BREAKOUT SESSION:
CONNECTED SUPPLY CHAIN

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DHL Global Energy Conference 2018 | Houston
Agenda

1. **Understanding** the connected supply chain and journey ahead (10min)
   - Challenges and opportunities
   - Developments in the IoT ecosystem

2. **Applications** of IoT in Logistics: Use Cases (10min)
   - Overview on logistics use cases
   - Case study on smart pallet tracking

3. **Open discussion** and exchange of ideas on connected energy supply chains (35min)
Why is it so hard to achieve end-to-end, real-time visibility today?

[Diagram of Pizza Tracker process with steps: Order Place, Prep, Bake, Box, Delivery.]

- Exporter (e.g., shipper)
- Exporter's bank/insurer
- Importer's bank/insurer
- Importer (e.g., consignee)
Why is it so hard to achieve end-to-end, real-time visibility today?

Global, networked business

Many parties, few connected

Antiquated IT systems and tools

Total cost of ownership
IoT Ecosystem: Breakthrough Innovations Geared Towards Industrial IoT Applications will Enable Mass Deployment in Logistics

1. Data **Collection**
   - Sensors & Devices
   - Shipments
   - Assets

2. Data **Connection**
   - Communication Technology
   - Internet Connection

3. Data **Intelligence**
   - Visibility & Control
   - Data Storage & Analytics

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1. Data Collection:

- Ultra low-cost
- Smaller and embedded form factors
- More intelligent
- Interoperable with various networks
- Longer battery life or built to be disposed
2. Data Connection: New „Low Power Wide Area“ Networks for IoT

### Properties

<table>
<thead>
<tr>
<th>Cost-Effectiveness</th>
<th>Availability</th>
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<tbody>
<tr>
<td>$</td>
<td>Sigfox</td>
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<tr>
<td>$$</td>
<td>Industrialized nations and (Air)Ports</td>
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<td>$$$</td>
<td>LORA</td>
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<td>Industrialized and emerging markets</td>
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<td>NB-IoT</td>
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<tr>
<td></td>
<td>Europe, China and South Africa</td>
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<tr>
<td></td>
<td>2G / 3G / LTE/4G</td>
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<td>Global</td>
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- **GPS**
- **WiFi**
- **NFC**
- **3G, 4G/LTE**
- **Bluetooth**
- **RFID**

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**Energy Efficiency**

- **Low**
- **Medium**
- **High**
2. Data Connection: Soon – Low Power Global Area Networks

1st Launch
Sriharikota, India

2nd Launch
Cape Canaveral, USA
2. Data Connection: Soon – Low Power Global Area Networks

- Buy a LPGAN certified satellite modem & antenna via a dealer.
- Embed or integrate the LPGAN hardware into your IoT device.
- Activate a LPGAN annual service plan via our online platform.

Expensive, cumbersome, power hungry

Traditional satellite

<table>
<thead>
<tr>
<th>Total cost of ownership</th>
<th>Power required</th>
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<tbody>
<tr>
<td>high</td>
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</tr>
<tr>
<td>mid</td>
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</tr>
<tr>
<td>low</td>
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- Only 10% coverage

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3. Data Intelligence: Analyzing IoT Data and Transforming it into Business Value

- Automated decision making
- Predictive and proactive
- Self-steering processes
- ...
# IoT Use Cases

<table>
<thead>
<tr>
<th>Warehousing</th>
<th>Transportation</th>
<th>Last Mile Delivery</th>
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</thead>
<tbody>
<tr>
<td>Inventory Management</td>
<td>Condition Monitoring</td>
<td>Mail / Parcel Collection</td>
</tr>
<tr>
<td>Asset Utilization</td>
<td>Fleet / Asset Management</td>
<td>Automatic Replenishment</td>
</tr>
<tr>
<td>Connected Warehouse</td>
<td>Predictive Maintenance</td>
<td>Flexible Deliver / Pick-Up</td>
</tr>
<tr>
<td>Energy Management</td>
<td>End-to-end SC Risk Mgmt.</td>
<td>Next-Generation Visibility</td>
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Case Study: Shipment Monitoring Via Smart Pallets

Why Smart Pallets?

*Pallets are ubiquitous in the supply chain*

- Common means of storing/moving case quantities and larger
- Often contain multiple Purchase Order Lines worth of material
- Present significant added weight / reuse / recycling challenges
Solution: lightweight, durable, smart pallet with IOT Sensors to provide real-time monitoring
Smart Pallet Technology: Solution can enable fast and seamless IT integration and meets key business requirements

**Pallet Technology**
- Sensor-driven detection of geo location, movement, delay, shock and temperature
- Low power wide area network cellular connectivity

**Information System Integration**
- Cloud based platform using Pallet-ID# only
- Detailed reporting and analytics
- Integrated passive RFID (Pallet ID#)

**Lifecycle**
- Turn key maintenance free with estimated lifespan of 5 – 10 years (dependent upon use case)
- Pallet can be cleaned during lifecycle
- Geo coverage: Americas, Europe, APAC
Customer Case Study

- Global Life Science company with significant regulatory, product value and handling considerations
- 644 pallets with embedded sensors to detect geo location, movement, delay, shock & temperature
- Cloud based platform using pallet ID with remote programmable profile
- US operations as initial test

Interim Results

- Pallets reporting reliability near 100%
- Data capture along all criteria deemed a success
- Lifecycle costs projected at a 6-7% reduction versus current
Key learnings from the deployment…

• Clear problem definition (probably not cheapest way to solve some needs)
• Ability to get pallets/sensors back (need low cost point if only one-way use)
• Generate tangible value out of the data (probably greater value where multiple service providers are involved)
1. Understanding the connected supply chain and journey ahead (10min)
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2. Applications of IoT in Logistics: Use Cases (15min)
   - Overview on logistics use cases
   - Case study on smart pallet tracking

3. Open discussion and exchange of ideas on connected energy supply chains (30min)
THANK YOU!