

# Možnosti, ki jih ponuja digitalizacija za krožno gospodarstvo

**GZS ZEE**

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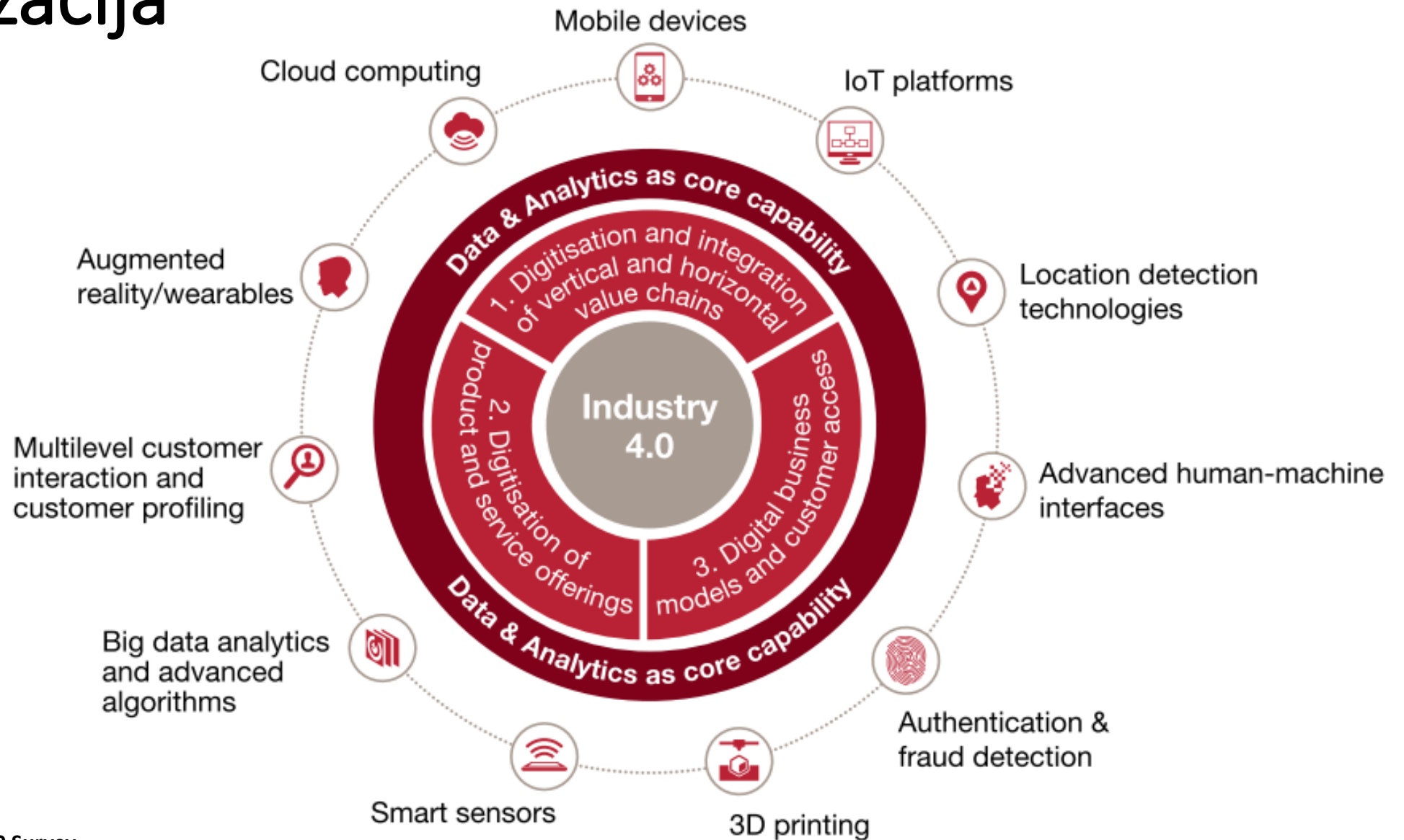
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# Intelligentna sredstva

- **Intelligent assets**

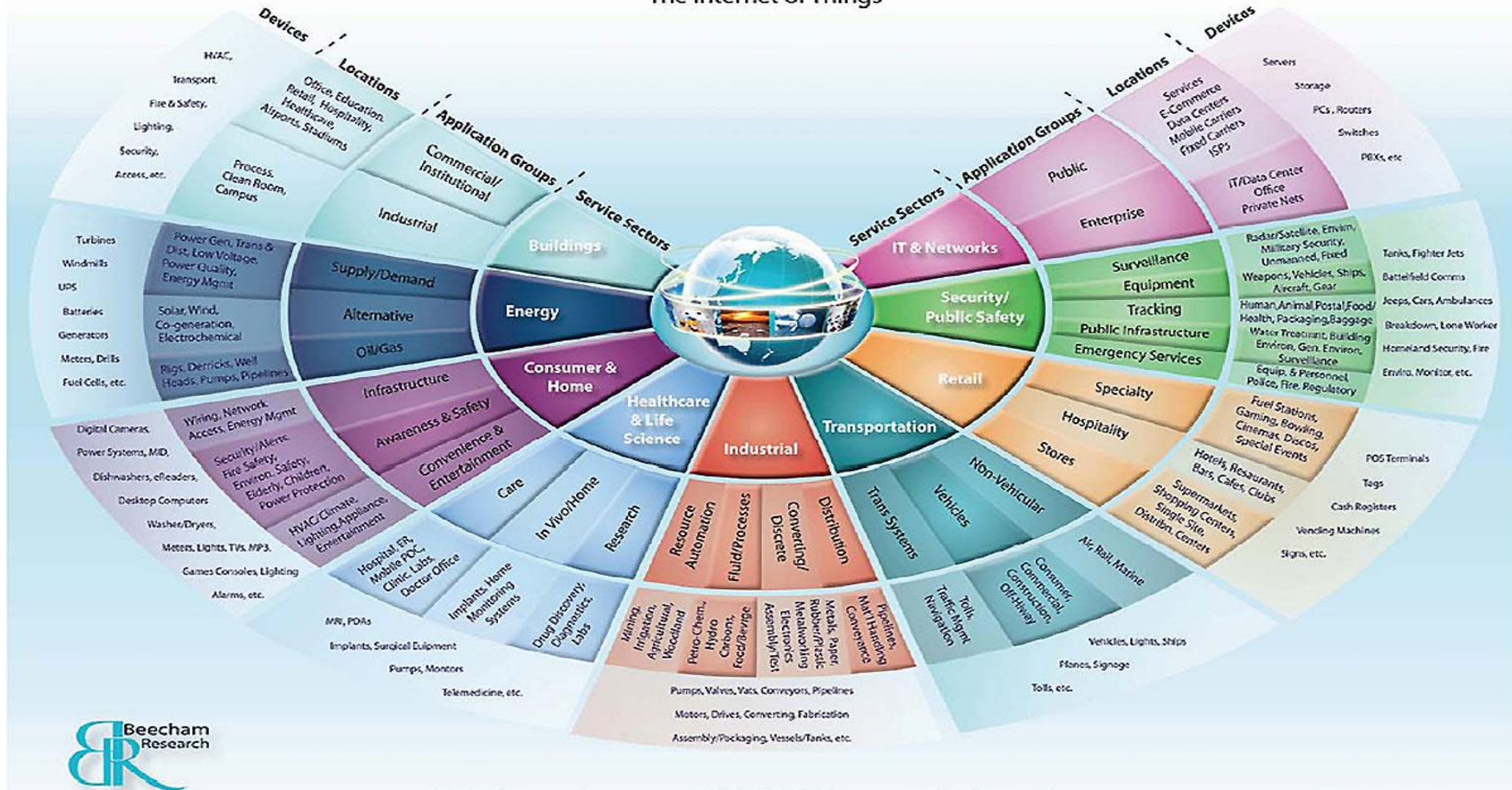
- **Sredstvo** (asset) – fizični predmet, kot je stroj, zgradba ali material, pa tudi komponente, ker se jih lahko obravnava ločeno po življenjski dobi produkta
- Fizični predmeti, ki so sposobni **zaznavanja, pomnenja in komuniciranja** o sebi in svoji okolici
- **IoT** objekti
- **Tudi** predmeti, ki ne pošiljajo stalno informacij in ki nimajo brezžične povezave
- Število povezanih naprav bo do leta 2020 preseglo 50 milijard

# Digitalizacija



# Internet stvari

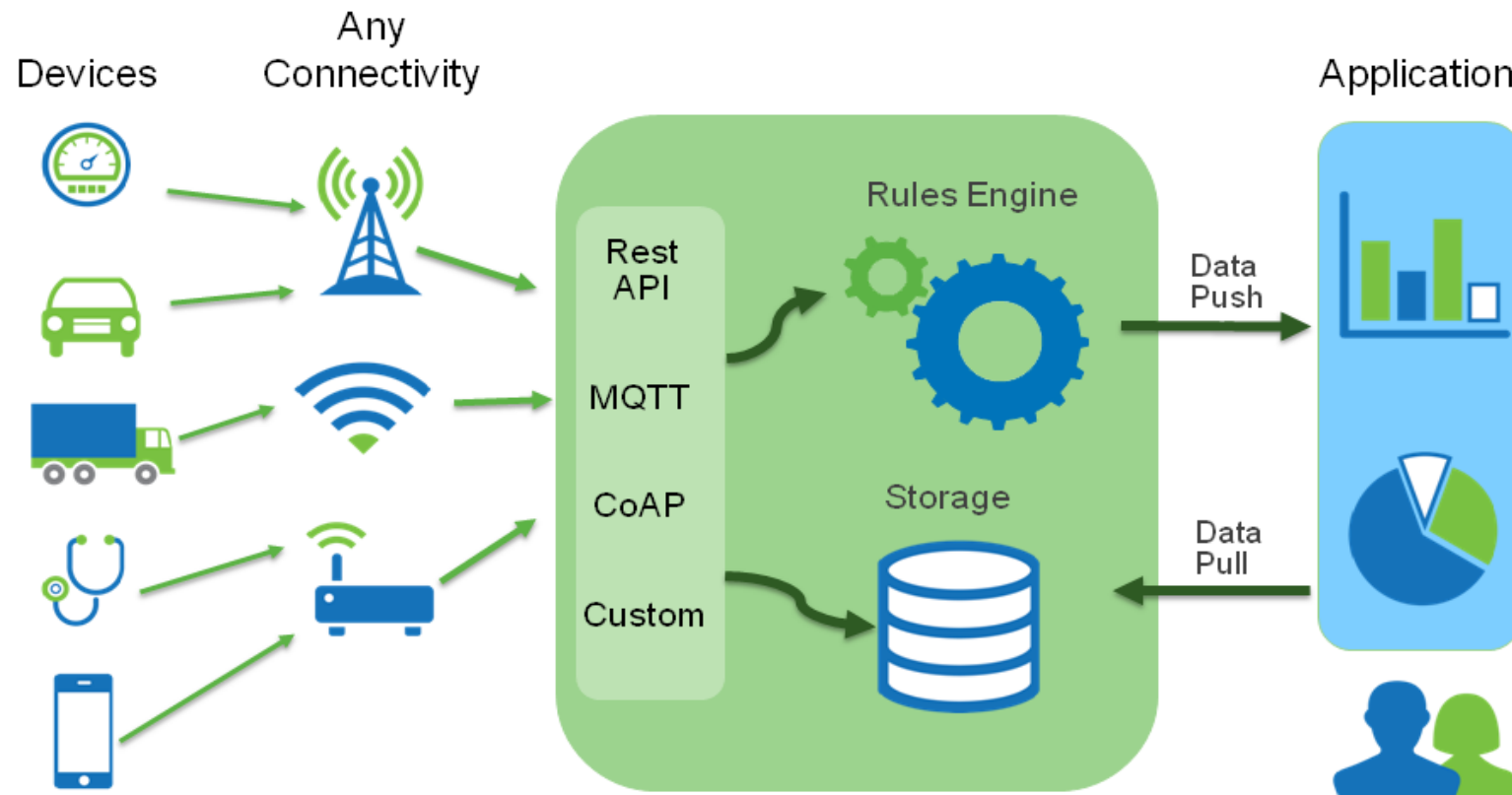
The Internet of Things



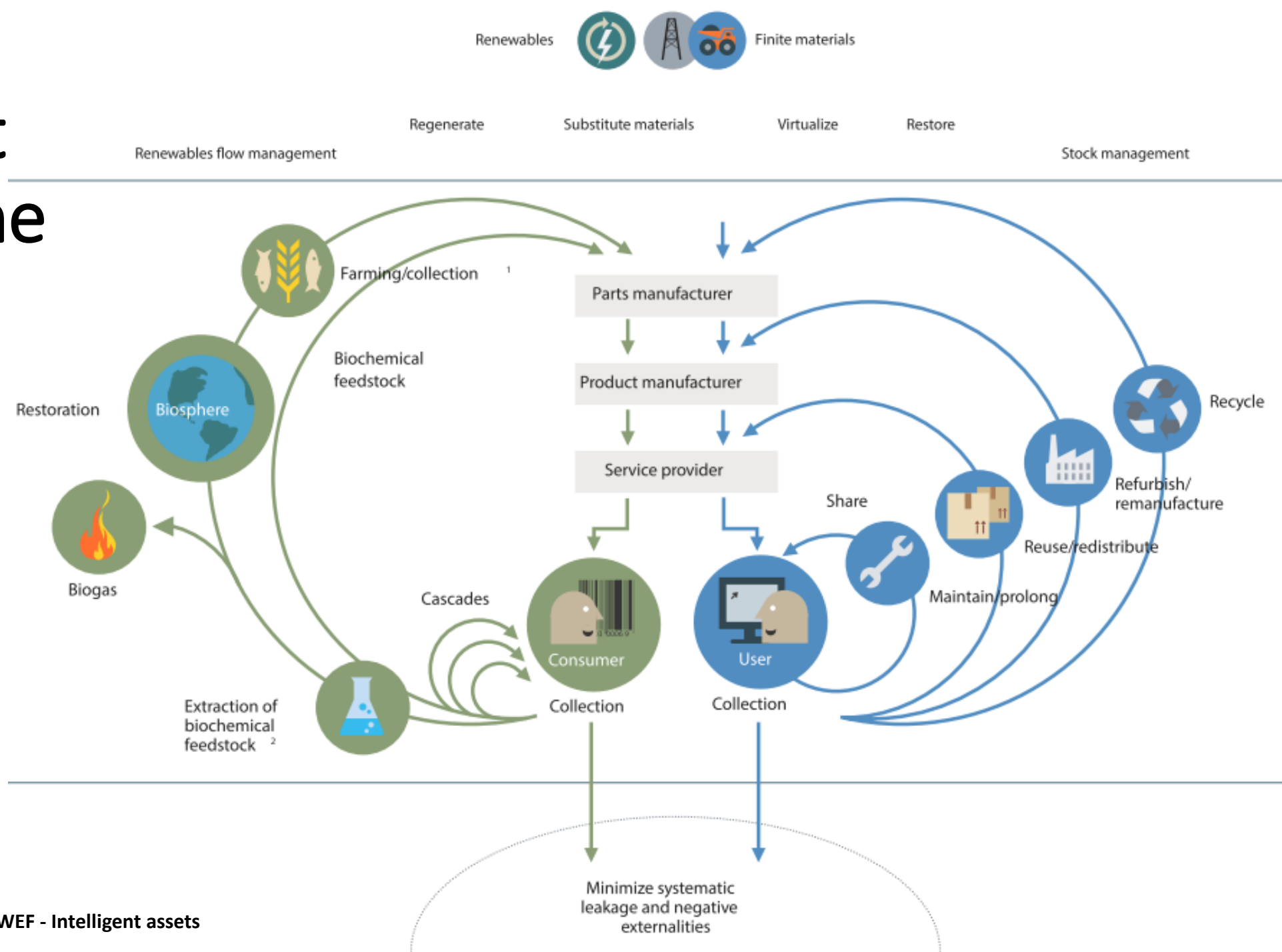


# Internet stvari - Arhitektura

- Naprave, senzorji, povezanost, IoT platforma
- Domensko znanje, (Big)Data, Aplikacije



# Vzajemnost IoT in krožne ekonomije



# Primer 1

- **Angaza** - Pay-as-you-go Solar Energy
  - Angaza's pay-as-you-go (PAYG) platform facilitates the sale of solar-powered devices to end users in the developing world
  - Angaza's business model is a combination of usage monitoring systems and micro-financing
  - Knowledge of the **condition** of the asset **increases the utilization of the asset** (by enabling users to afford to use them) but also has the **potential to extend the use cycle of the asset** by, in the case of products with transmitting Global System for Mobile communications (GSM) chips, **leveraging data for predictive maintenance purposes.**

# Primer 2

- **Arup - IoT in Construction and Infrastructure**
  - Arup is actively introducing IoT to increase resource productivity in construction and infrastructure projects.
  - structural health monitoring system (SHMS) will give advance warning of structural problems and allow targeted inspection (**predictive maintenance**) and intervention to ensure the smooth operation of the bridge, and **prolong its service life**.
  - building information modelling (BIM) software to develop a detailed ‘3D’ model that helped design the plant in a resource-effective way and enables a ‘material bank’ in the future. The ‘3D BIM’ model provides transparency about material composition in the facility, enabling **replenishment at decommission**.



# Primer 3

- **Delta Development - Park 20|20 and Schiphol Trade Park**
  - a fully serviced office park that comprises approximately 89,000 m<sup>2</sup> of office space, 1,400 parking spaces, a 18,000-m<sup>2</sup> hotel with conference centre and 3,700 m<sup>2</sup> of facilities, including a supermarket, athletics track, and a variety of restaurants.
  - Delta's PoS leasing model – all elevators
  - The IoT capabilities translate elevator use and parts/components maintenance data to provide building occupants with **ongoing quality assurance and undisrupted usability** through predictive maintenance.
  - **Predictive maintenance**, paired with ongoing quality assurance and improvement, **extend the use cycle of the asset** and increases asset utilisation. The longer lifetime of the asset allows the asset owner to **loop the elevator through several use cycles.**

# Primer 4

- **Enit Systems - The Enit Agent**

- The ENIT Agent is a clip-on IoT device that enables its user to understand, manage and maintain complex, decentralised energy systems such as industry plants. It allows for a comprehensive read-out of the billing meter as well as a full integration of the system's sub-meters and therefore eliminates the need to replace some of the client's older assets. The device has been developed to overcome two major barriers to effective resource management, the cross-sector integration of data and the implementation of multifaceted management algorithms.
- The client is given a **web access point** via which the energy flows in the operation can be **traced in real time**, revealing where **predictive maintenance** is required **and savings potentials exist**. On average, the ENIT Agent saves companies 5–20% on energy costs.

# Primer 5

- **IBM - Digital capabilities to enable the Circular Economy: Circularity Insights as a Service**
  - To be able to effectively know the real potential value of reuse of a product, component or materials, **various data sets need to be integrated and analysed**. Only then the optimal reuse option of a product can be made, whether to refurbish it, remanufacture it, harvest some key components or recycle the materials. **The more we know** about the product, components and materials specs, their state, their location, their accessibility and the market demand across the various product layers as well as the relevant regulations, **the more we are able to pull value out of the reuse options**.
  - data sets include the engineering and design specs, the components list and accessibility, materials, their accessibility and characteristics.
  - Furthermore, IoT is enabling data by better tracking of the state, location and availability of assets making planning more accurate.
  - And finally, data on the market status can be assessed through capturing demand data as well as the legislation constraints that might exist and limit the reuse options.
  - **forecasting and optimisation model**, to enable real time based insights around optimal reuse.

# Dodana vrednost inteligentnih sredstev v krožni ekonomiji

## Intelligent asset value drivers

Circular economy value drivers

**Extending**  
the use cycle  
length of an  
asset

Increasing  
**utilization**  
of an asset  
or resource

**Looping/  
cascading**  
an asset  
through  
additional  
use cycles

**Regeneration**  
of natural  
capital

Knowledge of the  
**location** of the asset

Knowledge of the  
**condition** of the asset

Knowledge of the  
**availability** of the asset

- Guided replacement service of broken component to extend asset use cycle
- Optimized route planning to avoid vehicle wear

- Predictive maintenance and replacement of failing components prior to asset failure
- Changed use patterns to minimise wear

- Improved product design from granular usage information
- Optimized sizing, supply, and maintenance in energy systems from detailed use patterns

- Route planning to reduce driving time and improve utilization rate
- Swift localization of shared assets

- Minimized downtime through to predictive maintenance
- Precise use of input factors (e.g. fertilizer & pesticide) in agriculture

- Automated connection of available, shared asset with next user
- Transparency of available space (e.g. parking) to reduce waste (e.g. congestion)

- Enhanced reverse logistics planning
- Automated localization of durable goods and materials on secondary markets

- Predictive and effective remanufacturing
- Accurate asset valuation by comparison with other assets
- Accurate decision-making for future loops (e.g. reman vs recycle)

- Improved recovery and reuse / repurposing of assets that are no longer in use
- Digital marketplace for locally supplied secondary materials

- Automated distribution system of biological nutrients
- Automated location tracking of natural capital, such as fish stocks or endangered animals

- Immediate identification of signs of land degradation
- Automated condition assessment, such as fish shoal size, forest productivity, or coral reef health

# Koraki digitalne strategije



Jasen okvir  
in cilji  
strategije



Pilotni projekti,  
agilni pristop,  
partnerstva



Kompetence,  
Privabiti prave ljudi,  
izboljšati procese



Podatkovna analitika,  
nove stortive,  
večfunkcijski timi



Celovita tranformacija  
podjetja,  
digitalna kultura



Celoviti produkti  
in stortive,  
ekostistem



# Hvala

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