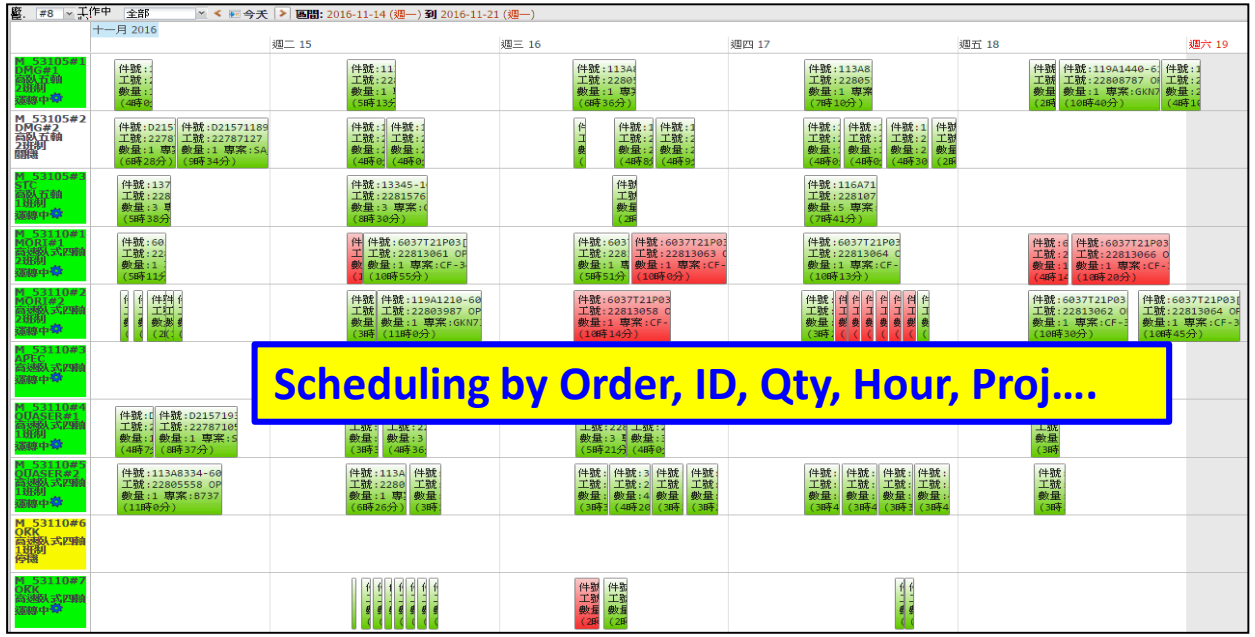
2. Cases of AI practices

- Composite materials intelligent scheduling
- Quantitative data on benefits of PMS system



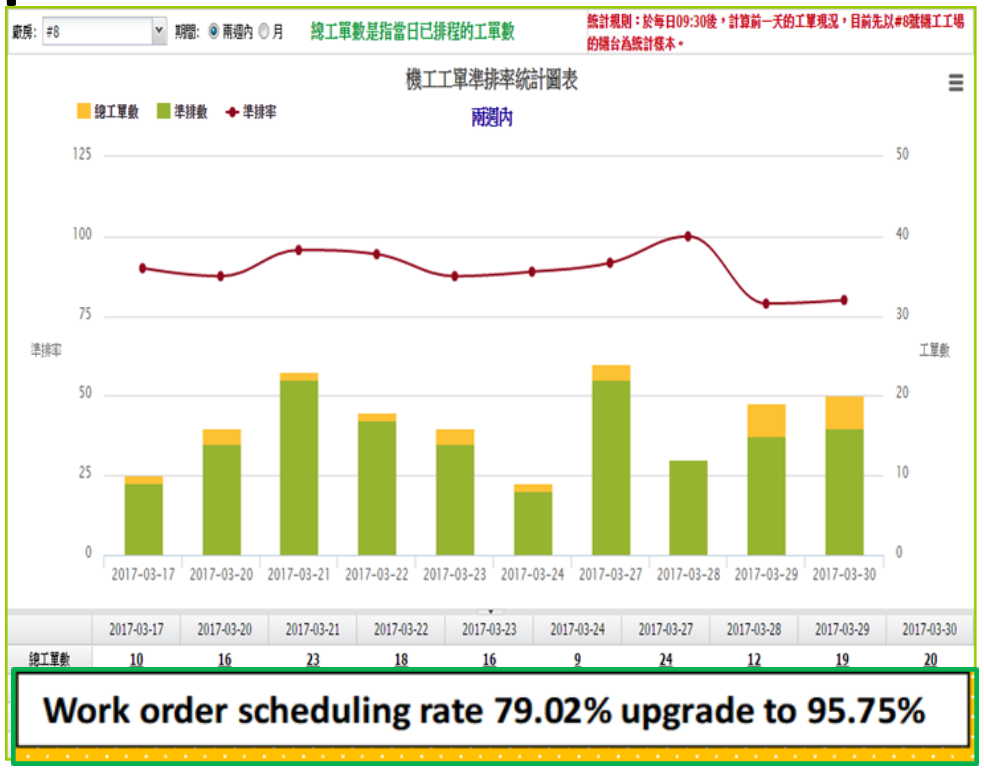
Compound material Intelligent Scheduling

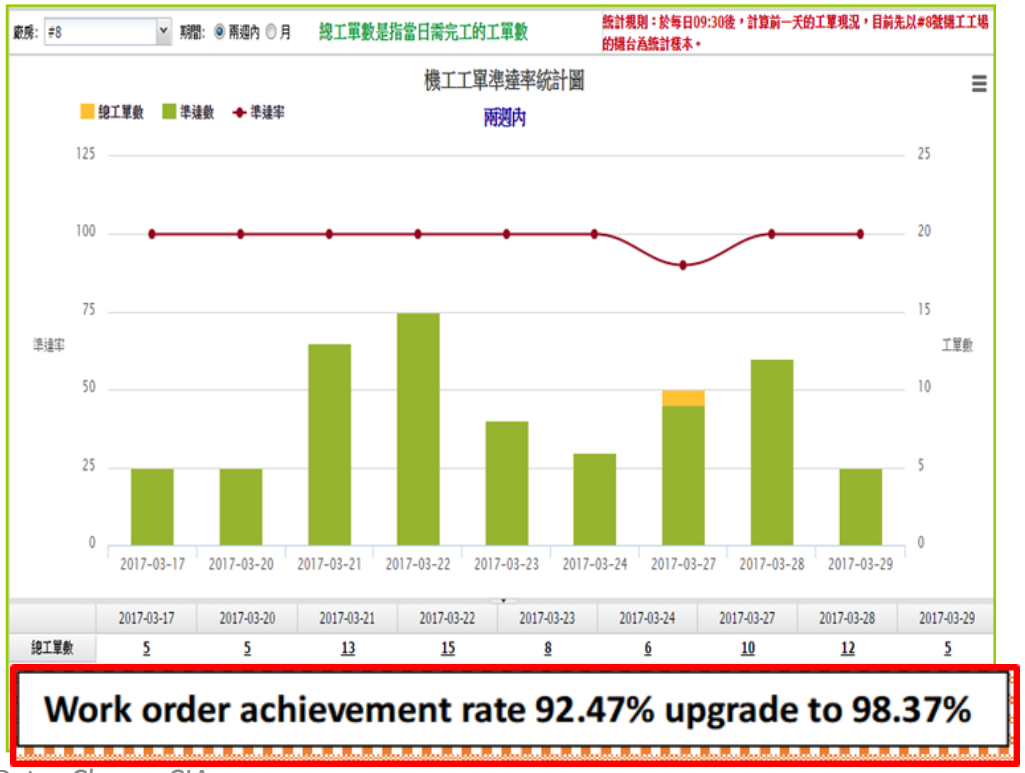
- Auto generate based production needs by color management
- Display OLRT information by work orders, improving efficiency of production



Mechanical Intelligent Scheduling

Function of machine work order scheduling rate and the machine work order achievement rate is to set up a reasonable KPI for performance review

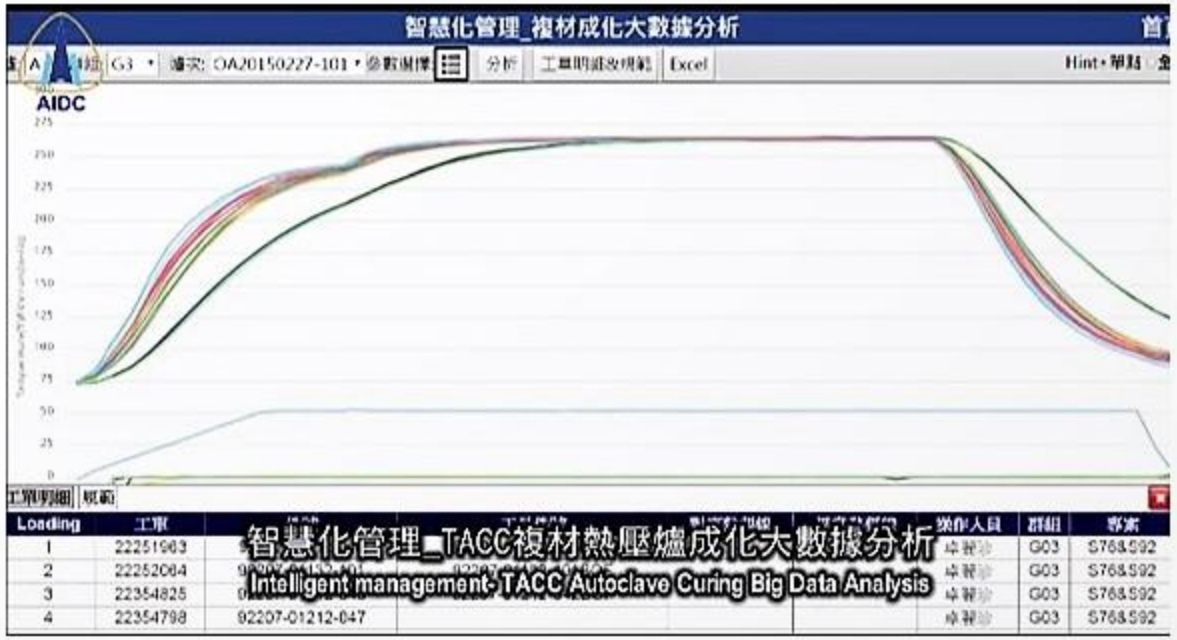




Compound material
Production process big data analysis

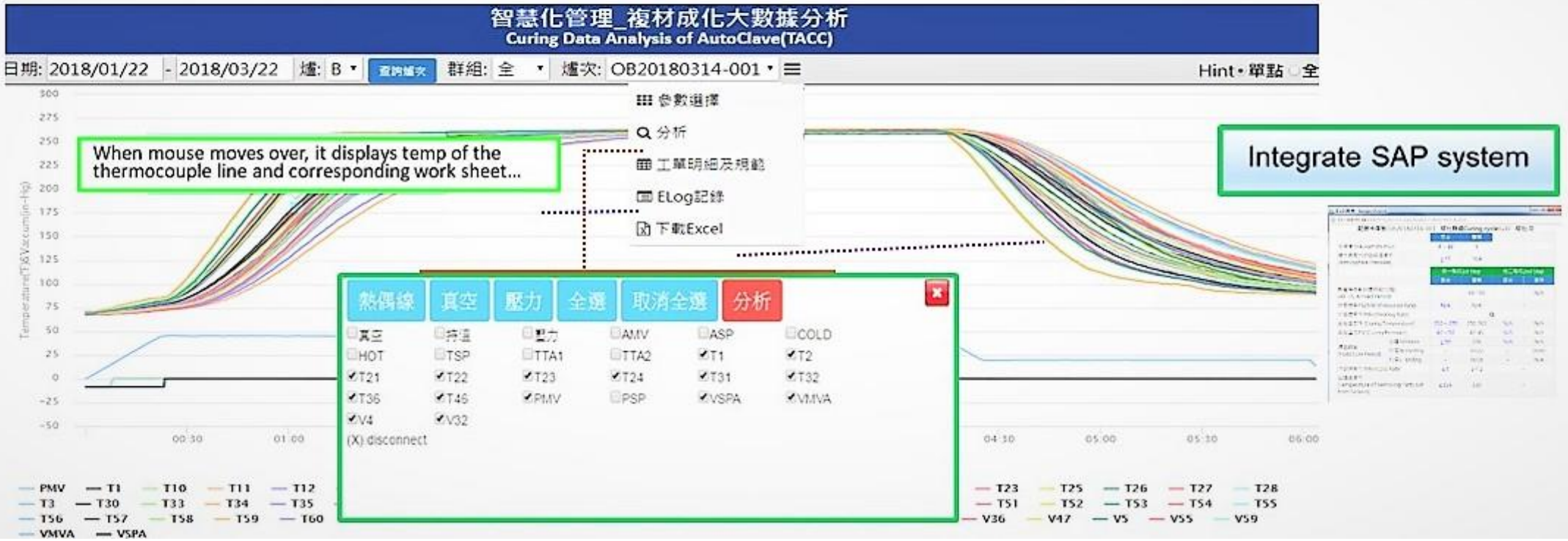
- OLRT monitoring, predicting, warning & prevention of failure
- Control autoclave to shorten the development time of the first piece, and improve the proper rate/capacity

Big data shows company's valuable assets



Intelligent Management Compound Big Data Analysis

- Autoclave showing the thermocouple line, vacuum tube, PSI value, system parameters, work sheet information and SAP data, etc., for the production or quality assurance to review and control



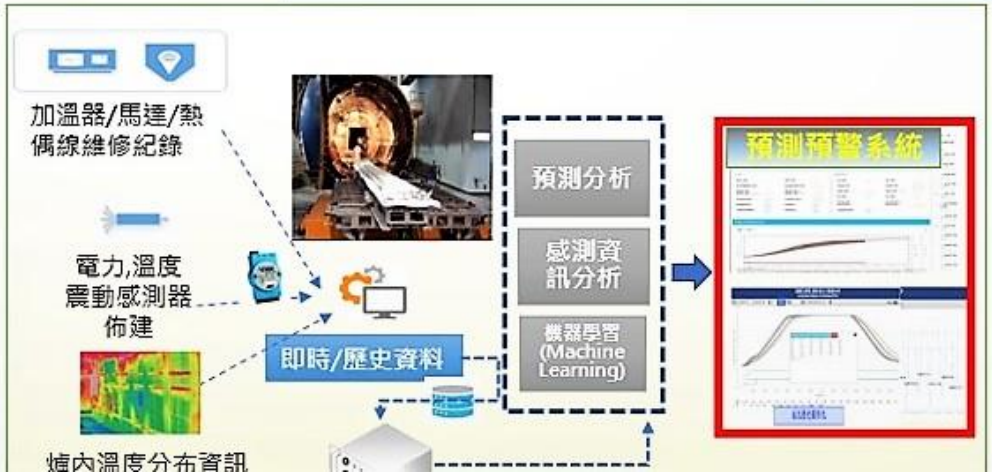
AI Migration Before & After

Before

人工監控成化進度

After Migration

- Autoclave installation sensor
- Compound monitoring control OLRT
- Migration machinery learning prediction and early warning analysis assure compound is normally, reducing the cost of failure.
- Effectively getting compound data to shorten the time schedule of first create piece of parts.



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Composite materials prepreg laminate

iAIDC AI Dashboard Platform

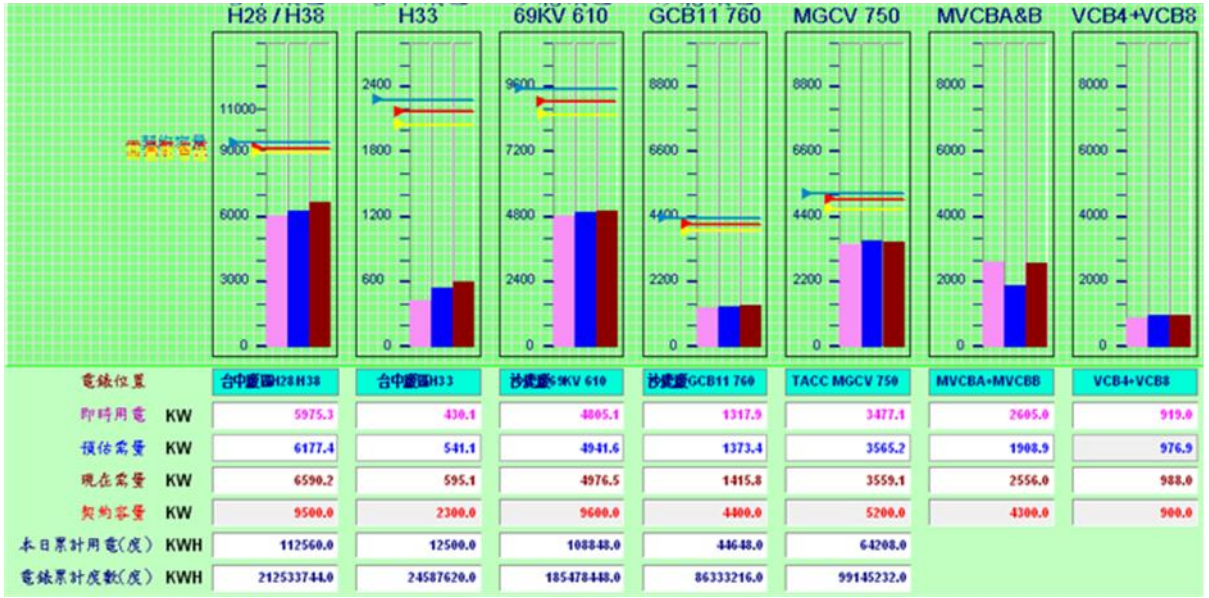
Power monitoring Control

- Each Plant Installs 107 / 173 / 80 (total 360) smart meters to simultaneously monitor the load usage of the main feeder, office building and hangar (including facilities).
- Improve the peak electricity consumption rate and reconcile the manufacturing operation with the rush hour pricing to save the electricity costing achieve energy saving as well.
- Monitoring control major energy-consuming equipment to avoid overlapping peak power consumption, and being fined by Tai-power for exceeding the power contract capacity.

Electricity Consumption OLRT Monitoring Control

Top 15 power stations information: provide current total electricity consumption/charges for Supervisor

Company-wide information: Provides main feeder loops to assist managers in preventing over-provisions



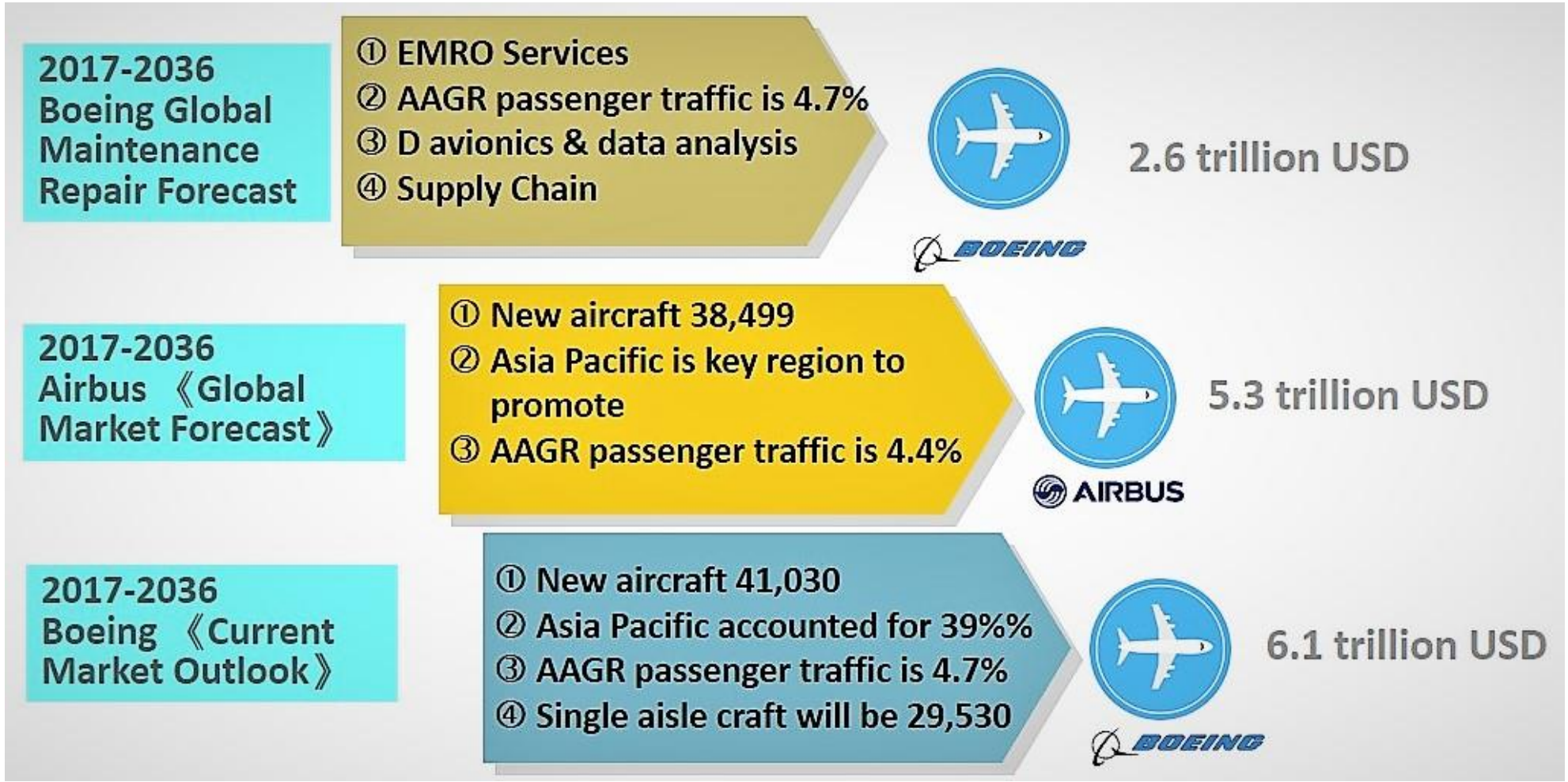
Annual Electricity cost benefits

- **Annual electricity cost saving 500K USD after pricing adjusted.**
  - **saved USD80K due to contract regulation loop down reduced 1,100KW.**
  - **saved USD 52K comes from reconcile the heavy electric heating facilities peak voltage.**
  - **saved USD 346K comes from PMS control benefits**

3. Supply chain with Boeing's and Airbus’s

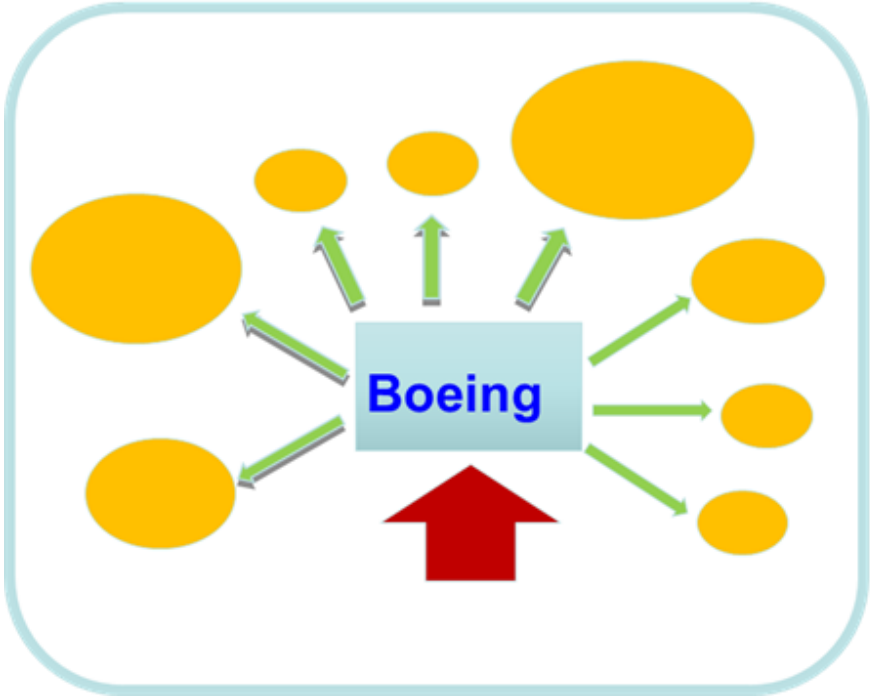
- Global Aerospace Market strategies and Outlook
- Taiwan Airlines‘ domestic aerospace industry value chain division & cooperation

Global Aerospace Market Strategies & Outlook

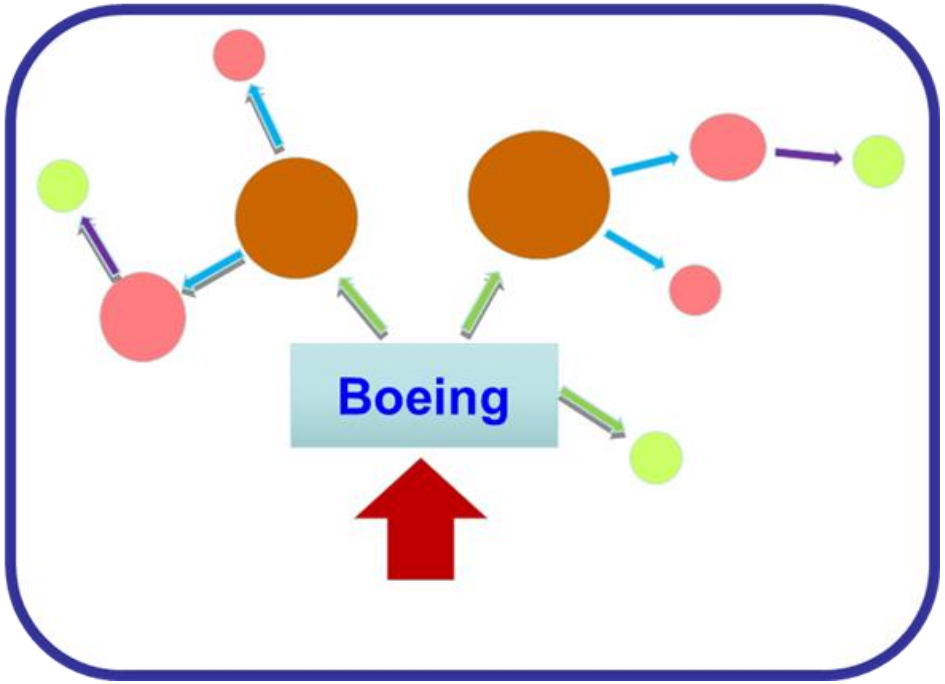


Boeing Supply Chain Policy

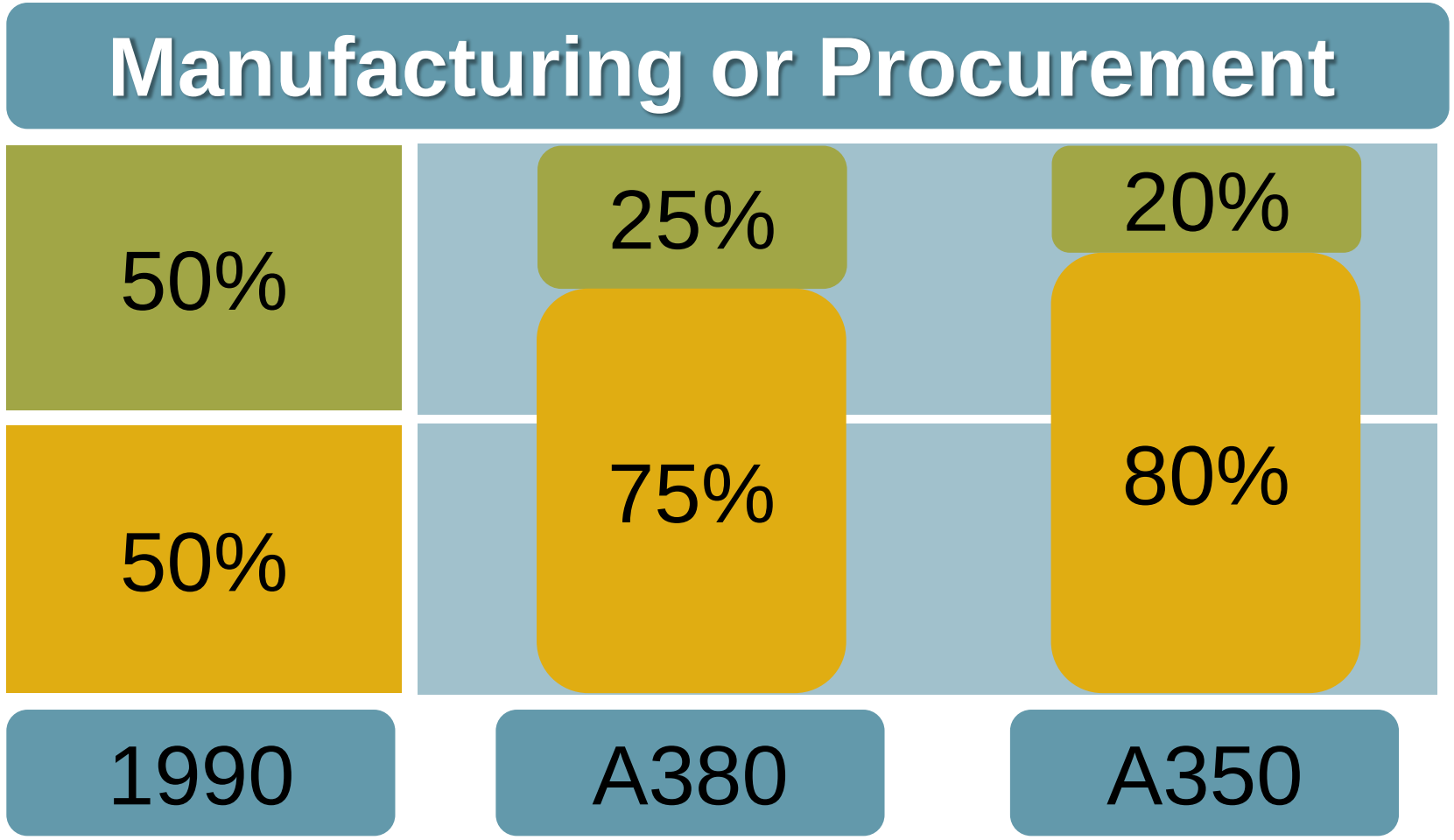
Central Development



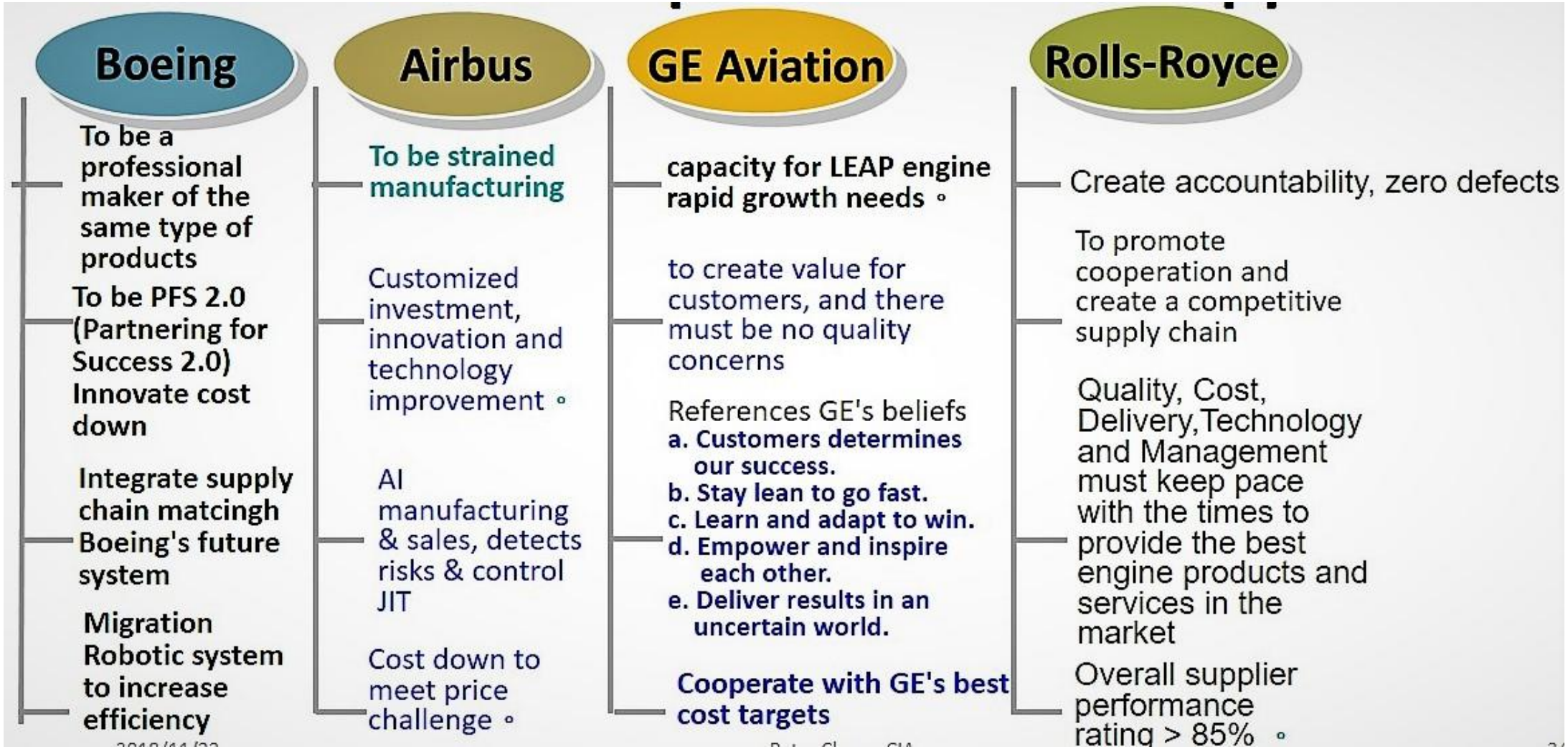
Integrated Strategic Alliance



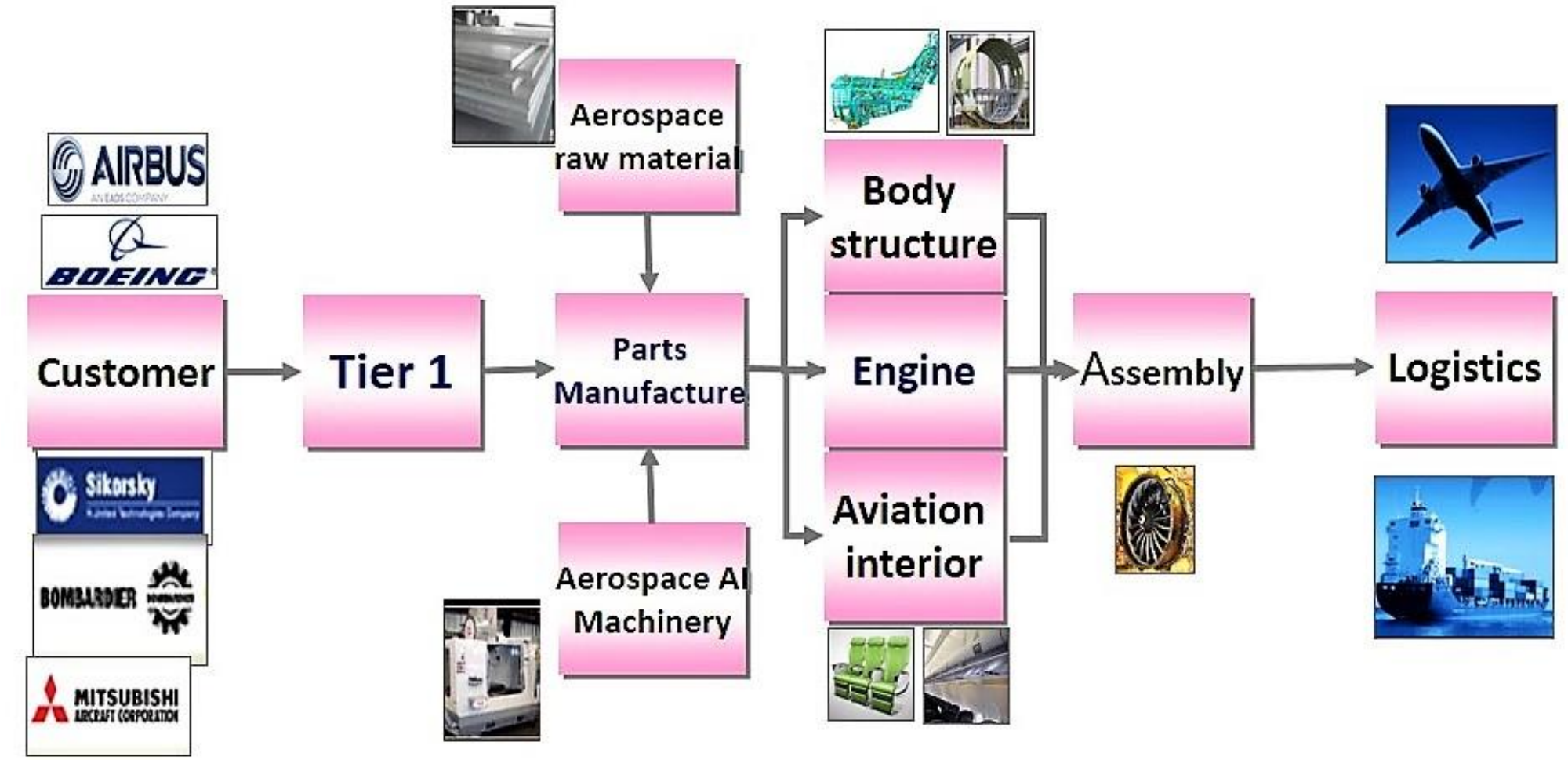
Evolution of Airbus Strategies



Customer requirements for suppliers



Taiwan Airlines industry value chain division & cooperation



Supply Chain Integration

Cross-sector alliance

A-Team 4.0 totally 273 suppliers

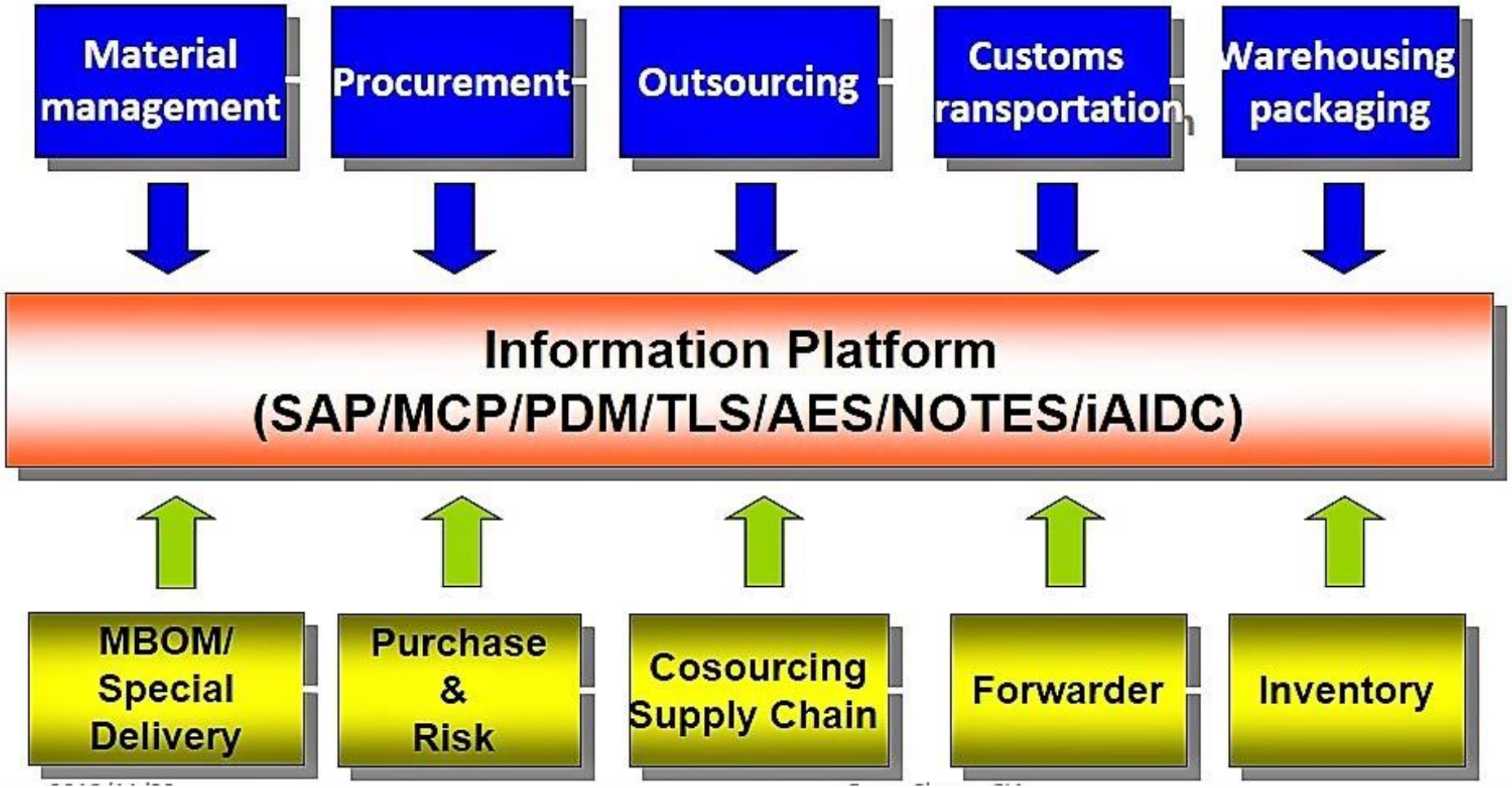
Manufacture 116s	AI Machinery 48s	Raw Materials 27s	Logistic 7s
Banking 12s	Tooling 19s	Institutes 18s	Others 26s

Industrial Cooperate

A-Team 4.0 member 85
Passed AS9100 Verification

112 Local suppliers qualified

Suppliers information System



Suppliers Club Administration

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