



IOT BEYOND THE BASICS

NEXT STEPS FOR SMART, CONNECTED SERVICE

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MACIEJ REDEL



- My company & my work
 - PTC (since 2013 via Axeda acquisition)
 - Global Services Technology Platforms Group
 - Fellow Solutions Architect
- Previously – Solutions Architect at:
 - T-Mobile and Orange (now EE / BT Mobile)
 - MetraTech (now Ericsson)
 - Convergys (now Netcracker)
 - EDS (now Hewlett-Packard Enterprise)
- Other facts
 - Born in Poland, living in the United Kingdom
 - Happy father of 2 boys (6 & 3)
- LinkedIn: <https://uk.linkedin.com/in/maciejredel>



LET'S START WITH SOME NUMBERS

Where is your IoT initiative today?

- A. “Thinking about it”
- B. Planned or in development
- C. In production
- D. “Not interested in IoT”

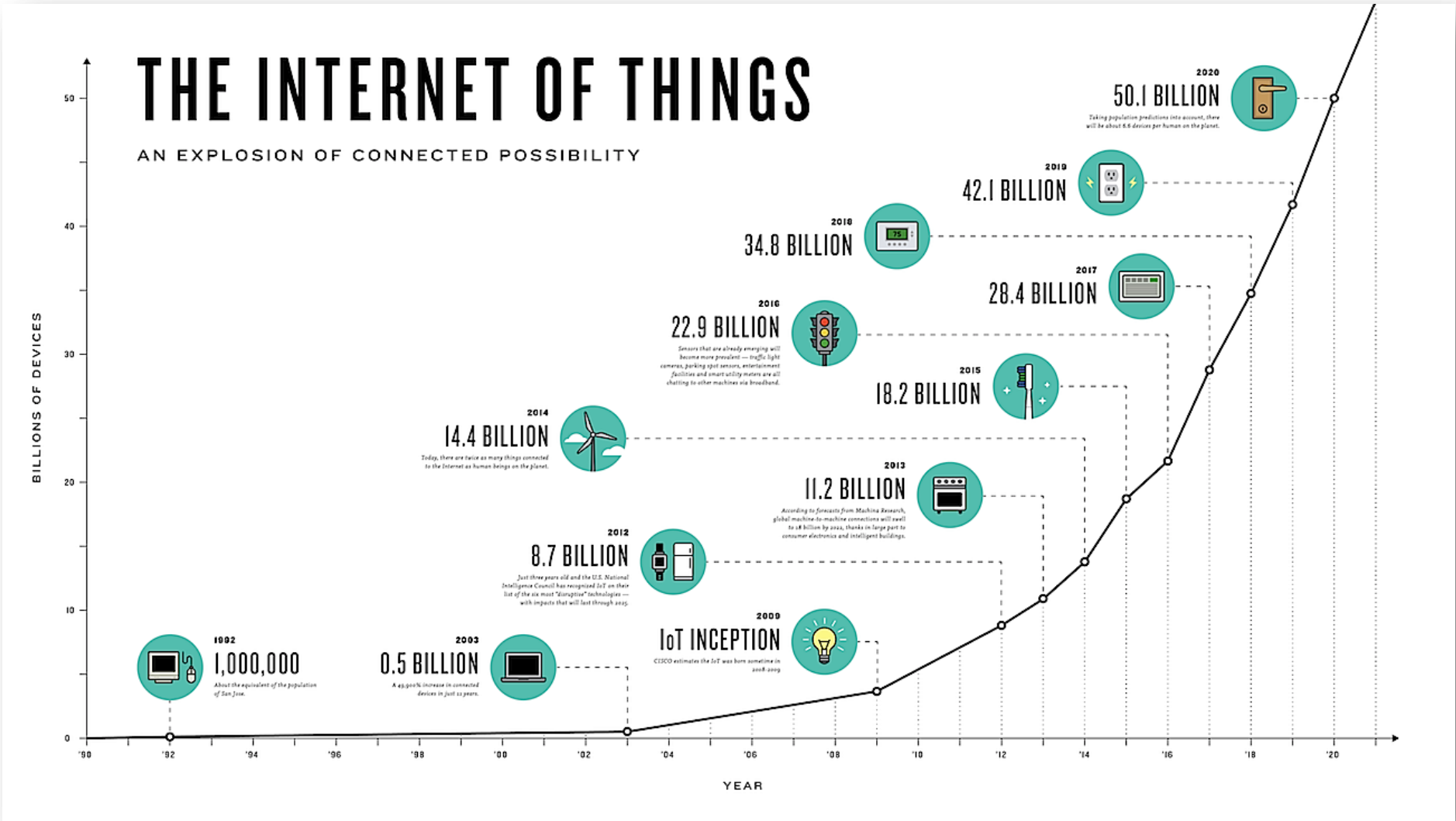


Everyone is doing it!

(or is about to do – very soon)



CONNECTIVITY IS UBIQUITOUS



Prepare for **Bazillion** devices producing constant flood of data...

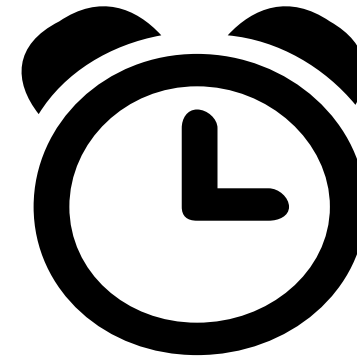
DIFFERENTIATORS OF TOMORROW

TODAY

- Connected
- Asset Tracking & Monitoring
- Remote Service & Diagnostic
- Preventive Maintenance
- Software and Content Distribution
- Product usage analytics and feedback into R&D
- Some automated flows (replenish consumables, issue ticket creation, ...)

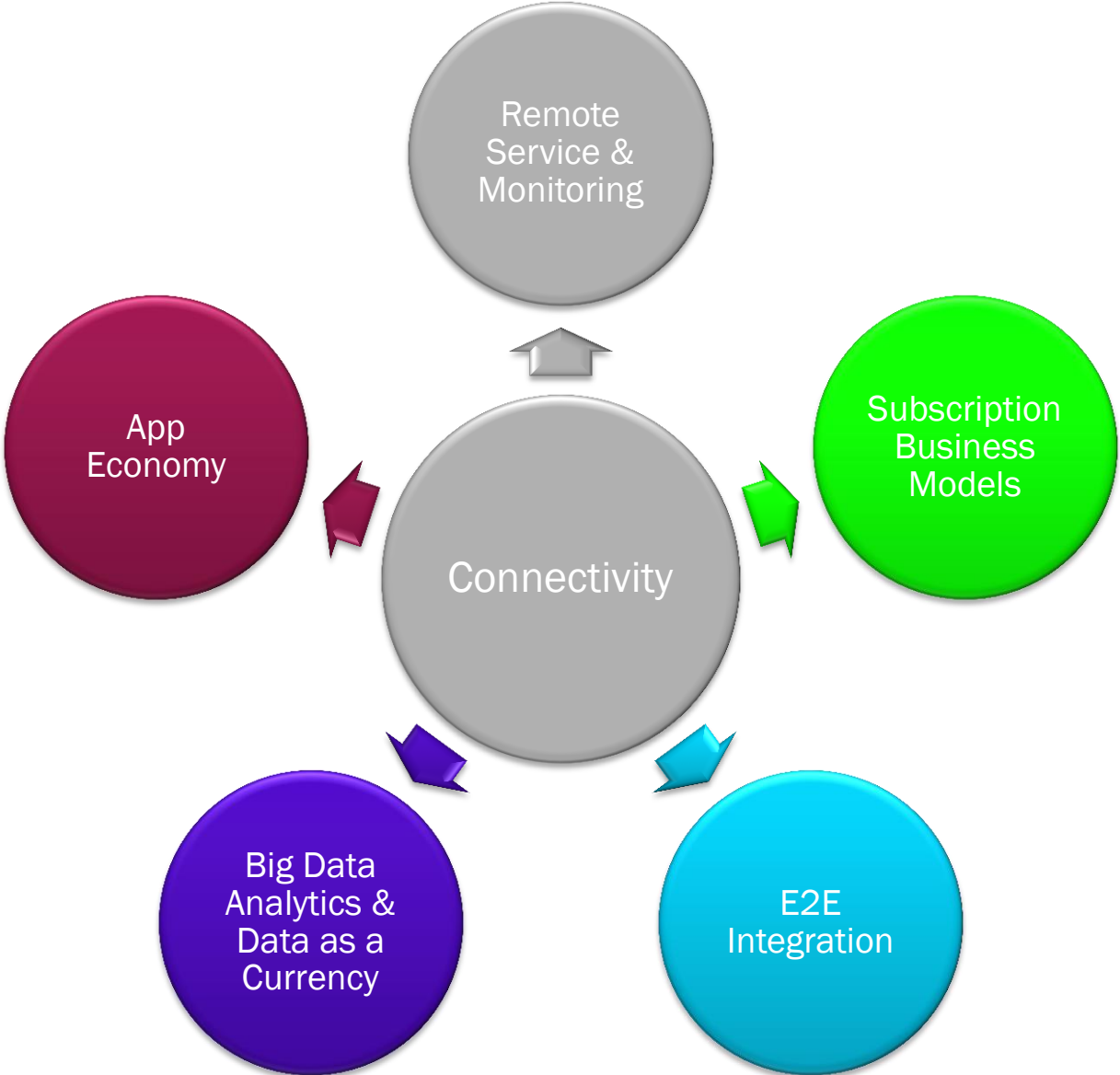
TOMORROW

- Connectivity is not Unique Selling Point anymore
- Remote Service is not differentiator anymore...
- Etc.
- ...



BEYOND BASIC CONNECTIVITY & REMOTE SERVICE

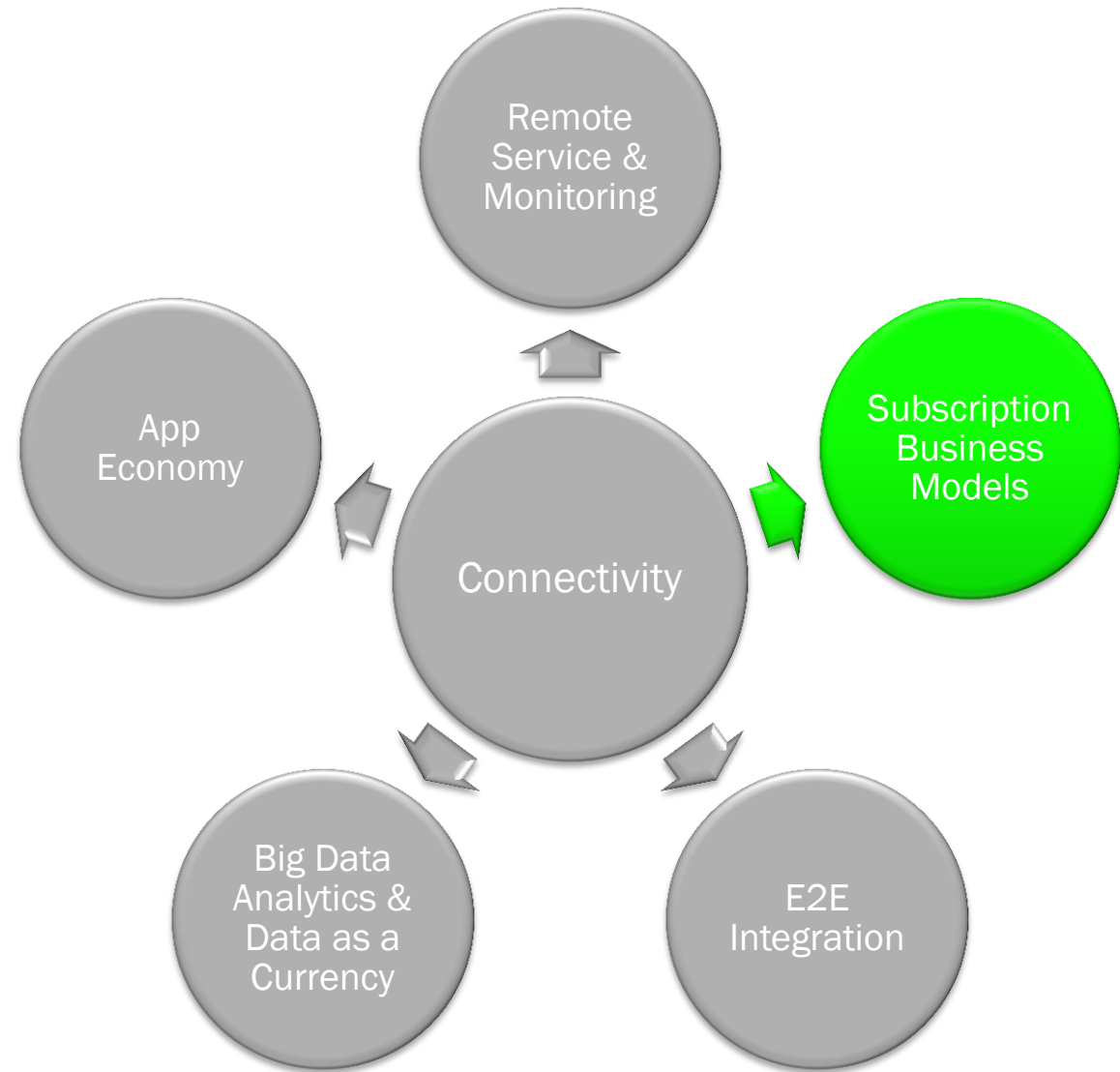
OPPORTUNITIES OF TOMORROW (IOT 2.0/WAVE2)



- Opportunities
- Challenges
- Considerations
- Recommendations
- How PTC can help



SUBSCRIPTION BUSINESS MODELS



CHANGE IN BEHAVIOURS AND EXPECTATIONS



- Transportation in large cities
 - Vehicle ownership is replaced with Uber, ZipCar, London Cycle Hire Scheme
- Media/Instant service access
 - Physical media is replaced with Streaming or Direct to Digital releases
- Power by the hour
 - Airline industry (jet thrust per hr), power generation & delivery
- Pay per use
 - Medical & healthcare – pay fee per use of the equipment/per treatment
- Pay per outcome
 - Smart buildings – savings in utilities shared between end customer and providers

Manufacturers of Smart Connected Products will become impacted by these global trends

- Avoidance of the commitment and difficulties related to the product ownership
- Focus on the outcome or the promise of a result
- Expectation of the instant service delivery
- Access to new services



OPPORTUNITY – SBM/PAAS/EAAS



- Rise of new business models:
 - Subscription Business Model
 - Product as a Service
 - Everything as a Service
- Customer view
 - Easy access
 - Quick time to value
 - Always up to date
- Manufacturer view
 - Recurring revenue
 - Better market penetration
 - **Need to adopt**

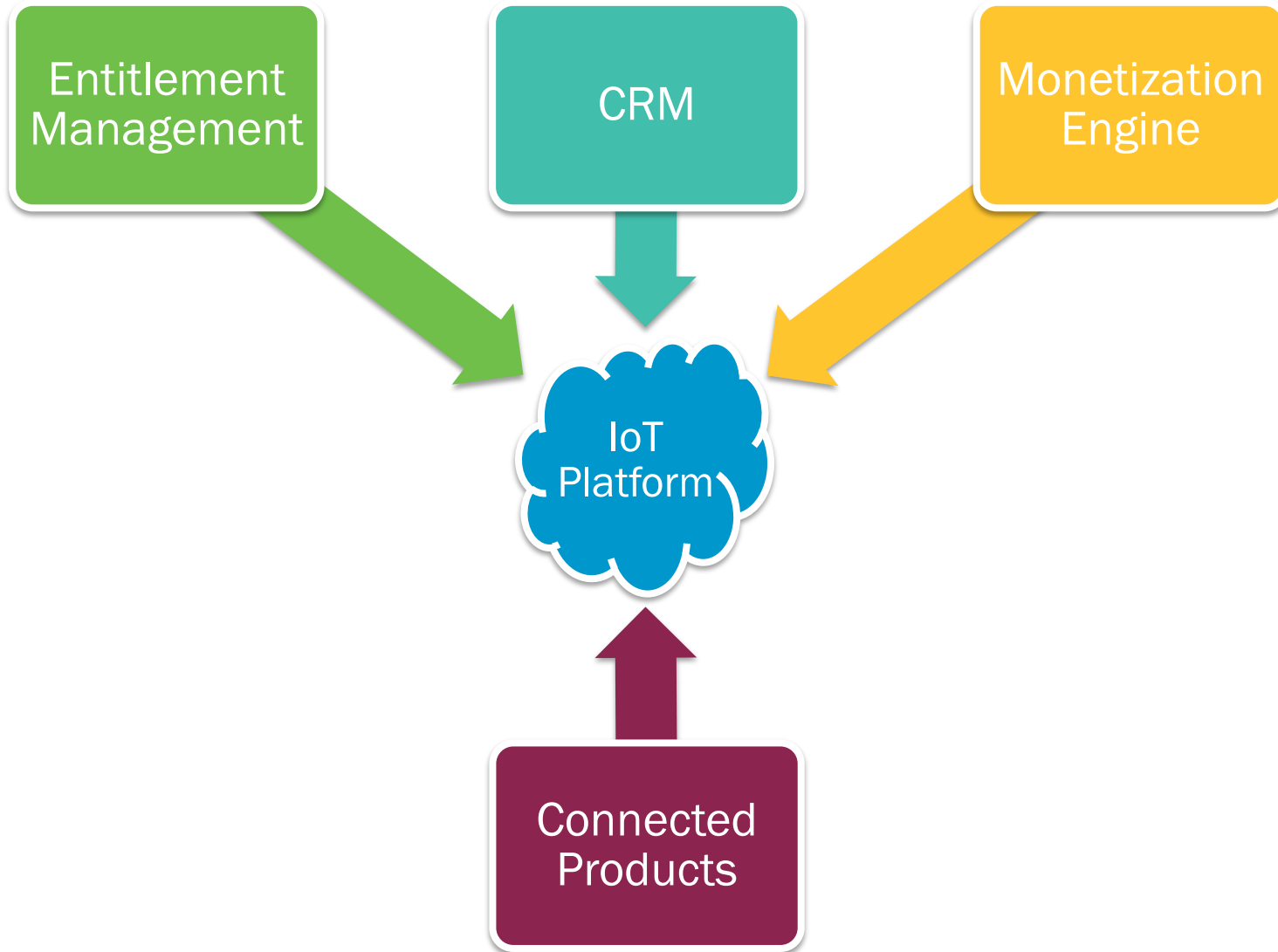
Traditional business model

- Product purchase with capital expense
- High cost of entry and long time to value
- Product capability locked at purchase

Subscription based business model

- Product as a service
- Low cost of entry and short time to value
- Evolving product capability (updates, upgrades)

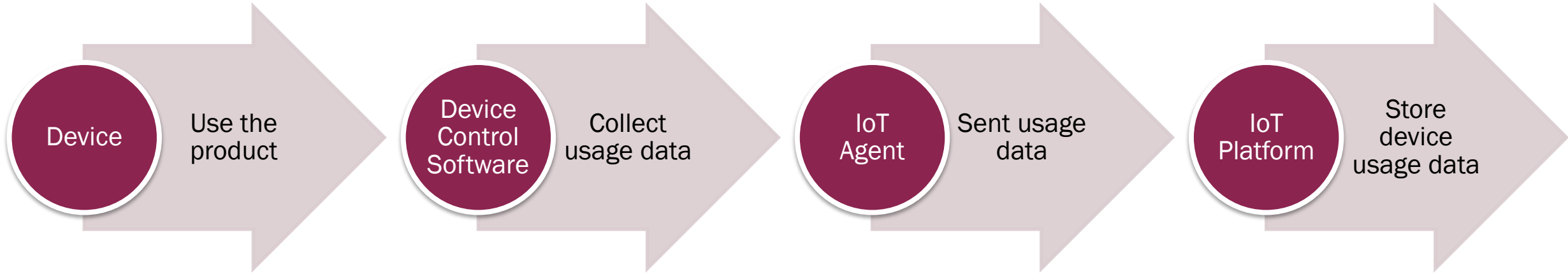
PAAS READY IOT SOLUTION BLUEPRINT



Challenges

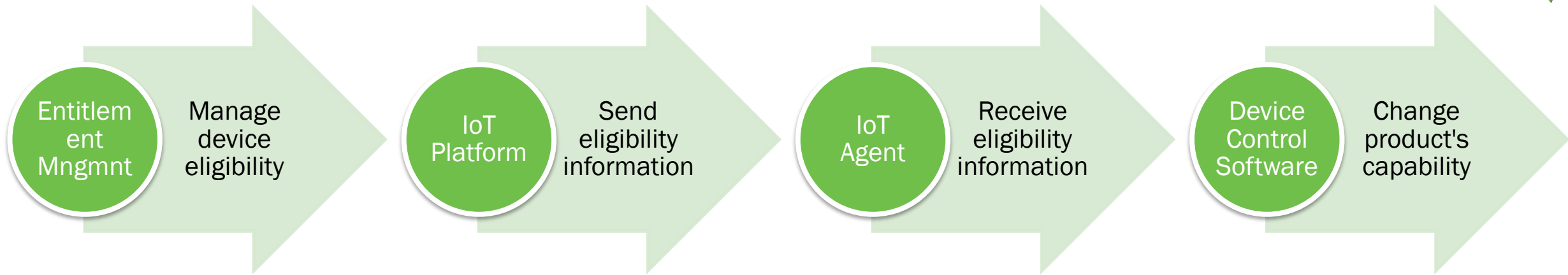
- Manufacture
 - Products
- Architectural
 - IT Landscape
- Operational
 - Processes
- Organizational
 - People and Culture

PRODUCT: DEVICE USAGE DATA COLLECTION



- What are the key data points used for usage based pricing?
 - Single qualifiers (#MRI scan jobs; #cycles)
 - Multiple qualifiers (#miles driven & #days; #cycles & power levels, ...)
 - Quantitive and qualitative
- Chargeable add-on services must generate related data points – i.e.: real time consultancy with expert, use of product extra features
 - Collect various data points to adapt to changing market conditions
- Use this data to provide usage feedback to the user
 - Avoid bill shock
 - Avoid unexpected service cut-off
 - Provide transparent usage structure information

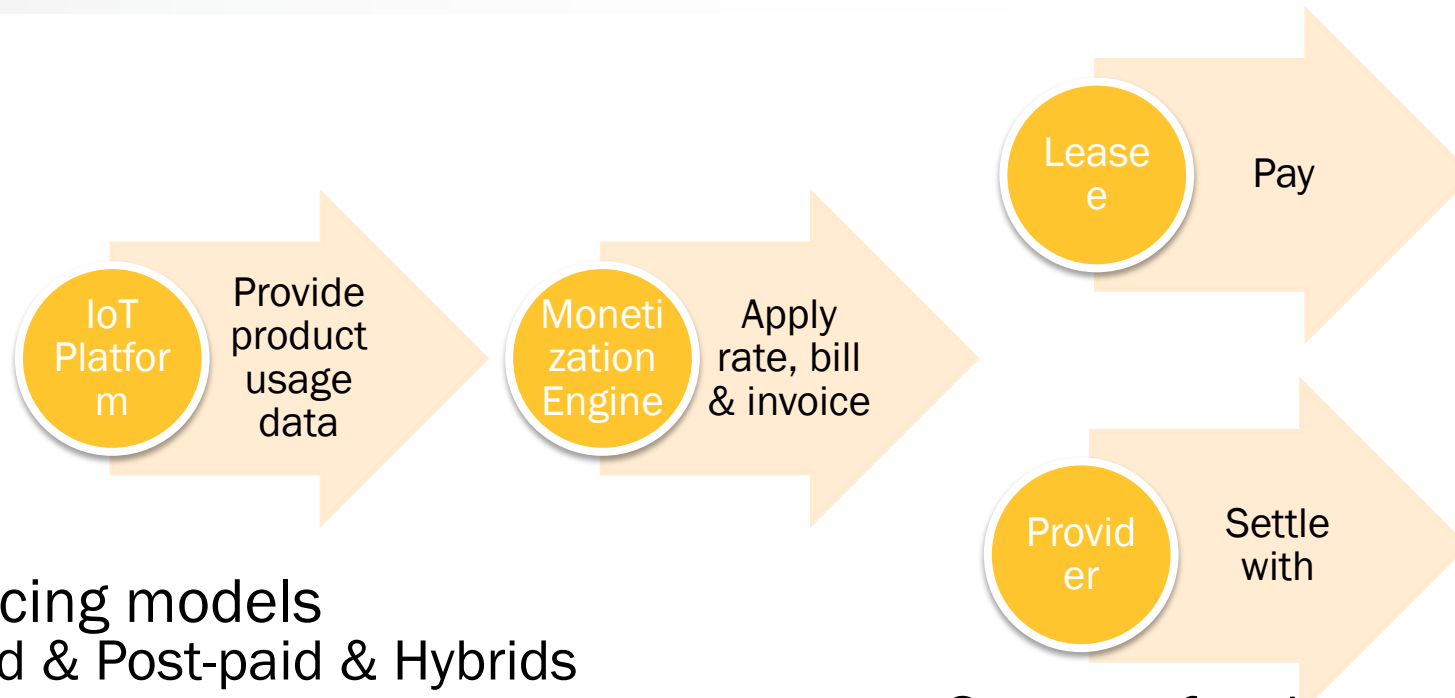
ARCHITECTURE: ENTITLEMENT MANAGEMENT



- License & entitlement granularity
 - On / Off
 - Per function
 - Fully qualified & parametrized

- License expiration mechanisms
 - Early warning
 - Should you cut-off or downgrade the service?
 - Is it possible?
 - What are the consequences?

ARCHITECTURE & PROCESS: MONETIZATION ENGINE

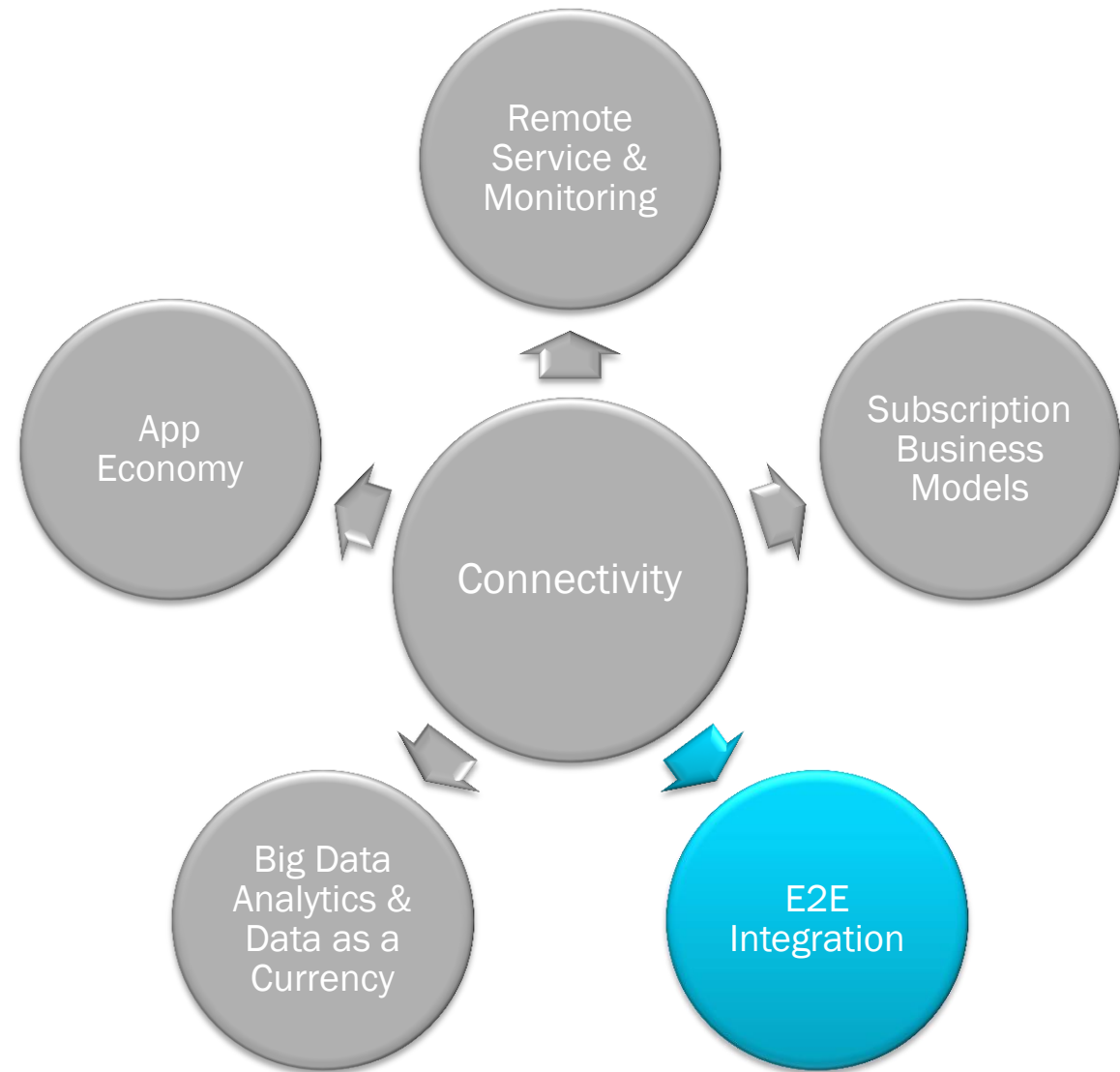


- Flexible pricing models
 - Pre-paid & Post-paid & Hybrids
- Support for global markets
 - Currencies
 - Taxations
 - Legislations
- Support for ad-hoc billing (B2C!)

- Support for data volumes generated by IoT
- Multi-way settlements:
 - End Customer
 - Application Provider
 - Content Provider
 - Service Provider

“By 2020, a failure to put in place a Licensing and Entitlement Management system will result in a 20% drop in potential revenue generated from software for device manufacturers connecting to the IoT.” – Gartner

E2E INTEGRATION



- TBD
 - Full product life cycle automation
 - CAD – PLM – SLM – Spare Parts Management – Field Service Management – IoT – VR/AR
 - Product simulation

E2E DIGITAL COVERAGE OF PRODUCT LIFECYCLE



Connect



Connectivity and Device Management



Device Cloud Options



Create



Dev. Tools



Application & Mobile Enablement



Enterprise Extensions



Analyze



Machine Learning



Rules and Alerts



Experience



Digital Twin



Augmented Reality

Share

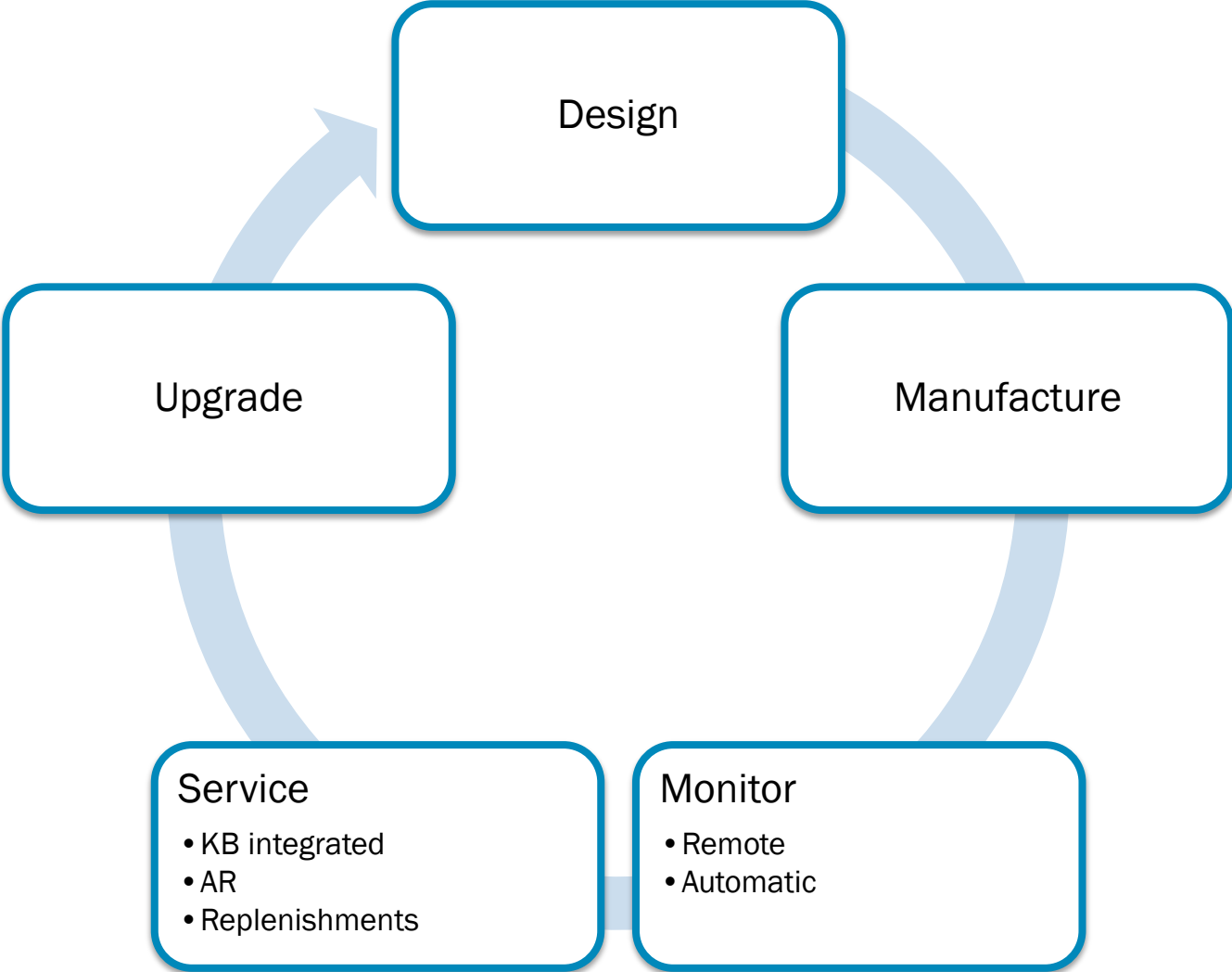


Developer Community

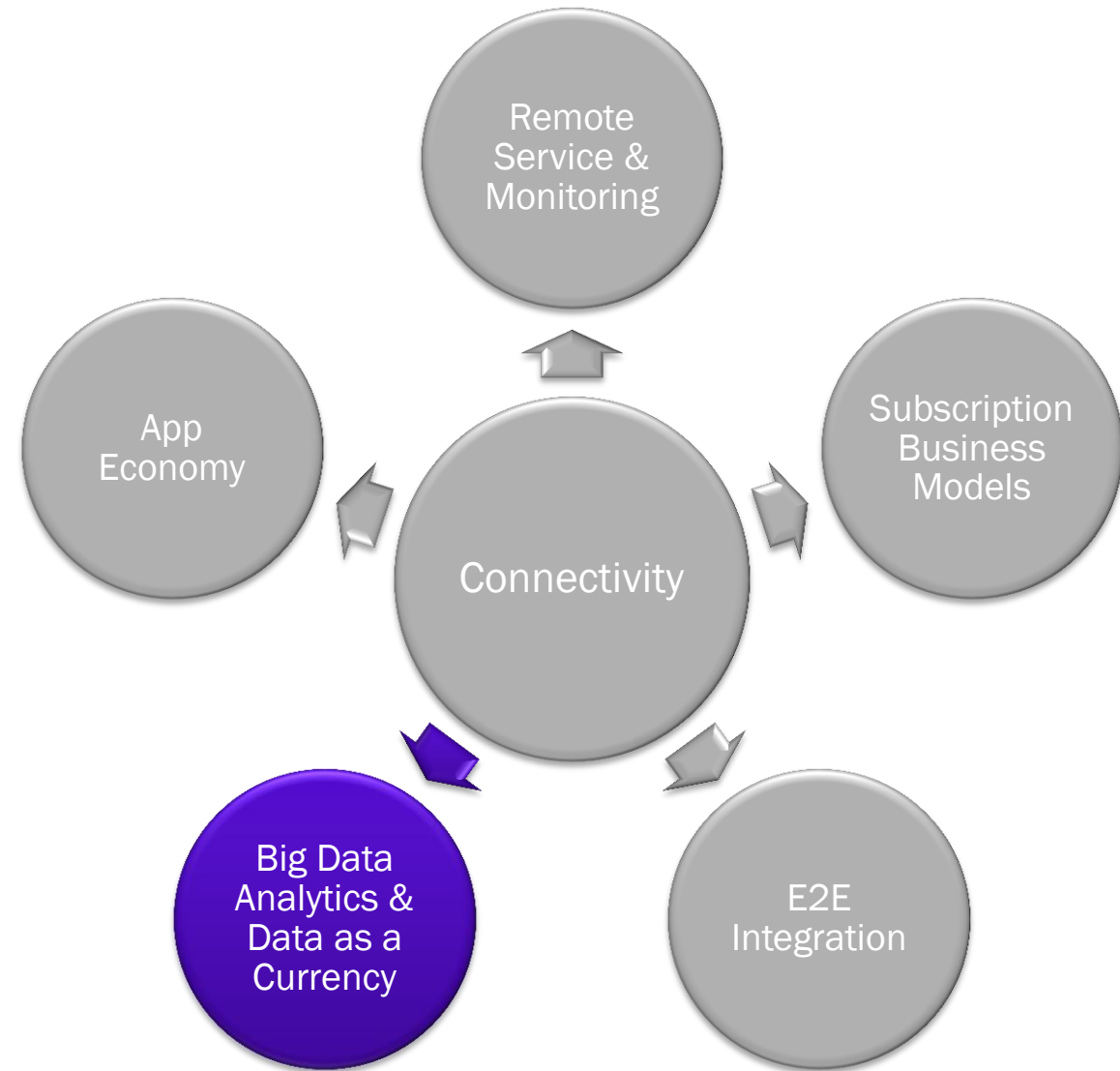


Marketplace

CONNECTED PRODUCT LIFE CYCLE



BIG DATA ANALYTICS & DATA AS A CURRENCY



Vs of Big Data

- Velocity
- Volume
- Variety
- Veracity
(accuracy/quality)
- Value

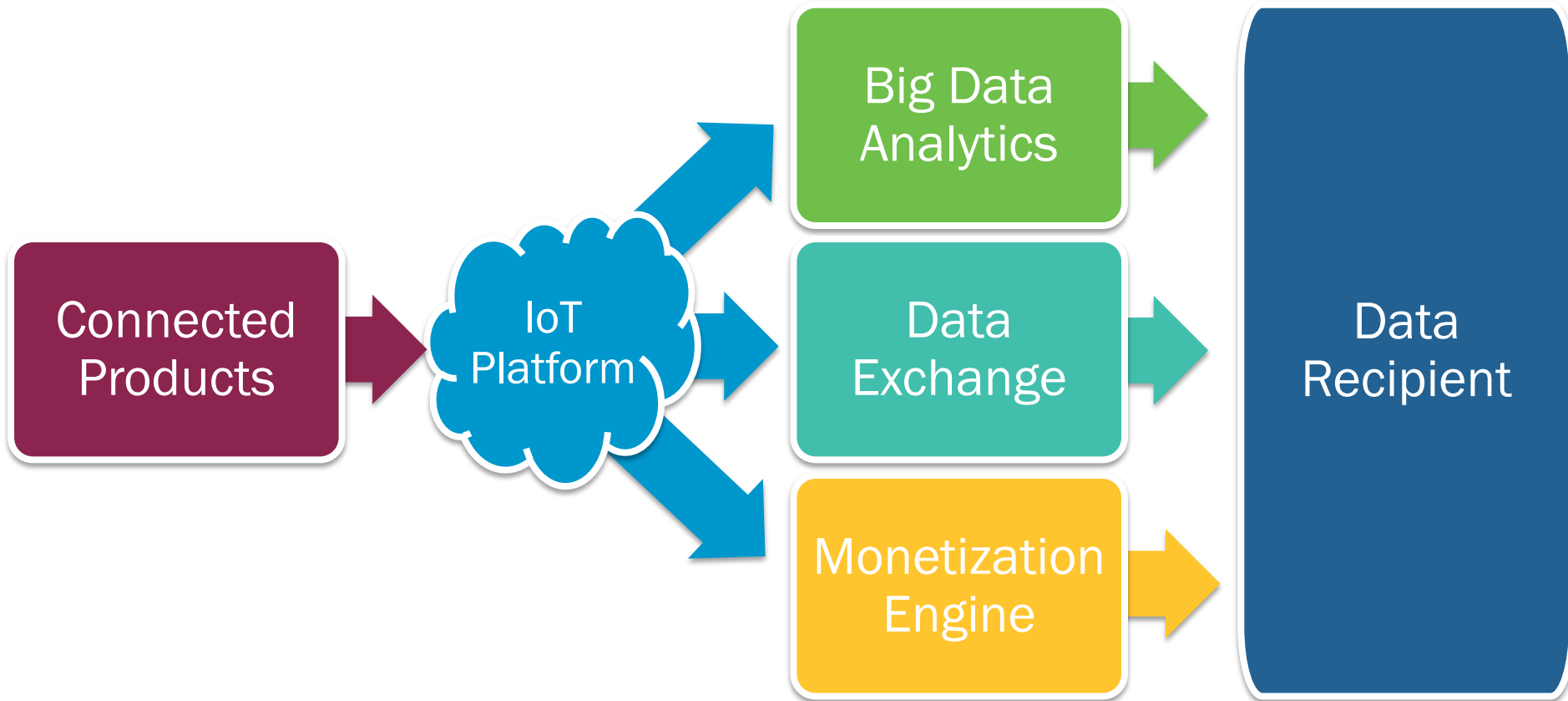


"I feel sorry for the archaeologists of the future" – M. Redel

- Technological
 - Security
 - Privacy
 - Aggregation
 - Data science
- Non-technological
 - Security
 - Privacy
 - Data ownership
 - Local legislations
 - Constraints in moving data across borders
 - Ethical issues

What IF we could solve the non-technological issues, how could the IoT solution evolve?

DATA AS A CURRENCY SOLUTION BLUEPRINT



- Internal Organization
- External Organization
- Data Broker / Trader
- Government
- Product User(s)
- All of above

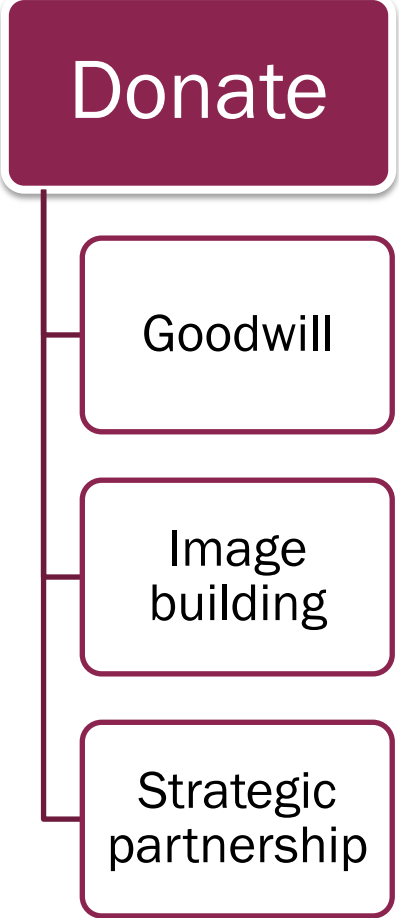
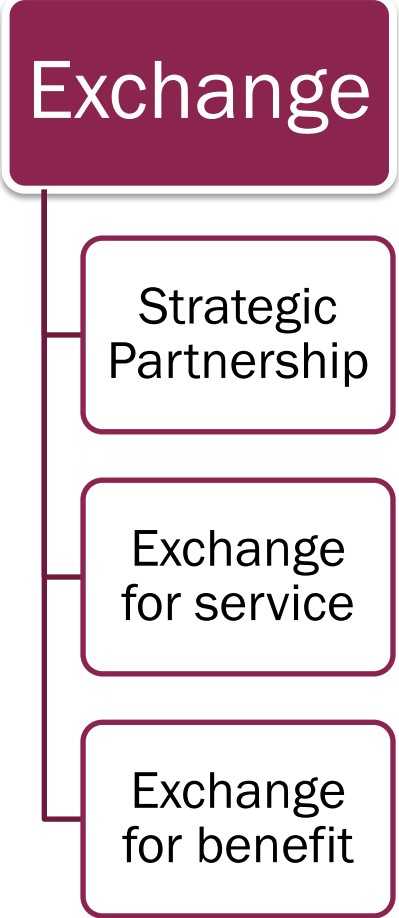
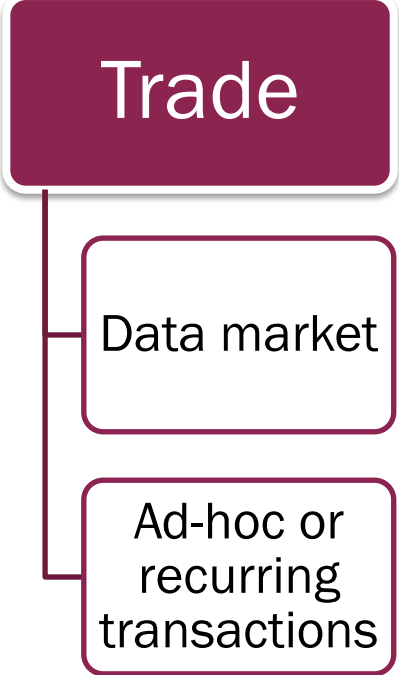
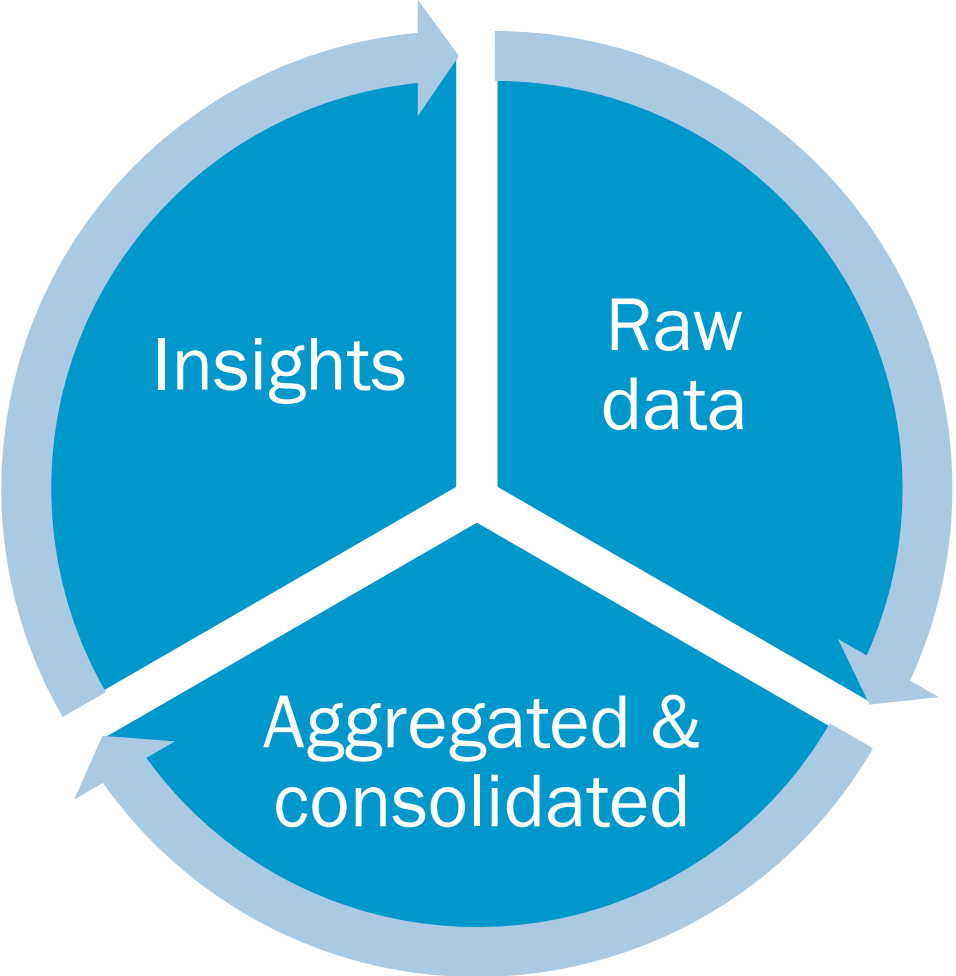
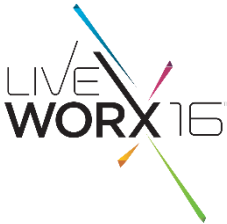
Data Exchange

- Trade data in & out
 - Search & filter
- Consolidate & aggregate
- Store & protect
- Extract the insights
 - Market place for proprietary, industry specific algorithms?
- Change insights into decisions & actions
 - Tap into external workflows

Monetization Engine

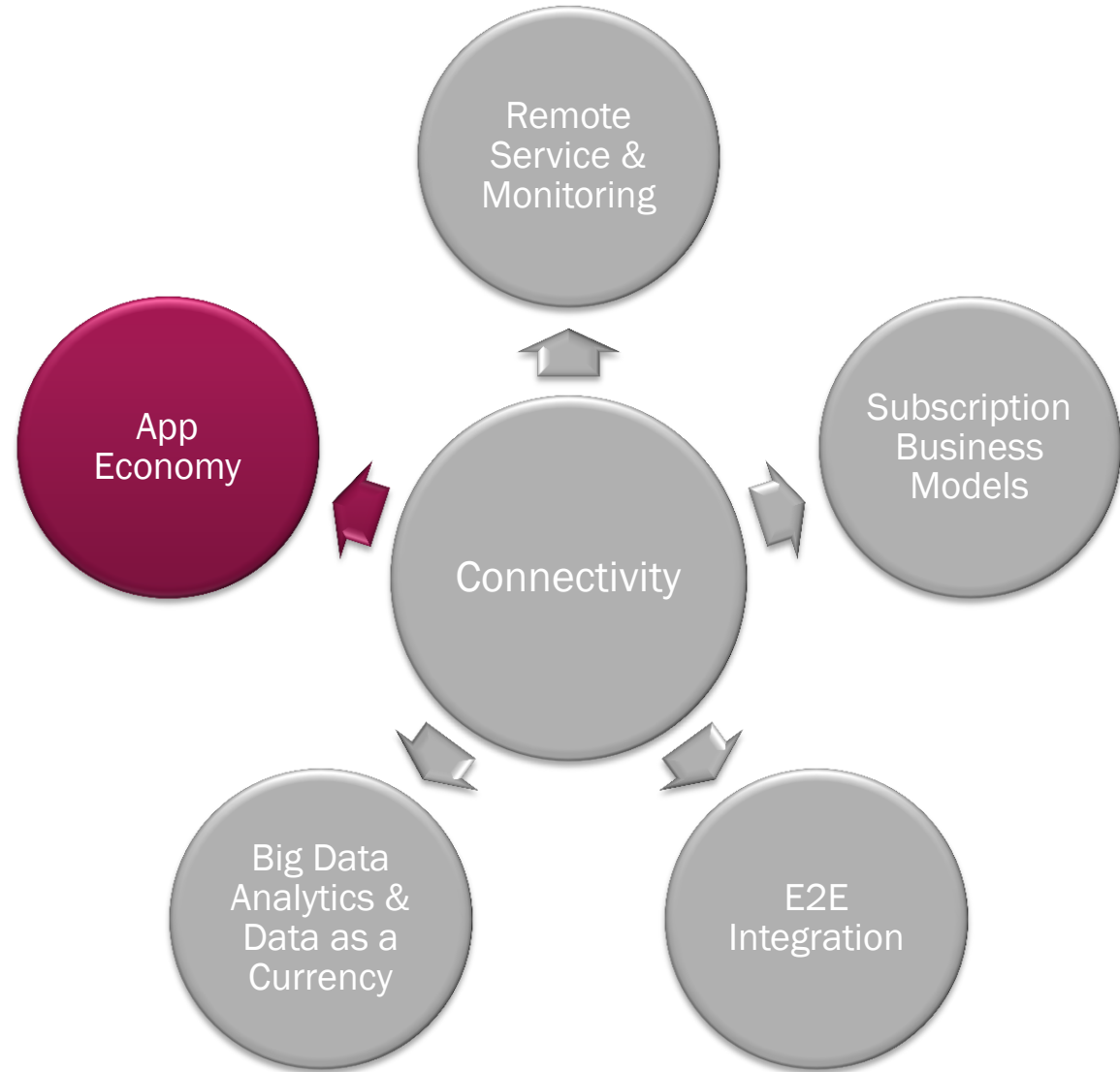
- Monetize transactions
- Settlements

DATA EXCHANGE STRATEGIES



“Data is the oil of the 21st century. But oil is just useless thick goop until you refine it into fuel. And it’s this fuel – proprietary algorithms that solve specific problems that translate into actions – that will be the secret sauce of successful organisations in the future” – Gartner

APP ECONOMY

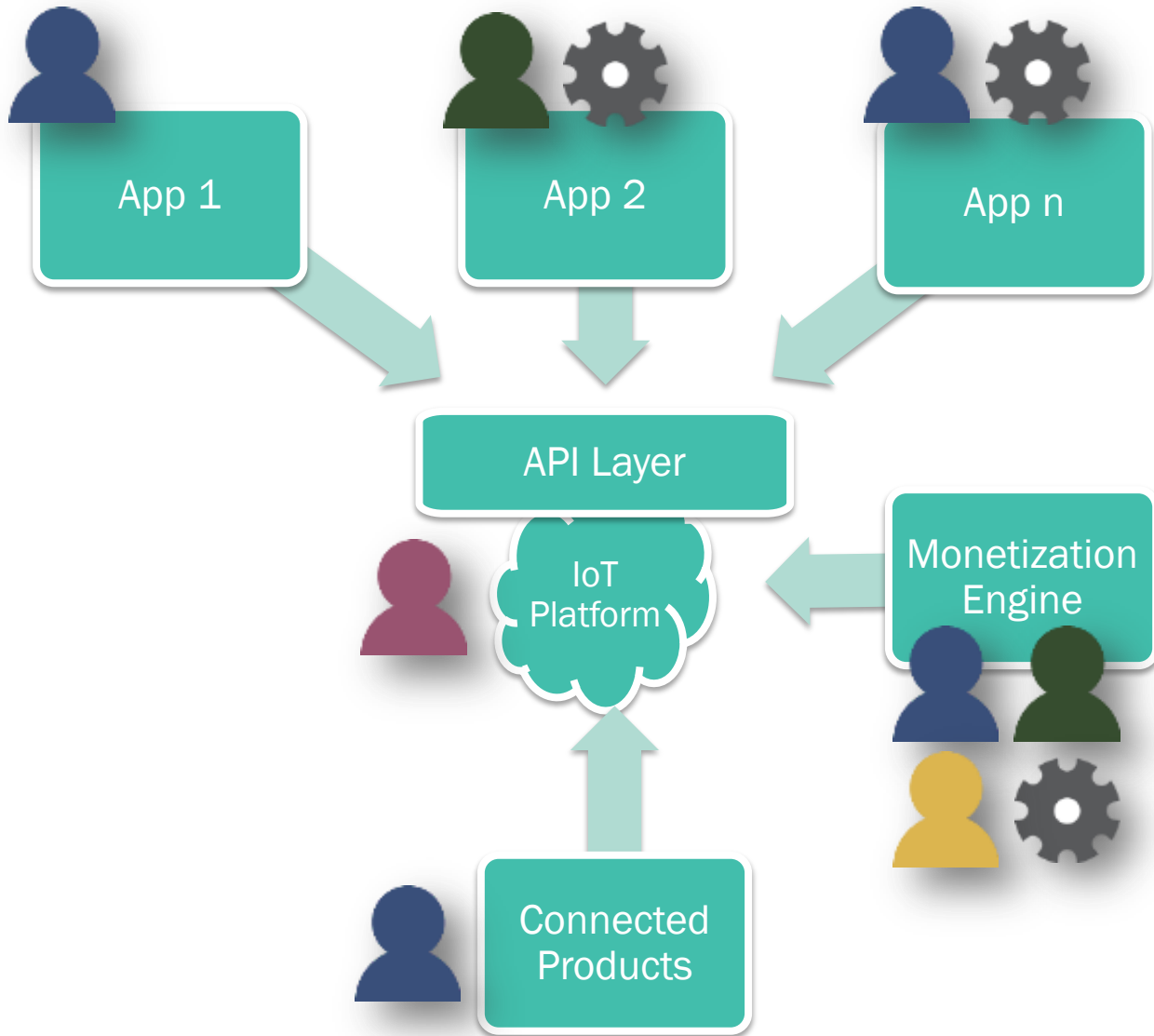


APP ECONOMY IS HERE TO STAY



- Application ecosystem
 - Platform is as good as applications solving real problems
 - External developers solving core and non-core problems
 - Expertise
 - Budget
 - Identify new opportunity
- Applicability to IoT
 - Public sector (smart cities)
 - Infotainment (connected vehicle)
 - Health & fitness industry / health & life insurance
 - Logistics
 - Home automation
 - Agriculture (smart farming)
 - ...

APP ECONOMY READY IOT SOLUTION BLUEPRINT



- API Layer
- New categories of users
 - Product user
 - Service Technician
 - App user
 - Inanimate app user
 - App developer
- Multi-way settlements (PaaS/EaaS)

CONSIDERATIONS FOR API LAYER

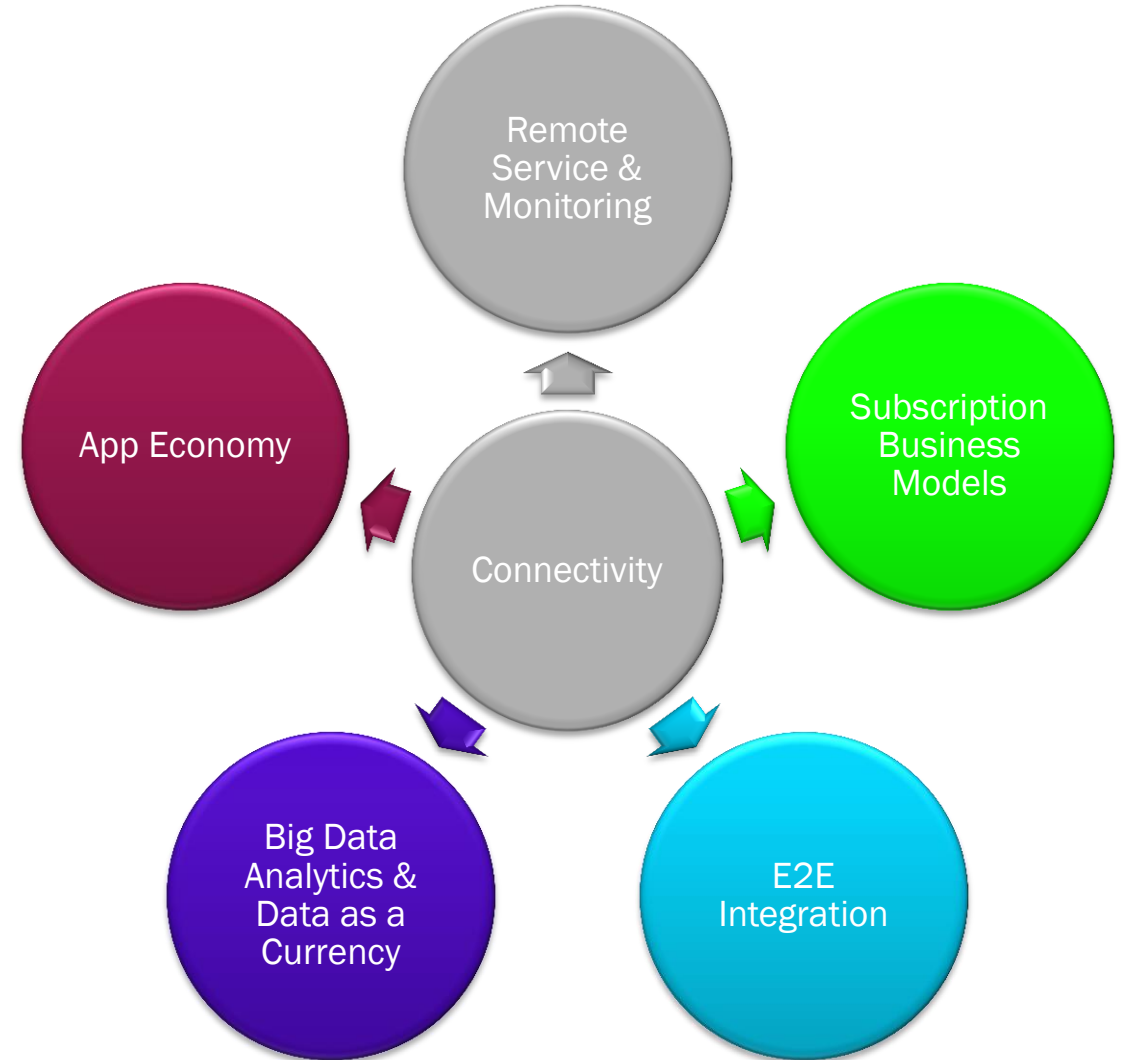


- Access rights
 - Data scope
 - Read only VS Full access
- Security considerations
 - Secure, encrypted, trusted
- Data visibility
 - Multi tenant
 - Segmentation by various criteria (geographical, functional, ...)
 - Free VS paid data
- API usage tracking
- Audit trail
- Audience
 - Open for everyone?
 - Open for certified partners only?
 - Open for other IoT platforms?



CONCLUSION

- Ubiquitous Connectivity is OK
- Connectivity is key enabler
- Synergies between all new directions



PTC – WE ARE HERE TO HELP



- Broadest offering portfolio
 - ThingWorx IoT Platform & application building capabilities
 - ThingWorx Utilities & Integration capabilities
 - ThingWorx Connectivity (Thingworx, Kepware, Axeda, device clouds, ...)
 - ThingWorx Machine Learning
 - ThingWorx Vuforia Augmented Reality
 - PTC's Product Lifecycle Management and Service Lifecycle Management offerings
- Experience and expertise
 - PTC's Global Services know-how and experience
 - Partners
- Partners
 - Strategic partnerships

- Tomorrow
 - Share what you have learnt with your organization and key stakeholders
 - See Kent Eriksson’s presentation *IoT Dos and Don'ts: Ensuring Success with your Internet of Things (IoT) Program* on Thursday at 10.30AM
- Next 90 days
 - Review your IoT strategy – see where you can benefit from “new opportunities”
 - Prepare the “Plan B” – what to do once everyone has connectivity in place?
 - Research:
 - Is my competition moving towards **Subscription Business Models**? Should I move?
 - Can I extend process **Automation** towards my connected products?
 - Do we have / can we have **Data** that is of use to other organizations (internal & external)?
 - Should I open my IoT solution to **App Developers**?
 - Check if you need PTC help formulating or delivering IoT 2.0 capable solutions
- Next 6-12 months
 - Initiate transformations which will deliver IoT 2.0 capabilities to your organization, your connected products, and your Customers

Q & A

The image features several colorful geometric shapes, primarily triangles and lines, scattered across the background. A large, multi-colored triangular shape is prominent on the right side, composed of various shades of blue, green, yellow, orange, pink, and purple. Several thin, colored lines (blue, pink, green, orange) radiate from the center towards the edges. The text 'LIVE WORX 16' is centered in the upper half, with 'LIVE' in a thin, outlined font and 'WORX 16' in a bold, solid black font. A small 'TM' trademark symbol is positioned to the right of the '16'.

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TAKE A FRESH LOOK AT THINGS

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