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Business Models and Reference Architecture for IIoT

Business Models – Part 2

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Business Oppurtunities in IIoT

- Entrepreneurship theory:
  - Asset-driven opportunities
  - Service innovations that aid manufacturing
  - Service-driven opportunities targeted at end users
  - Information infrastructure ownership
- Transaction cost theory:
  - Non-ownership contracts
  - Performance contracts

Components of IIoT Business Models

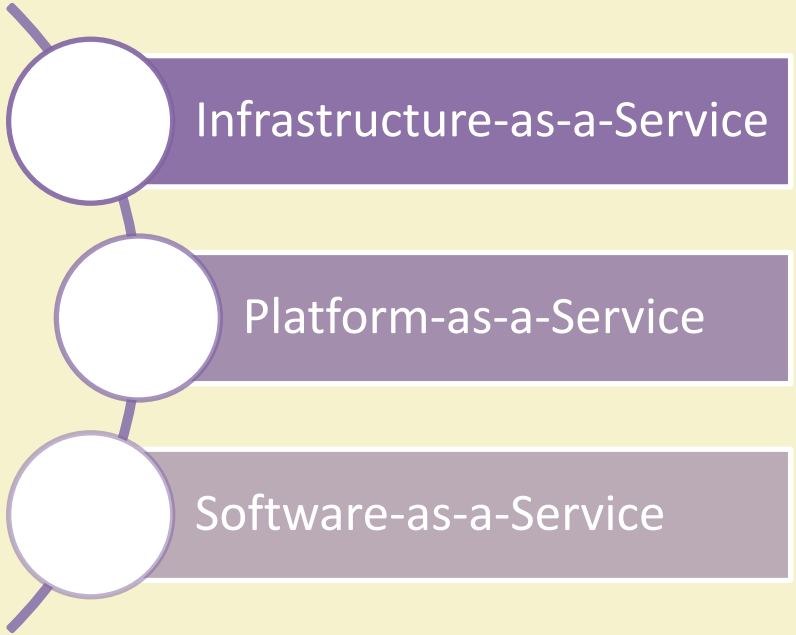
- Value proposition
- Value capturing mechanism
- Value network
- Value communication

IIoT Business Models: Types

- IIoT business models can be divided into following categories:
  - Cloud-based Business Model
  - Service-Oriented Business Model
  - Process-Oriented Business Model

Cloud-Based Business Model

- Customers do not purchase software, platform or infrastructure
- Instead, they lease the cloud computing resources temporarily



Cloud-Based Business Model (Contd.)

- Cloud-based BMs comprise manifold offerings
  - Processing power
  - Data storage
  - Virtualization of the operating system online

- Infrastructure-as-a-Service (IaaS) model
  - Aim at providing required hardware and software online in the cloud

Cloud-Based Business Model (Contd.)

- Platform-as-a-Service (PaaS) model
  - Open toward external parties
  - Provide development-oriented platforms
  - Facilitate the development of applications
  - Facilitate the integration of applications into existing solutions
- Software-as-a-Service (SaaS) model
  - Offer online capable and customized applications

Cloud-Based Business Model (Contd.)

- Partner network
  - Risk reduction
  - Synergies due to economies of scale
  - Shared usage of resources
- Value configuration
  - Development of cloud services and applications
  - Establishment of partner network

Cloud-Based Business Model (Contd.)

- Core competencies
  - IT resources
  - Software infrastructure
  - Knowhow
- Relationships
  - Community networks
  - Forums

Cloud-Based Business Model (Contd.)

- Value proposition
  - Processing power
  - Data storage
  - Virtualization of the operating system
  - Development oriented platforms
  - Integration of applications
  - Applications

Cloud-Based Business Model (Contd.)

- Distribution channels
  - On demand
- Target customers
  - Educational institutions
  - Startups
  - Independent software vendors
  - Small and medium-sized enterprises

Cloud-Based Business Model (Contd.)

- Cost structure
  - Cost reduction
  - Initial costs for installation
  - Service costs
- Revenue model
  - Pay-per-use
  - Subscription fees
  - Advertisement

Service Oriented Business Model

- Offers
  - primarily utilization
  - Analysis of data
  - aggregation of data
- Example:
  - Medical environment

Service Oriented Business Model (Contd.)

- Offered to a mass market on demand through infrastructures and platforms established by Cloud-based BMs
- Provides to customers
  - Self-service interface
  - Automated services
- Target customers
  - Mass market

Service Oriented Business Model (Contd.)

- Partner network
  - Community
  - Infrastructure providers
  - Platform developers
- Distribution channels
  - Platforms
  - On demand

Service Oriented Business Model (Contd.)

- Value configuration
  - Maintenance and further development of
    - Platforms
    - Infrastructures
    - Applications
- Relationships
  - Self-service interface
  - Automated services

Service Oriented Business Model (Contd.)

- Value proposition
  - Utilization of data
  - Analysis of data
  - Aggregation of data
- Core competencies
  - Platforms
  - Data analysis methods
  - Data

Service Oriented Business Model (Contd.)

- Cost Structure
  - Initial establishment costs
  - Variable instead of fixed costs

- Revenue Model
  - Collected data
  - Direct and indirect monetization of data

Process Oriented Business Model

- Process optimization resulting in
  - Reduced downtimes
  - increased machine availability
- Optimize processes within a company and across company boarders
- Optimize data analyzed by Service-oriented BMs
- Results in reduced downtimes due to the eliminated delivery times

Process Oriented Business Model (Contd.)

- Value configuration
  - Master complex production processes
  - Various production technologies
- Core competencies
  - Platforms
  - Data
  - 3D printers

Process Oriented Business Model (Contd.)

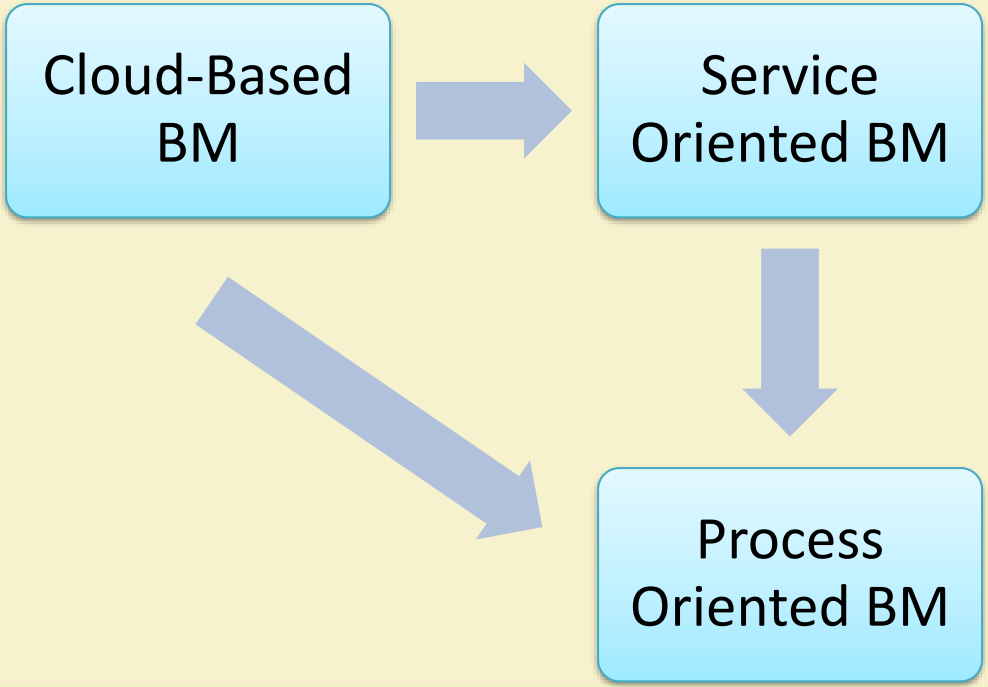
- Value proposition
  - Reduced downtimes
  - Increased machine availability
- Target customers
  - Machine and plant engineering industry

Process Oriented Business Model (Contd.)

- Cost structure
  - Initial establishment costs

- Revenue model
  - Licenses
  - Higher prices possible

IIoT Business Model: Flow



IIoT Business Model: Flow (Contd.)

- Cloud-based BMs aim at providing an infrastructure
- Companies operating a Service-oriented BM employ Cloud-based BMs to gather data and information
  - Analyze and sell as a service
- Analyzed and prepared data help companies with a Process-oriented BM to optimize process flows

IIoT Business Model: Challenges

- Security and data privacy
  - Physical and virtual worlds combine at a large scale
- Need security frameworks for entire cyber physical stack
  - device-level authentication and application security
  - system-wide
    - Assurance
    - Resiliency
    - Incidence response models

IIoT Business Model: Challenges (Contd.)

- Lack of interoperability
- Increase complexity
- Increase cost
- Need for seamless data sharing between machines and other physical systems from different manufacturers

IIoT Business Model: Challenges (Contd.)

- Uncertain return on investments on new technologies
- Immature or untested technologies
- Lack of data governance rules across geographic boundaries
- Shortage of digital talent

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Thank You!!