



# Customer Service and Support:

OEM and SI Leverage of Industry 4.0. Not Such Dangerous Liaisons



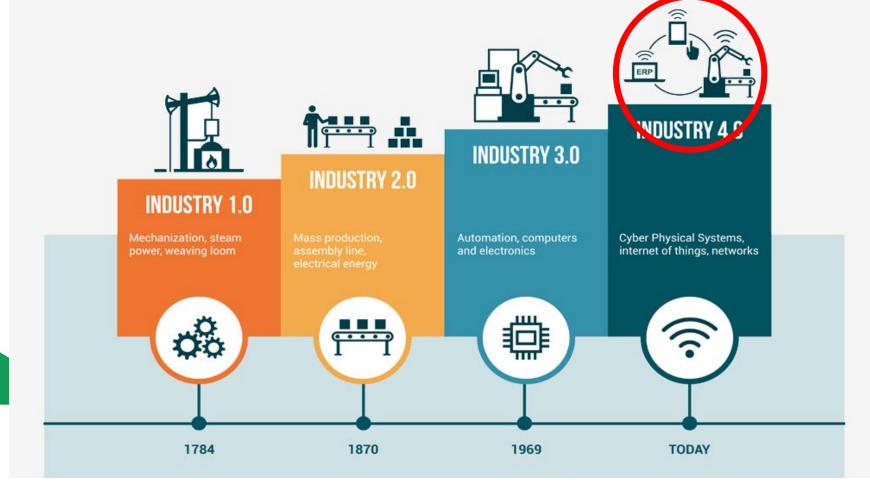
### Agenda



- What is Industry 4.0?
- Original Response to Industry 4.0
- What OEMs are seeing
- Why is that?- What is missing in industry?
- Readiness and maturity of the customer
- IIoT integration considerations
- Components of a support program leveraging Industry 4.0
- Leveraging AI
- Lemonade from lemons (leveraging i4.0 for support offering)

# What is Industry 4.0?





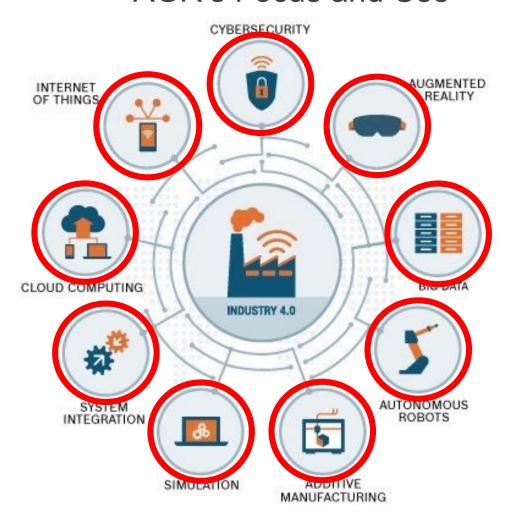


## Industry 4.0 Pillars





#### AGR's Focus and Use



#### i4.0T areas of focus:

- Internet of Things (IIoT)
- System Integration
- Big Data Analytics
- Augmented Reality
- Cloud Computing
- Cybersecurity
- Advanced Robotics
- 3D Printing (additive)
- Simulation

### First Pass Offering





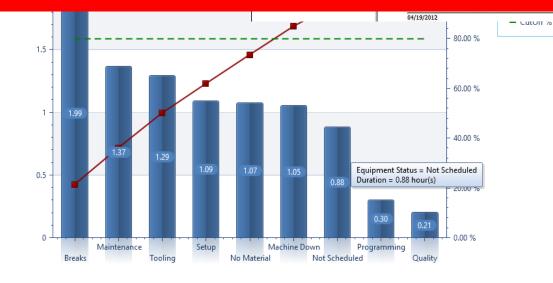
#### Overall Equipment Effectiveness (OEE)

Enable machine for i4.0T for customer's use:

- Add sensors
- System Integration
- Add a module for onboard analytics
- Results in...



# This is awesome...BUT...



#### **Outputs & Dashboards:**

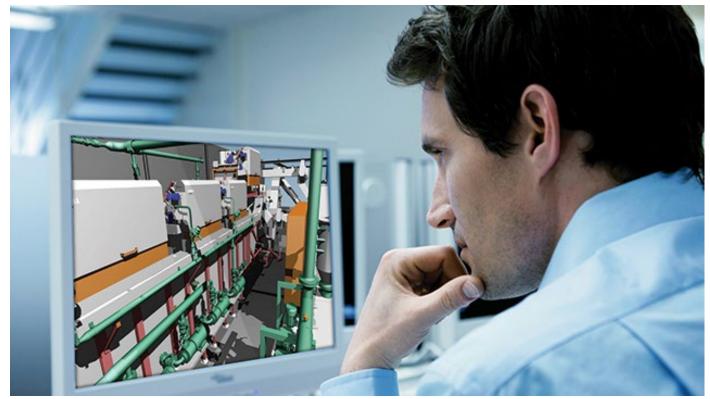
- Machine Speed Profile
- 2. Output Bottlenecks
- 3. Lost Time Pareto
- 4. Scrap Pareto
- 5. Station timing Analysis
- 6. Operator Response time
- 7. KPIs sensors and processes

### What OEMs Are Seeing





- Customers are engaging OEM partners to be part of the maintenance and support of the machinery.
- > In real time



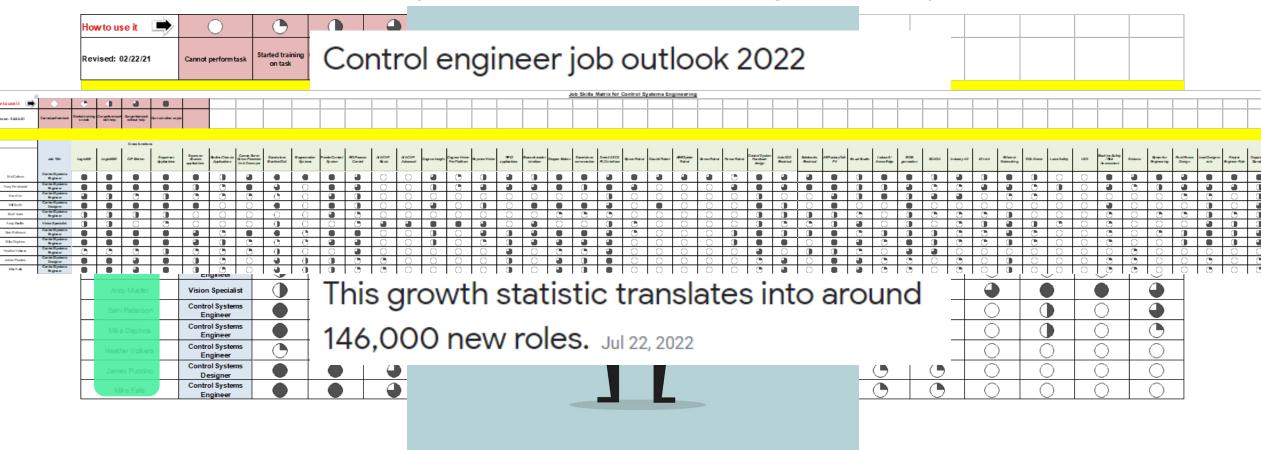
Source: © Siemens USA

# Why?





Why is that?- What is missing in industry?



### What's needed to make the transition



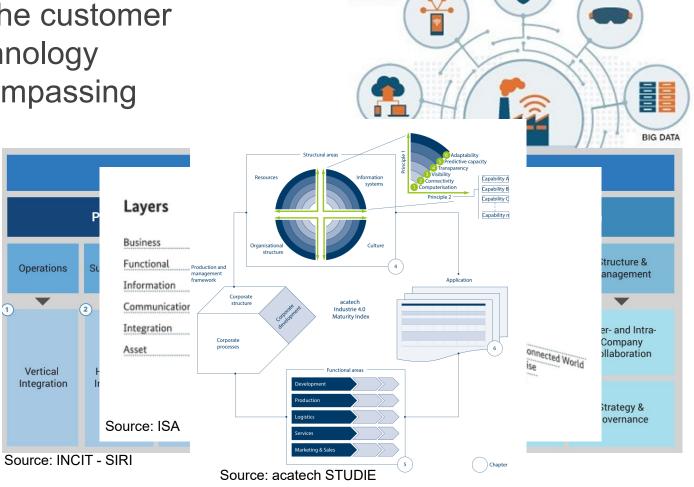
CYBERSECURITY



AUGMENTED

REALITY

- Leverage Industry 4.0 techniques
- > Readiness and maturity of the customer
- Ready as a culture and technology
- Readiness must be all-encompassing
- > Assessment tools
  - > Siri
  - > RAMI
  - Acatech
  - Many others



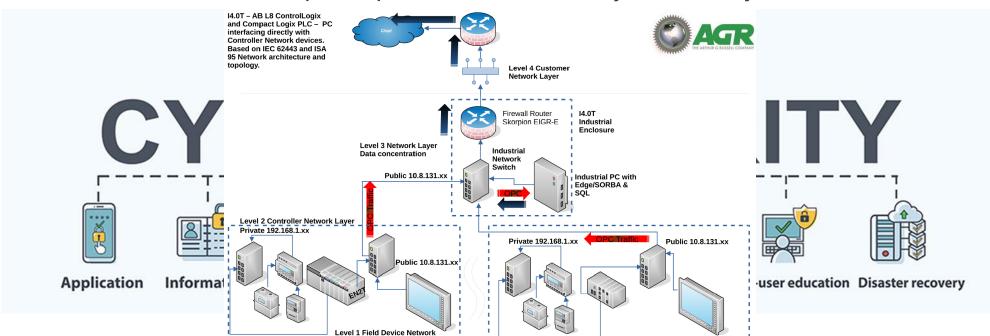
INTERNET OF THINGS

### What's needed to make the transition





- Unique to each company
- > Technology seems to be the first and easiest "go-to"
  - Might be putting the cart before the horse
- Cybersecurity
  - Network Infrastructure
  - Understand and participate in customer's cybersecurity









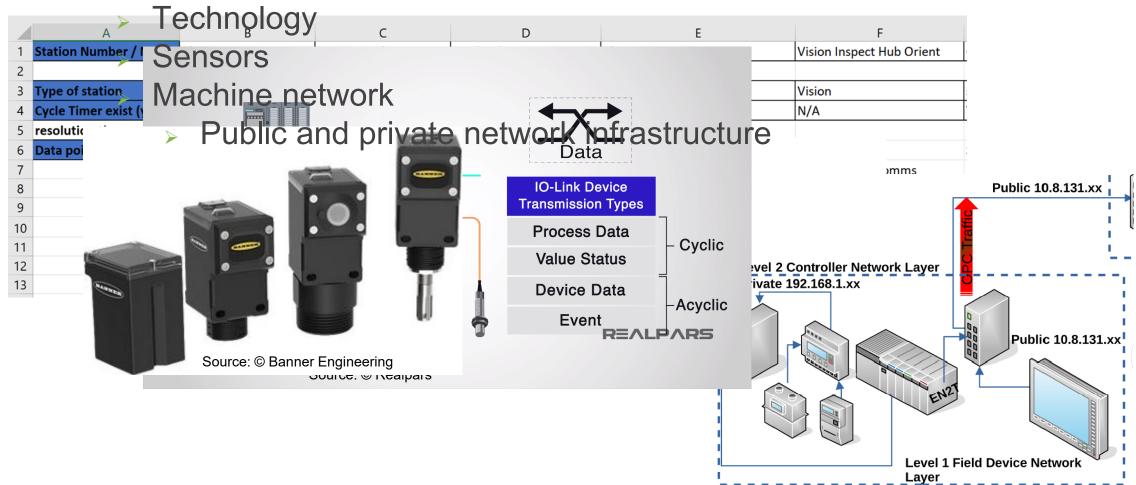
### lloT





#### IIoT steps

Expose the data

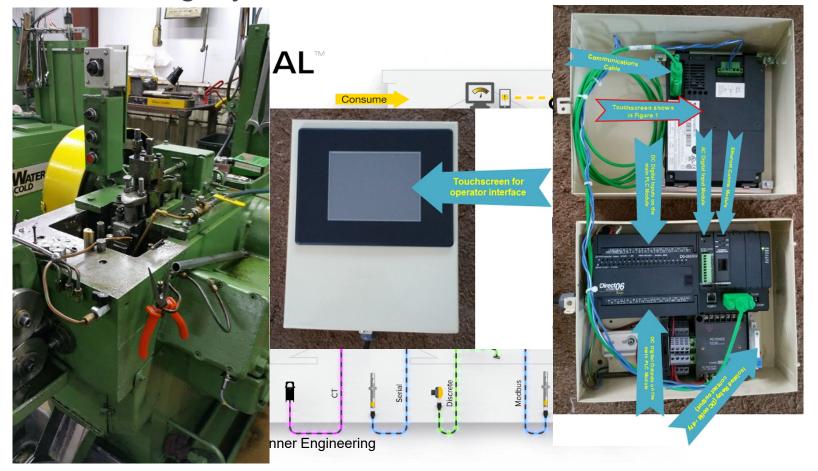






### IIoT steps

Don't leave out legacy machines

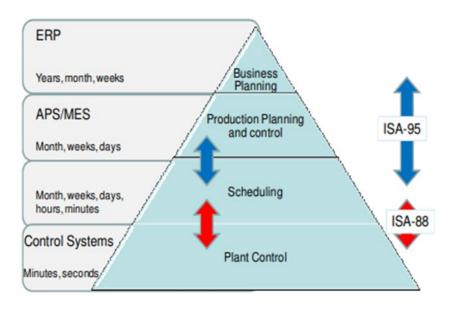






#### IIoT steps

- Collect the data
  - Database a repository of some kind
  - Cloud or local considerations
    - Depending on the level of security needs (medical device, pharmaceutical), local may be the only option



### lloT





#### IIoT steps

- Analyze the data
  - There are a myriad of ways to do this
    - Some SCADA packages have this built in
    - Offline analytics examples:
      - PowerBI
      - Excel from a rudimentary standpoint
      - Sorba AI local– covers the scenarios where data has to stay on-prem
    - Online analytics examples:
      - Sorba AI cloud analytics covers the scenarios where data has to stay on-prem
      - Aveva
      - ThingWorx PTC





#### IIoT steps

- Apply the learning
  - Probably the most important part and the differentiator between Industry 3.0, 3.5, and 4.0.
  - The cyber-physical interface to the factory floor and the "closing of the loop" by applying the learning from the historical past and experience
  - Forecasting and AI





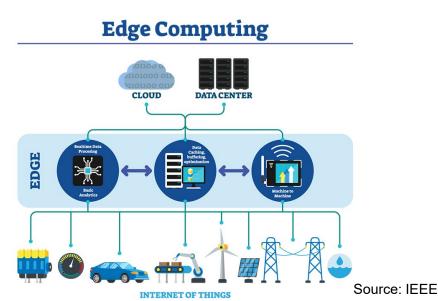


- Technology
- Software
- Storage To cloud or not to cloud. That is the question!
- Augmented Reality (AR)





- Technology
  - Edge computing
    - Cuts down on network traffic
    - Distributes computing power (computers can be less capable, therefore less costly)
    - Federated system topology is possible





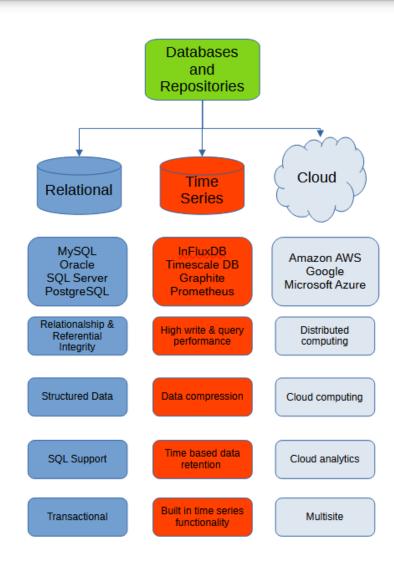


- Software and Data Storage
  - AR software for meetings (TeamViewer Assist AR, Vuforia)
  - Data gathering interface (MQTT, OPC or part of larger program)





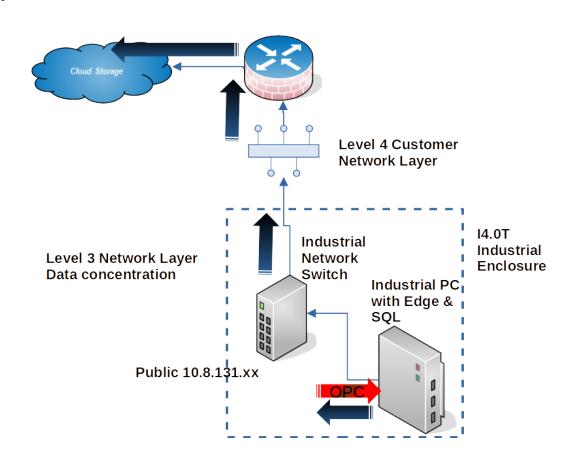
- Repository
  - Relational DB (e.g. MS SQL)
  - Time Series DB (e.g. Influx)
  - Cloud Data Services (e.g. AWS)
    - Vendors such as Aveva, PTC, Sorba have their own cloud path (which may be leased space from AWS or others)
- Cloud analysis for trend analytics
- Al software
  - > Important to understand data types
  - Image based or time series data







- Storage to cloud or not to cloud
  - On-prem
  - Cloud
  - hybrid









everaging Industry 4.0

e, we can talk them through a ng event these here

#### **TeamViewer Assist AR**

- Some level of
- If IT and cybe things like Mo a cell connect
- Meeting software AR or Vuforia Ch



## Leveraging Al





#### Leverage AI

- Support response with predicted and prescriptive maintenance
- Bottleneck analysis
- Anomaly detection
- Remaining useful life
- > And more....



Source: Sorba Al

### Lemonade from Lemons





Lemonade from lemons (leveraging i4.0 for support offering)

- > Requirements for support
- Use all the discussed facets of Industry 4.0
- AGR's offering
  - Answers customer needs
  - Support and monitoring program differentiates us through a more complete and diverse offering

# i4.0 Technologies Enabled Support Program



The i4.0 technologies-enabled support level methodology lets our clients choose the appropriate amount of support that augments their staff to help keep their production lines operating at high OEE.



After the machine or line assessment task, AGR will provide a report and quote for AGR to supply the services and materials needed to make your equipment i4.0T ready. The base requirements plus one of three levels below will be determined on your specific needs and desire.

#### BASE REQUIREMENTS

A base hardware platform is required to interface to your machine control hardware to allow AGR to interface to collect data. This base system will consist of:

Industrial computer with database interface installed.

Remote support hardware.

AR glasses for remote support.

Network interface hardware.

IIoT sensors (cost and installation quoted separately).

The following items are included with the Silver Level:

PLC to database interface software which provides locally hosted reporting screens for live and historical information.

Four base standard screens for OEE and downtime data. Additional screens available through a separate quote.

Two web-enabled screens available via smartphone or tablet.

Cell enabled device for AR-based remote support.

40-hour block of remote support.

Response time from initial call—within 1 business day.

SILVER

#### GOLD

LEVEL

The Gold Level offering includes everything listed in Silver plus the following:

Cloud-based data repository, with web reporting and cloud computing analytics.

Weekly AGR remote monitoring services.

Additional 80-hour block of remote support (total of 120 hours).

One preventative maintenance service trip, with a maximum of 40 hours on site.

Response time from initial call—within 8 hours.

#### PLATINUM

The Platinum Level offering includes everything listed in Silver and Gold Levels plus the following:

Al hardware and software subscription (to be installed in industrial PC listed in Base Requirements).

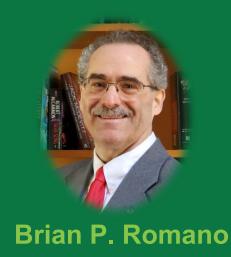
Additional weekly AGR remote monitoring services.

Additional 80-hour block of remote support (total of 200 hours).

Two preventative maintenance service trips, with a maximum of 40 hours on site per trip.

Response time from initial call—within 4 hours.





Director - Technology Development

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**Thank You!** 

AR glasses provided by:

EPSON®

Thank You!

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