Manufacturing and mobility innovation in the cloud

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Honda

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VP, Sustainability and Business Development  
American Honda
The manufacturing space

- Automotive
- Manufacturing
- Aerospace
- Chemical & Agrochemical
- And more
Enable bringing sustainable mobility, products, operations, and services to the world faster!
Industry data overload

55.7 billion Connected IoT Devices

1800 Petabytes generated by manufacturers per year
Today’s challenges

- Exponential data growth
- Cost management
- Customer expectations
- Software transformation
The promise of software-defined products

- Better customer experiences
- Products that get better with time
- New services and business models
- Data-driven discipline
- Intelligent decision-making
- Increased performance
Manufacturing industry transformation with AWS
Customer journey

Discovery & Pre-Sales

AWS Clean Rooms

Amazon Pinpoint
Customer journey

Discovery & Pre-Sales

Negotiation, purchase & finance

AWS Clean Rooms

Amazon Lex

Amazon Pinpoint
Customer journey

**Discovery & Pre-Sales**
- AWS Clean Rooms
- Amazon Pinpoint

**Negotiation, purchase & finance**
- Amazon Lex

**After Sales**
- Amazon Connect
Customer journey

**Discovery & Pre-Sales**
- AWS Clean Rooms
- Amazon Pinpoint

**Negotiation, purchase & finance**
- Amazon Lex

**After Sales**
- Amazon Connect

**Retention & Loyalty**
- Amazon Personalize
- AWS Entity Resolution
Serving industrial customers for years

SIEMENS  HONDA  Cox Automotive  UNOX  Dafgards  Equipment Depot  Valeo
TORC  KONE  AMATROL  ICCI  Invista  Terex
SKF  BOSCH  Valmet  RIVIAN  Hitachi  Airbus  BMW Group
DB  LG  USG BORAL  arm  Volkswagen Group  3M  ABB
Thermo Fisher Scientific  SANY  Georgia-Pacific  Schneider Electric  Sumitomo Chemical  Koch  Toyota
TC Energy  Samsung  Enel  Carrier  Continental  General Electric  NXP
Serving industrial customers for years
Serving industrial customers for years
“Together, Salesforce and AWS are helping automotive companies bring together a complete view of the driver and the vehicle to power connected, immersive consumer experiences.”

Achyut Jajoo, SVP Auto & Manufacturing, Salesforce
Product journey

Research & Development

Amazon WorkSpaces
Autonomous Driving Data Framework
Research and Engineering Studio
EC2 DL2Q
Serving industrial customers for years
Product journey

Research & Development

- Amazon WorkSpaces
- Autonomous Driving Data Framework
- Research and Engineering Studio
- EC2 DL2Q

Design Optimization

- Amazon SageMaker
- Amazon CodeWhisperer

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Product journey

Research & Development
- Amazon WorkSpaces
- Autonomous Driving Data Framework
- Research and Engineering Studio
- EC2 DL2Q

Design Optimization
- Amazon SageMaker
- Amazon CodeWhisperer

Manufacturing Operations
- Amazon Monitron
- AWS IoT TwinMaker
- AWS IoT SiteWise
- Amazon Lookout for Vision
Serving industrial customers for years
Product journey

Research & Development
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Product journey

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Design Optimization
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Manufacturing Operations
- Amazon Monitron
- AWS IoT TwinMaker
- AWS IoT SiteWise
- Amazon Lookout for Vision
- Amazon Supply Chain

Product Experience
- AWS IoT FleetWise
  Connected Mobility Platform (Solution) 2.0
Serving industrial customers for years
Industrial Data Fabric

AWS WELL-ARCHITECTED FRAMEWORK WITH PRESCRIPTIVE GUIDANCE
Serving industrial customers for years
Create without limits

Tony Hemmelgarn
Siemens Digital Industries Software
The amount of data generated in a typical month in one factory: 
~2,200 terabytes

This is equivalent to the data volume of 
~500,000 movies on one online streaming platform
COMPREHENSIVE DIGITAL TWIN
Combining the real and digital worlds
Powering the world and the products you use every day

Trusted
Preferred by companies in every industry, of every size

Modern
Proven solutions for transformation

Leading choice in PLM

#1
Preferred by customers, validated by experts, chosen by industries

Powering innovation
Making more of the products you use every day possible

Leading-edge
Delivering the future of PLM, today
Teamcenter X

- Cut costs: 60%
- Always up to date: 100%
- Scale: 10X
- Secure and reliable
- Time to value: 50%
- Global reach

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Teamcenter X transform to cloud ROI
Global electronics customer’s realized benefits

Overall customer benefits
Lower total cost of ownership
Faster time to value
Security and compliance
Always up to date
Reduced downtime
Scalable

$54% Lower cost of ownership
40% Better load performance

Total cost of ownership
IT Costs
Infrastructure
Install
Upgrades

Software Costs
License
Maintenance

On-prem
SaaS

IT costs
Software costs

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To compete and stay relevant you must …

**Innovate**
software and hardware decision-making into the design process

**Collaborate**
across engineering, automation, manufacturing and service

**Validate**
software and hardware integration to identify errors early
Transforming into the SDV enterprise

Scalable partner framework – for engineering, deployment and operation

IDEATION
- voice of customer
- portfolio resources budget

SYSTEM
- MBSE requirements features architecture

ANALYSIS
- 1D-3D multi-physics simulation

DESIGN
- mechanical software E/E

EBOM Planner
- multi-domain EBOM
  - prototype
  - color parts

MBOM
- plant MBOM
- BOP
- BOE
- as-built

SBOM
- service plan
- spares kits
- training
- as-maintained

QUALITY
- APQP • PPAP • FAI • root cause • risk management

SUPPLY CHAIN
- market intelligence • visibility • selection • integration • logistics

PROGRAM MANAGEMENT
- deliverables • work breakdown structures • schedule

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Transforming into the SDV enterprise

Scalable partner framework – for engineering, deployment and operation

Evolution - Software - Operation

CI CD CC

- Code
- Build
- Test
- Change
- Decommission
- Fit
- Commission

- Plan
- Release
- Deploy
- Monitor
- Operate
- Charge

- CMS ALM
- Configuration Requirements
- E/E BOM
- Container
- Performance
- ECU BOM Hardware

- HW & SW Constraints
- PLM ERP

- Manufacturing planning, simulation & execution
- MBOM
- SBOM
- Service plan
- Service life

- Quality
- SUPPLY CHAIN
- PROGRAM MANAGEMENT

- IDEATION
- SYSTEM
- ANALYSIS

- MBSE requirements, feature architecture

- AIPAP, PPAP, FMEA, root cause, risk management

- Market intelligence, visibility, selection, integration, logistics

- Deliverables, work breakdown structures, schedule
Software Defined Vehicle
Integrated vehicle software platform

Collaborative cloud development

- AWS Cloud9
- Container Manager
- Cloud IDE, launch & manage containerized applications

Validate SW on virtual HW

- Container Manager
- Container
- Container
- Virtual Hardware:
  - Arm Core
  - Arm Core
  - Drivers
  - Prescan
- Virtual Arm HW in the cloud - continuous SW development & V&V

Deploy SW on validated HW

- RTE & OS
- RTE & OS
- Hypervisor & BSW
- E/E Architecture, IO, PCB, IC, SoC
- HPC HW Platform:
  - SoC
  - IC
  - μC
  - GPU
- Deploy SW on compliant HW, platform certification, sustainment

Iterate

- AWS Cloud9
- AWS Copilot
- ...
Mendix pioneered low code market to empower IT and non-IT workforce
An integral part of Siemens Xcelerator

Attached to Siemens Xcelerator

Embedded in Siemens Xcelerator

Scale with our ecosystem partners

Extend, personalize and compose applications

With full deployment flexibility tailored to our customer needs

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Use Low Code to make data meaningful, valuable, and available with AWS Partners and AWS services

Industrial Data Fabric

Act
Analytics & Apps

Contextualize
IT/OT/ET Data

Store
Cloud & On-Prem

Ingest
Edge & On-Prem

Curated, contextualized, unified IT/OT data sets to consuming applications

AWS Connectors

Monitoring Use Cases
- Streaming use cases
- Equipment/Process state
- Monitor/Visualization tools
- Digital Twin

Diagnostic Use Cases
- Prediction & ML training
- Root Cause Analysis
- Batch Analysis
- Labor Mgmt

Control & Autonomy Use Cases
- Closed-Loop control use-cases
- Prescriptive action
- Autonomous Maintenance

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THE SUCCESS FACTOR

Leverage the infinite power of data
Auto
Top 23 OEMs
Top 20 EV

Battery
8-10 suppliers
87% of battery production

A&D
100%

Consumer electronics
9 out of 10
Create without limits
Innovation can transform industries
$74.5 Billion in automotive

$1.85 Trillion across all industries
Why artificial intelligence for manufacturing?

**Customer needs**
Anticipate needs to design better products

**Decision making**
Reduce time to make critical data-informed decisions

**Business agility**
Improve business operations to be more efficient

**Technological innovation**
Gain an edge for competitive advantage
Serving industrial customers for years
Serving industrial customers for years
The tipping point for generative AI
Serving industrial customers for years
Software-defined mobility and electrification at Honda

Tadafumi Nogawa
General Manager, Connected Solution Development
Honda

Jay Joseph
Vice President of Sustainability and Business Development
American Honda
Honda’s first original product
A leading global power unit manufacturer

28,000,000 units/year
Honda and AWS connected history

- 2023: 23M Global Telematics Center
- 2020: 20M Global Telematics Center
- 2016: 16M Global Telematics Center
- 2013: Internavi
- 2003: Floating car data system
- 1998: Telematics Navi
Honda is initiating deep cross-domain collaboration between in-car and out-car to achieve software-defined mobility.
How to achieve software-defined mobility

Challenge

- Each department has been working independently
- The schedule of hardware requirement decision and the out-car cloud development was different
- Time-consuming coordination between departments does not speed up entire car development
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Digital proving ground

Out-car side ECU developer
Development ECU application on cloud

In-car side ECU developer
Development ECU application on cloud

Data scientists
Exploration, integration, predictive models

Data experts
Ad-hoc reports, create KPIs

Third-party company
Real-time data feeds

SDM CCoE
Dashboarding, use KPIs, slice and dice

<table>
<thead>
<tr>
<th>Mobile App/Dealer system</th>
<th>Developer Portal</th>
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<tbody>
<tr>
<td>Region Telematics Center</td>
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<td>Global Telematics Center</td>
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<td>Governance &amp; Security Framework</td>
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<tr>
<td>Automotive Datalake</td>
<td>Data Connector</td>
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<tr>
<td>Vehicle Infrastructure</td>
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</tbody>
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Amazon EC2, AWS CodeBuild
AWS Batch, Amazon EC2
AWS Glue, Amazon Redshift
AWS Control Tower, IAM
Amazon S3
AWS IoT Core, AWS IoT FleetWise
Amazon ECS Fargate, Amazon Kinesis

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Honda & AWS: Working together for a software-defined mobility future

- Working together since 2013
- Over 10 years of AWS knowledge
- Amazon culture and mechanism
Software-defined mobility for all Honda products
Using insights from vehicle electrification to transform products and services

Jay Joseph
Vice President, Sustainability & Business Development
Transitioning from a carbon-centric world

Evolution from carbon-centric to sustainable clean energy

Customer-centric energy management system

Integrated energy management
Vehicle charging experience

- Charging experience
- Public charging
- At-home charging
Honda’s customer experience roadmap

- Electric vehicle range management
- Customer applications
- Vehicle-to-grid connectivity
Building Honda’s vision on AWS

AWS Solutions powering Honda’s innovation flywheel

- Application development
- Data analytics
- Energy management services
- Connected mobility services
- Subscription services
- Ecommerce
- Digital customer experience
- Advertising
- Customer call center
- Finance products

Customer insights
Trust & brand loyalty
AWS Solutions
Innovations
Enhanced customer experience
Improved products & services

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AWS Competency Program

AUTOMOTIVE AND MANUFACTURING COMPETENCIES LAUNCHED IN 2023

Build
Industry solutions

Engage
With industry experts

Deploy
Ready-made industry solutions
AWS automotive and manufacturing

The future
Helping develop and enable our customer’s vision is a core pillar of AWS value

Faster
Accelerating innovation with the deepest and broadest cloud platform and purpose-built services and solutions

Together
Transforming better through powerful collaboration
Thank you!

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