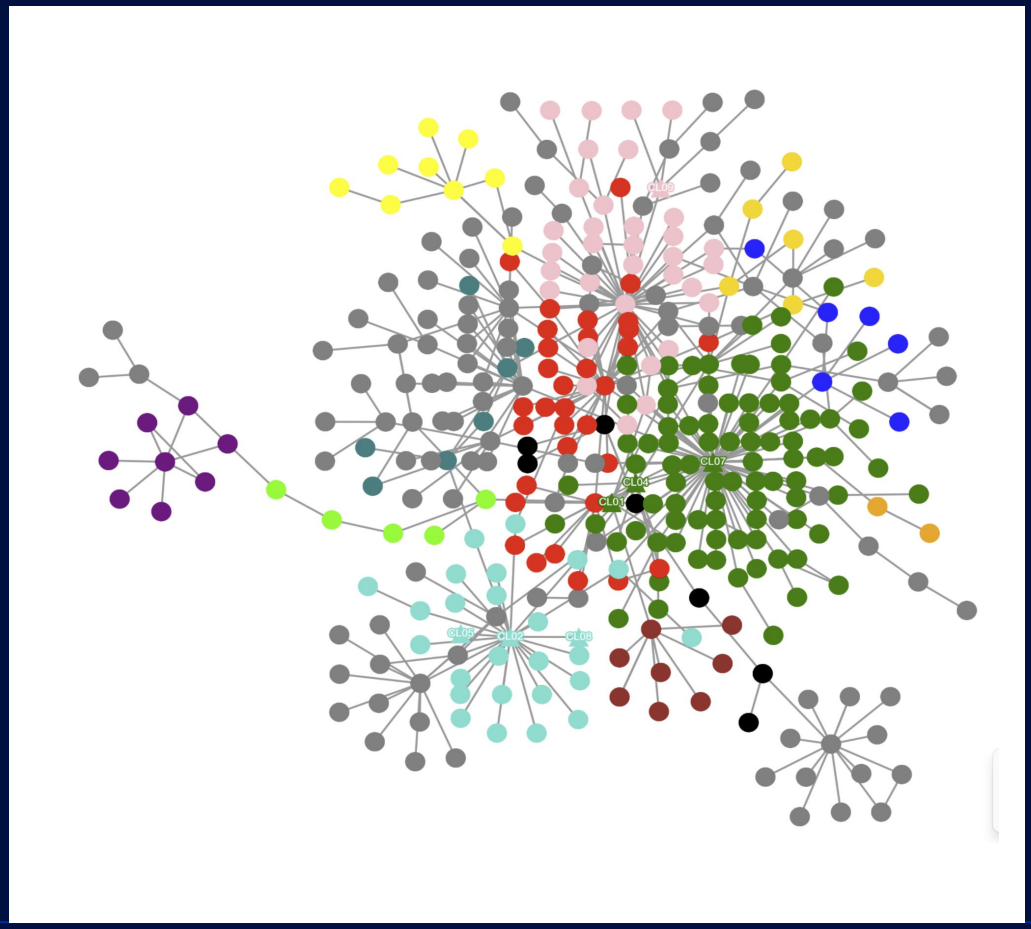
Presentation for Digital Twin Hub - Gemini Call

Large scale Digital Twins for logistics and supply chain.

Harry McCarney

A Digital Twin of the world’s pallet network



Scaled and in production - US Market Digital Twin metrics

Data capture

30M

Movements per year

854GB

Raw data output for analysis

Scenario explorations

5.12TB

Raw data output for 10+ models

43.9B

Rows of tracking data

Distributed Cloud Computing Utilising

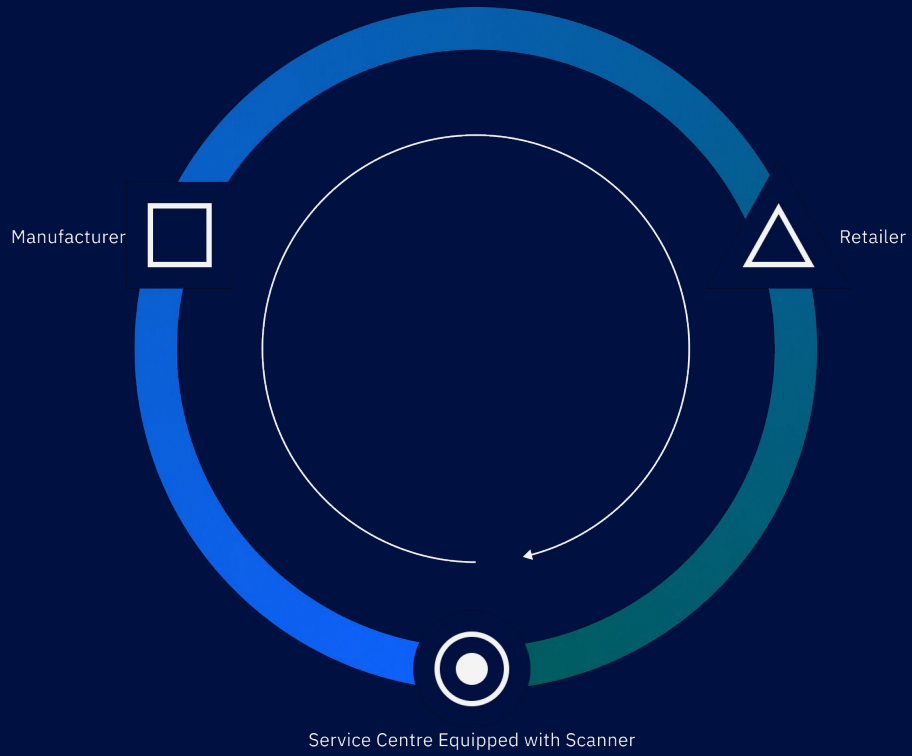
192

Cores CPU

1.5TB

RAM

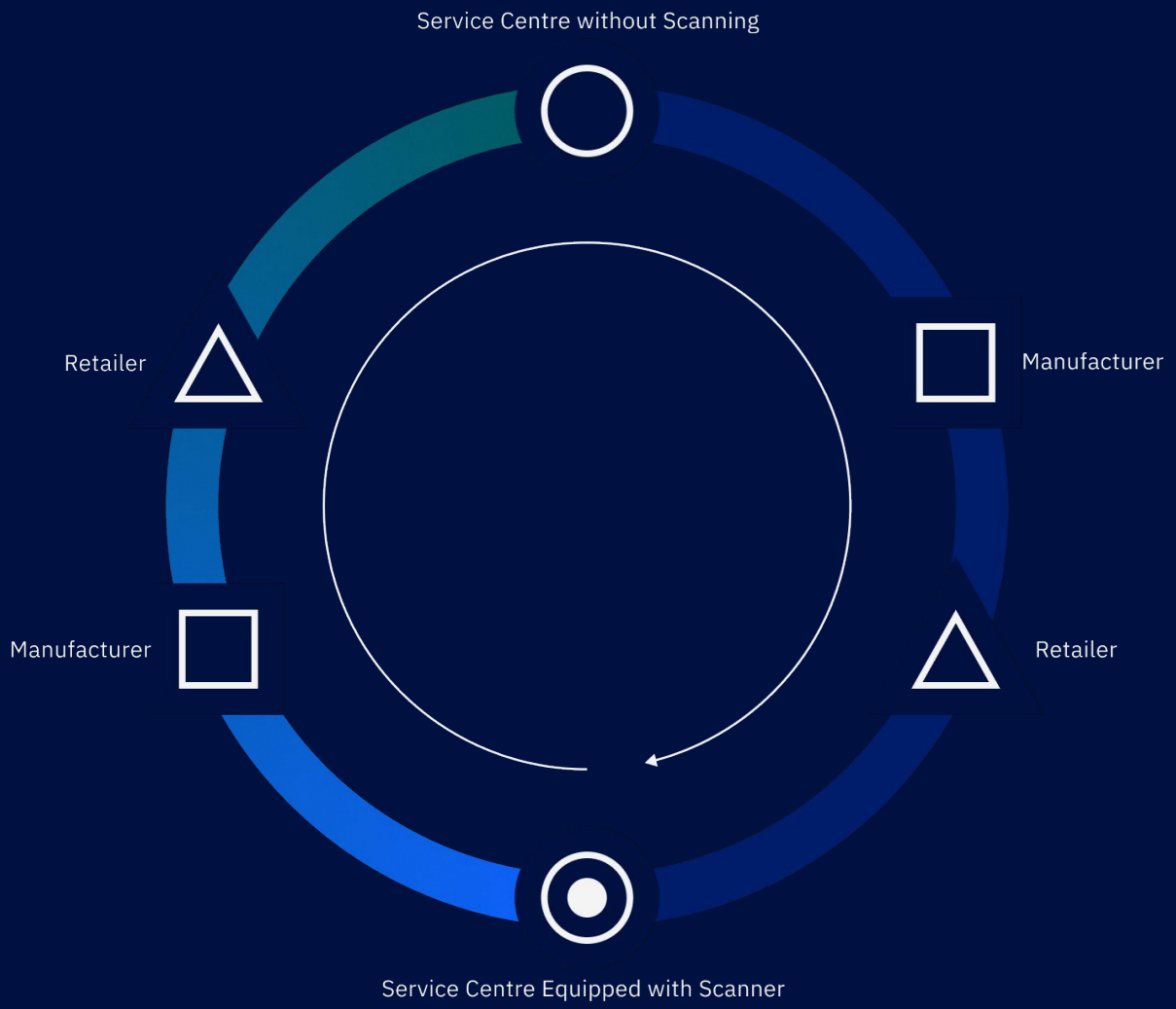
Tracking Reuse and Cycle Time



Correct cycle time is accurately tracked

Cycle

The ideal case. A pallet is scanned when it leaves and returns to a service centre.

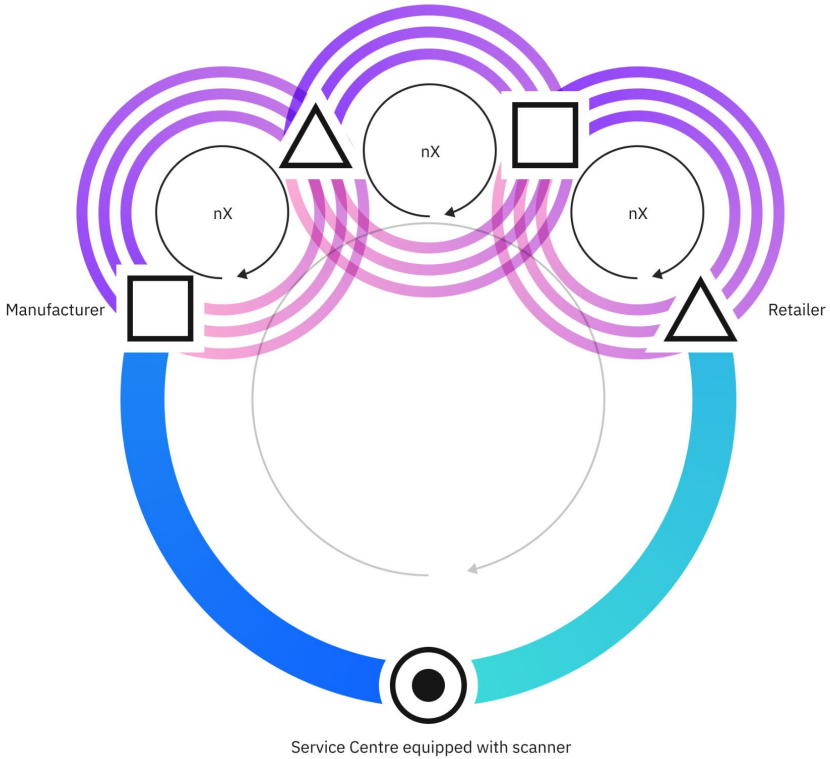


Cycle time is distorted. Multiple short cycles appear as one long one.

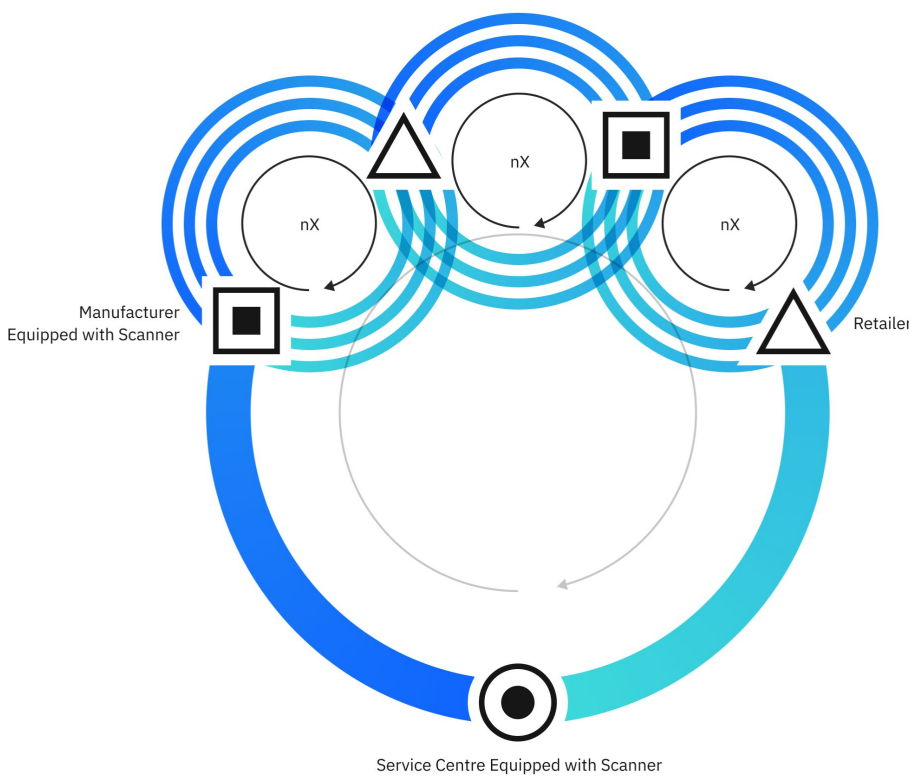
Dirty Cycle

A problem. A pallet passes through a service centre with missing or faulty scanning equipment.

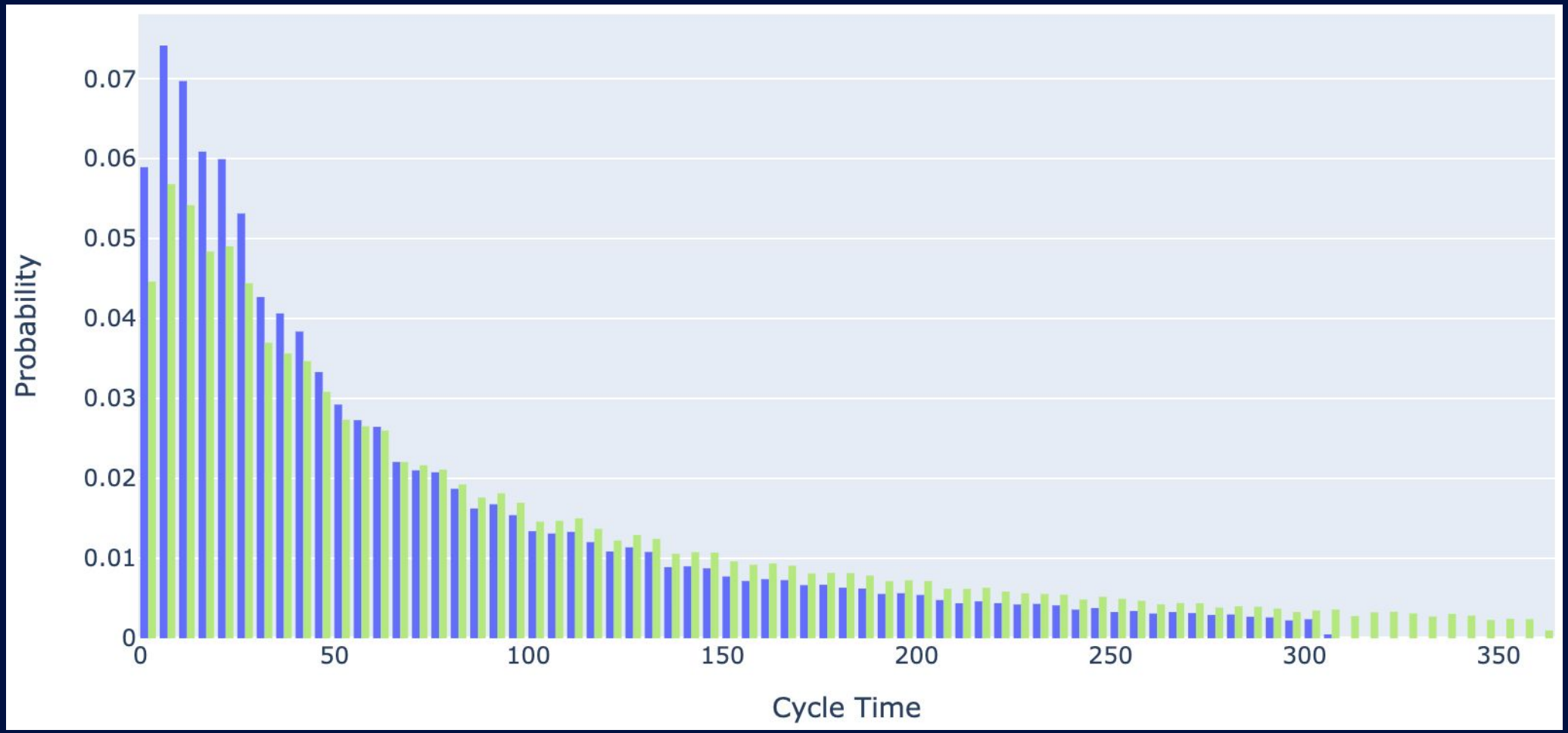
Multi Issue Cycles



Multi Issue Cycle with Manufacturer Scanning



Cycle time distribution is a key driver of reuse



Hack&Craft | Simulation Visualiser

Instance: 1

Mode

DEMO | NORMAL | PARALLEL

Controls

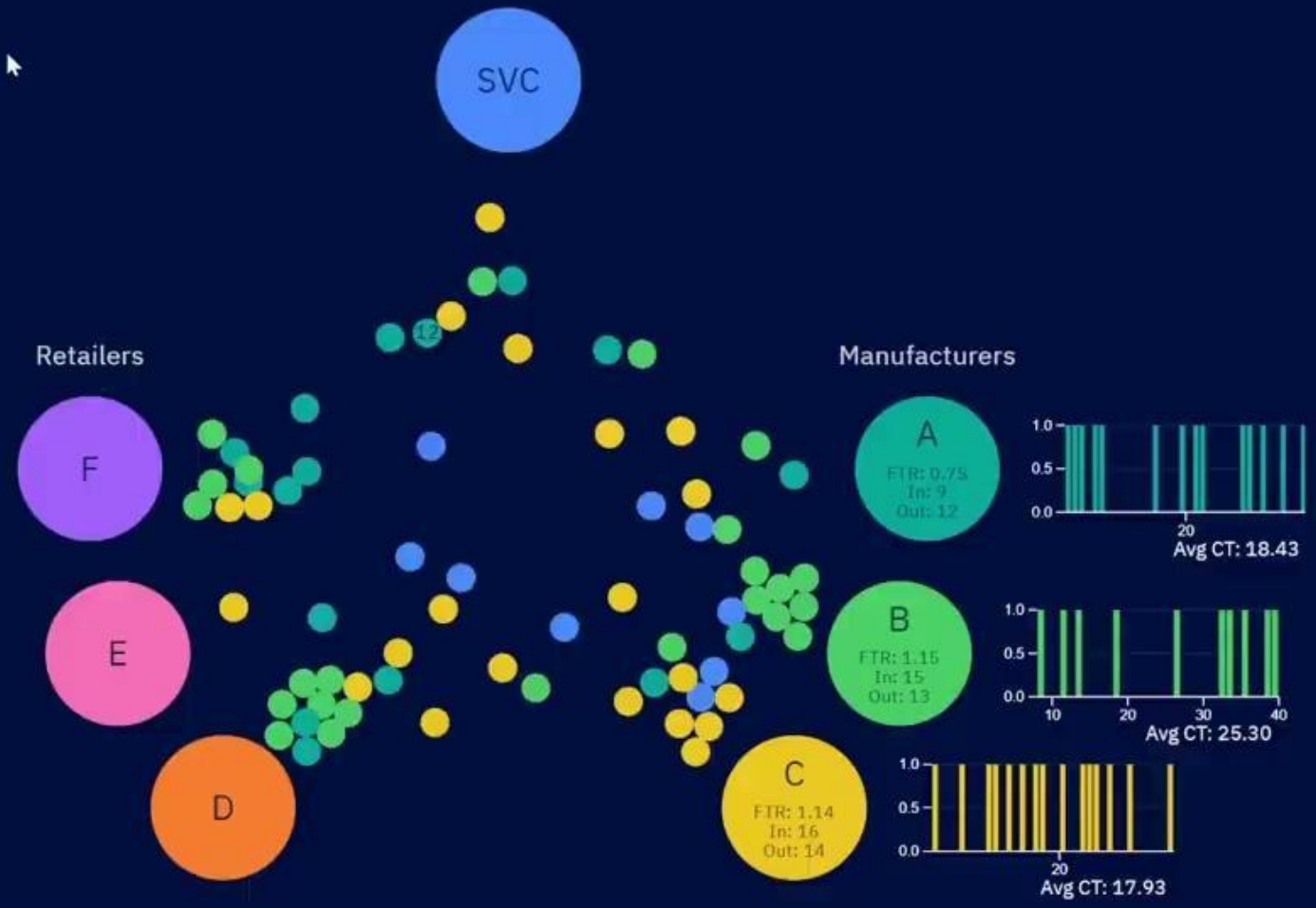
START | STOP | RESET

Serialisation

ON | OFF

From	To	Id
SVC	Manufact. B	67
Manufact. B	Retailer D	53
Retailer F	SVC	65
SVC	Manufact. A	12
Manufact. A	Retailer F	-
Retailer F	SVC	-
SVC	Manufact. B	-
Manufact. A	Retailer D	-
Retailer E	SVC	-
SVC	Manufact. B	-
Manufact. C	Retailer F	-
Retailer D	SVC	-
SVC	Manufact. B	-

Configuration:
Rounds: 300
Instances: 300

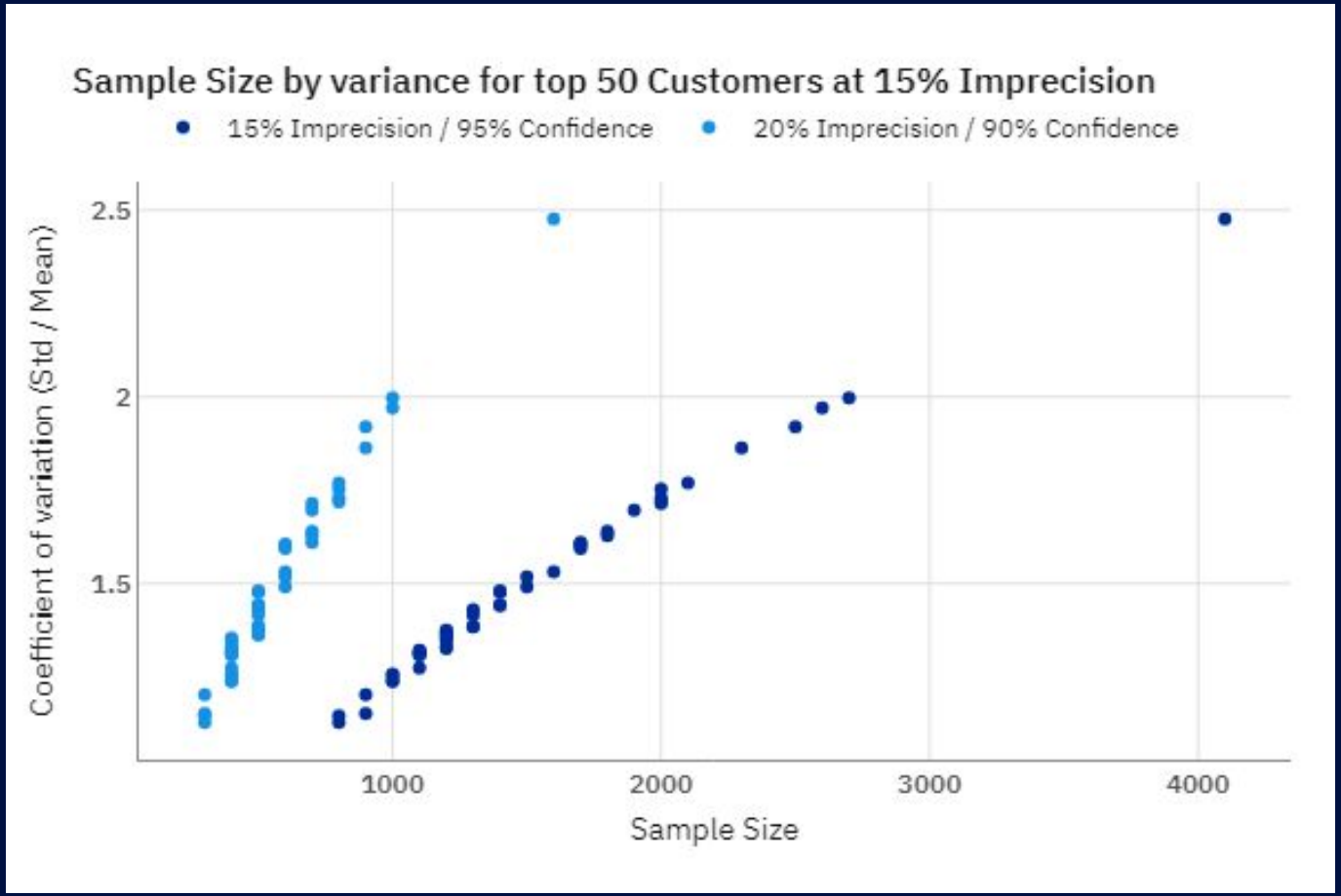


Tracking devices - Density and uncertainty

Declarations

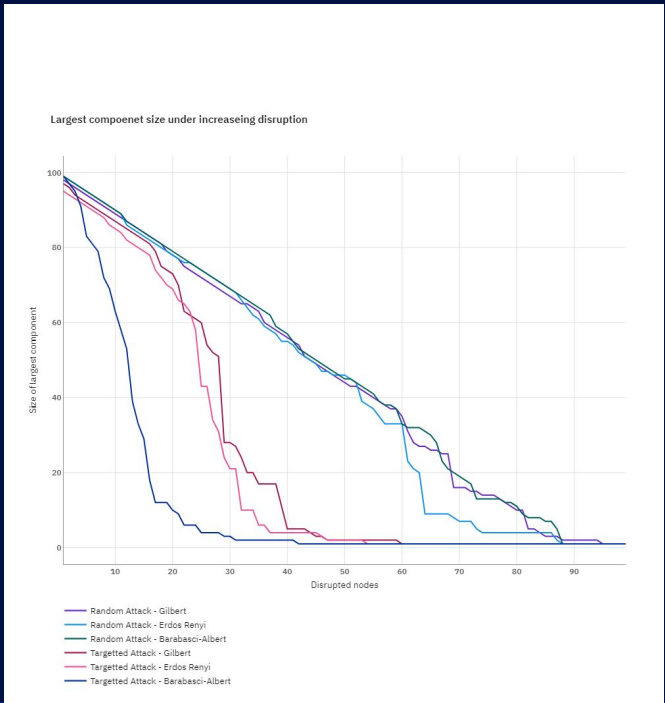
Tags

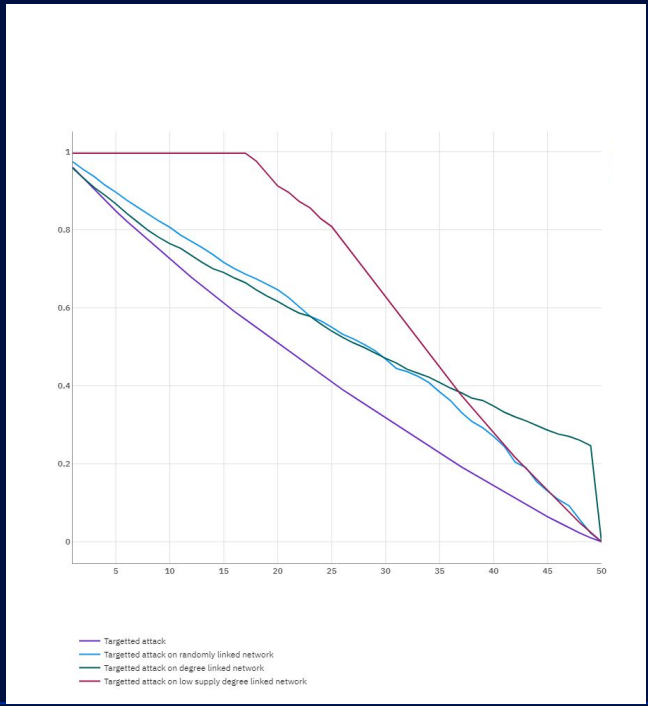
Ultras

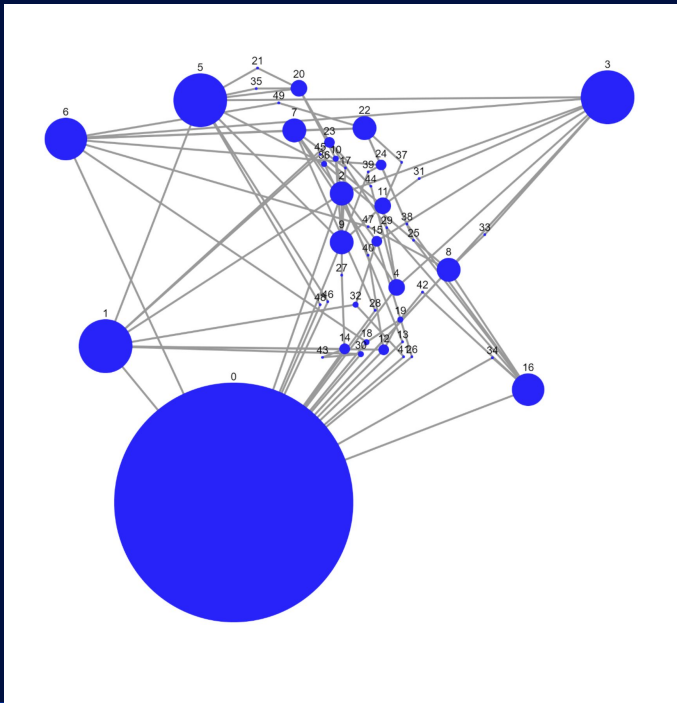


Benefits - Exploring Resilience

- Increased visibility and robust metrics.
- Become anti-fragile and thrive in uncertainty.
- Reduce sensitivity to prediction errors and cascade effects.
- Make cost effective increases in flexibility and redundancy.

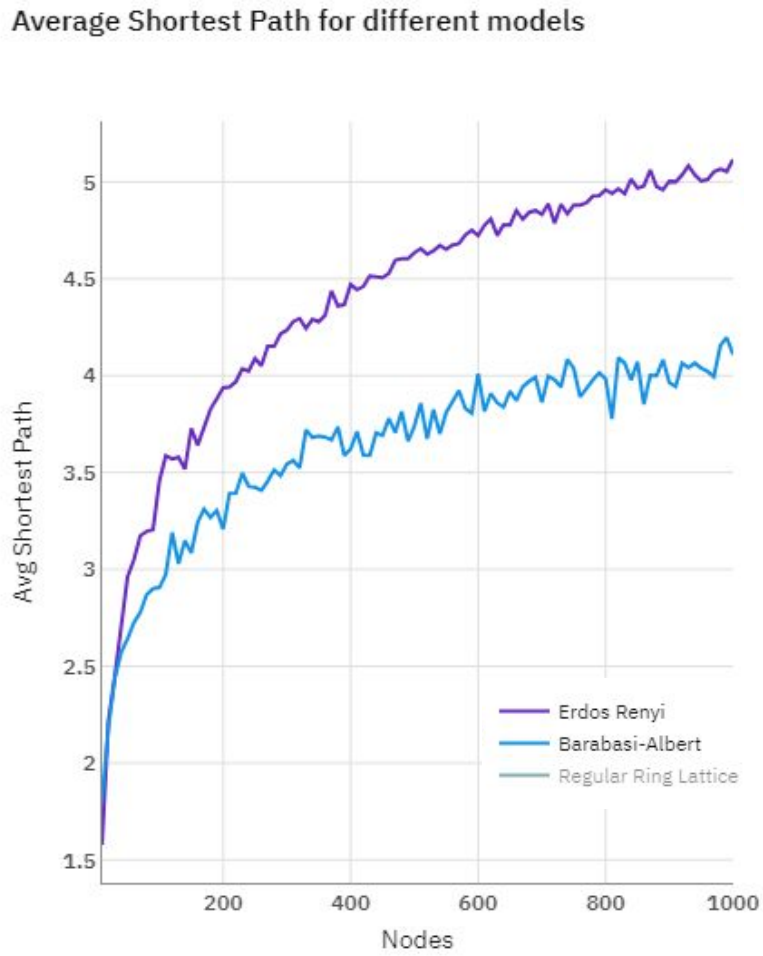




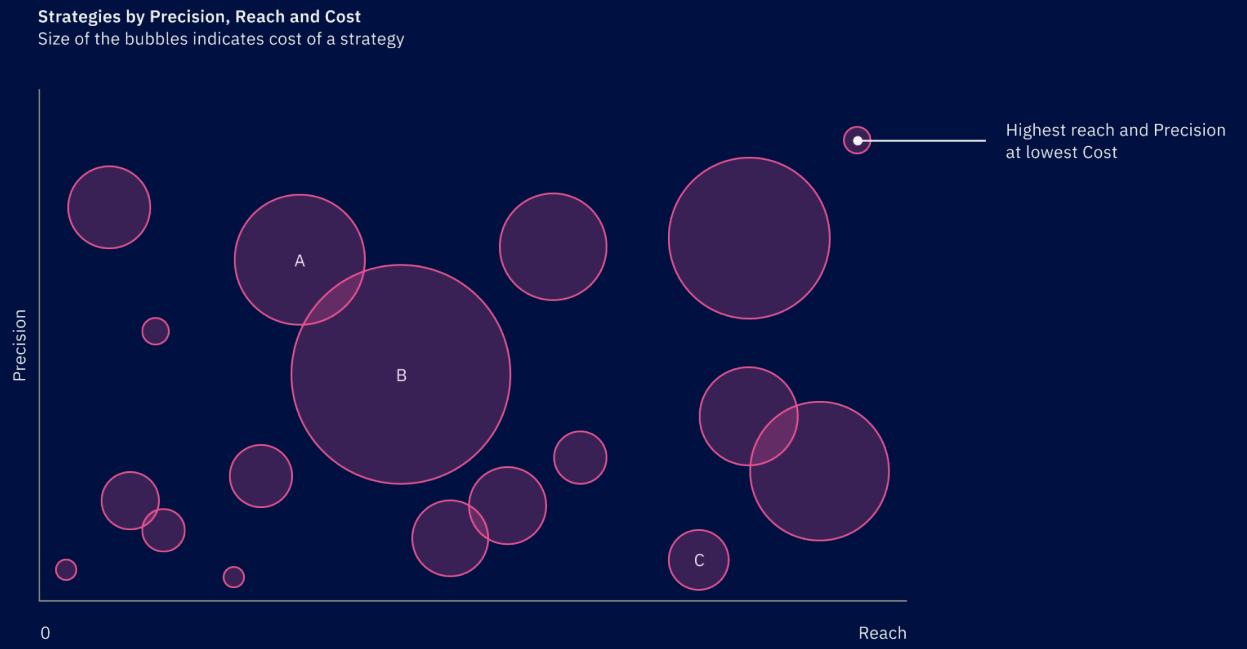


Benefits - Maximise sustainability

- Drive sustainability with trackable commercial metrics.
- Understand drivers of asset productivity.
- Reduce sensitivity to prediction errors and cascade effects.
- Make cost effective increases in flexibility and redundancy.

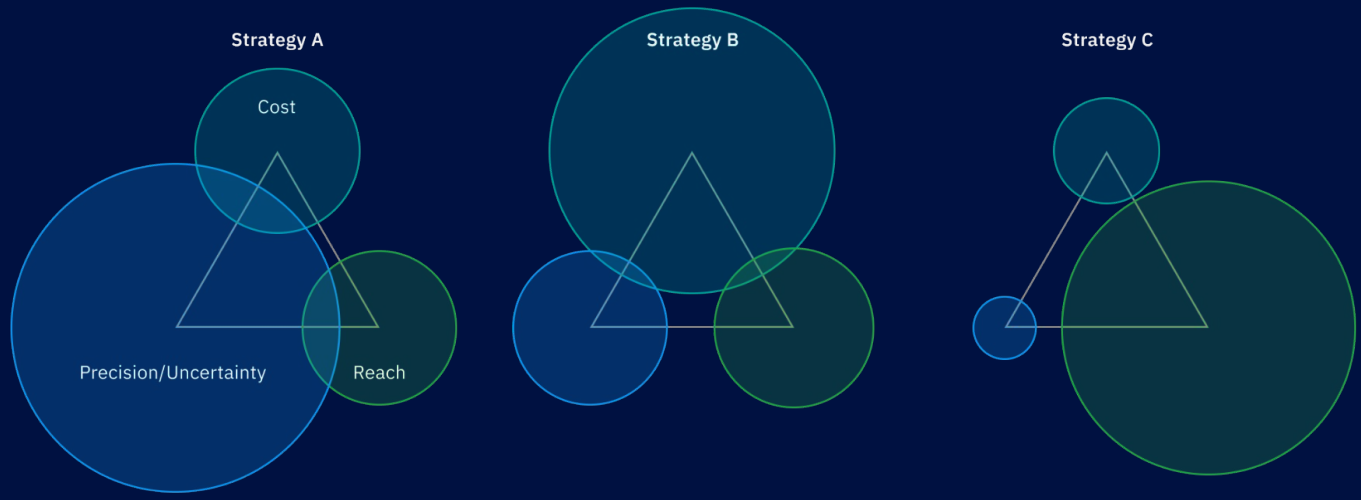


Benefits – A Virtuous Circle

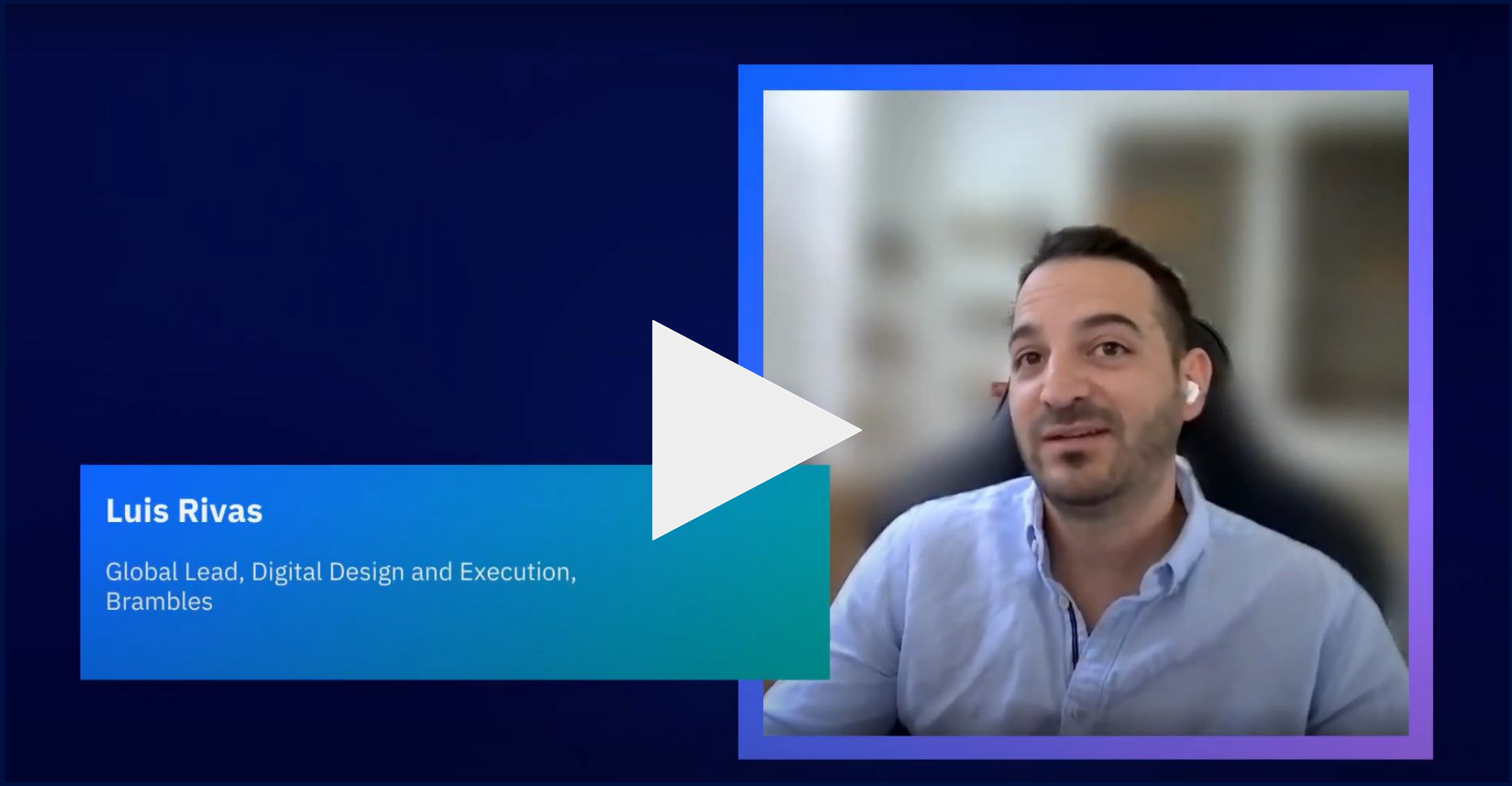


Roll out planning

Virtual replicas run scenario comparison on strategies by Reach, Precision and Cost and identify the trade-offs.



Testimonial from Brambles (CHEP)

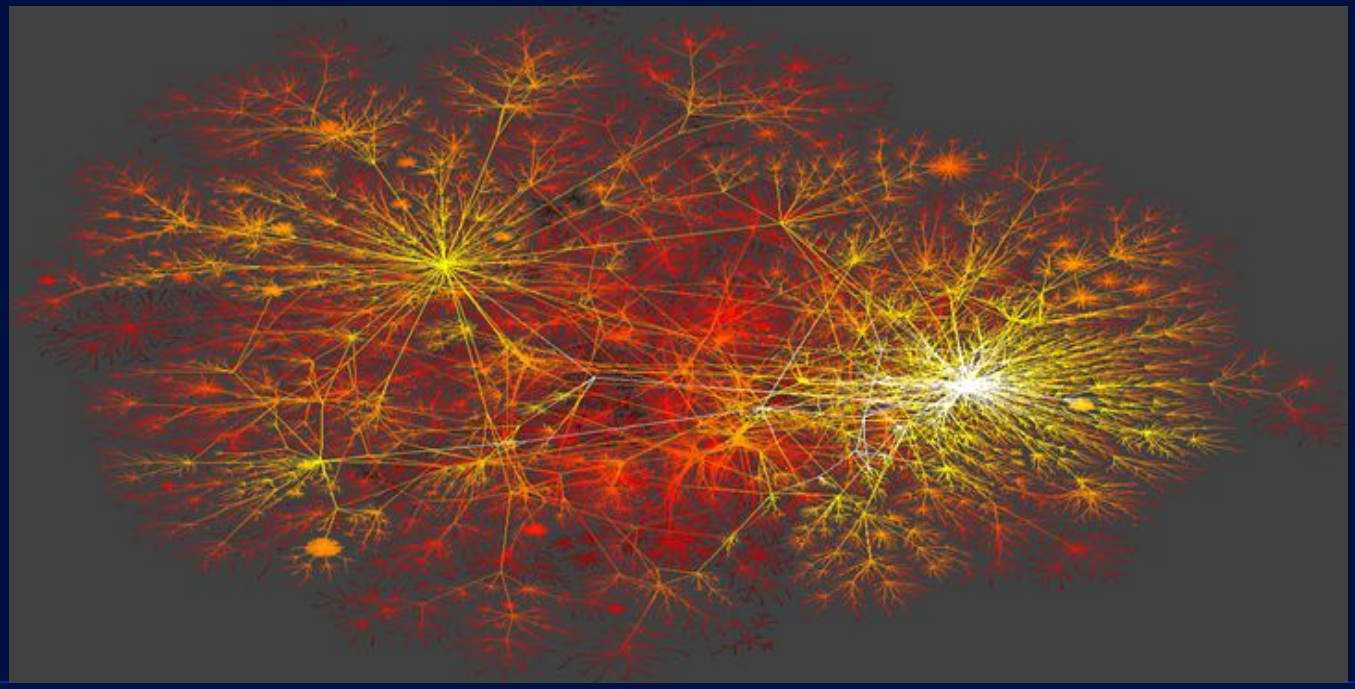


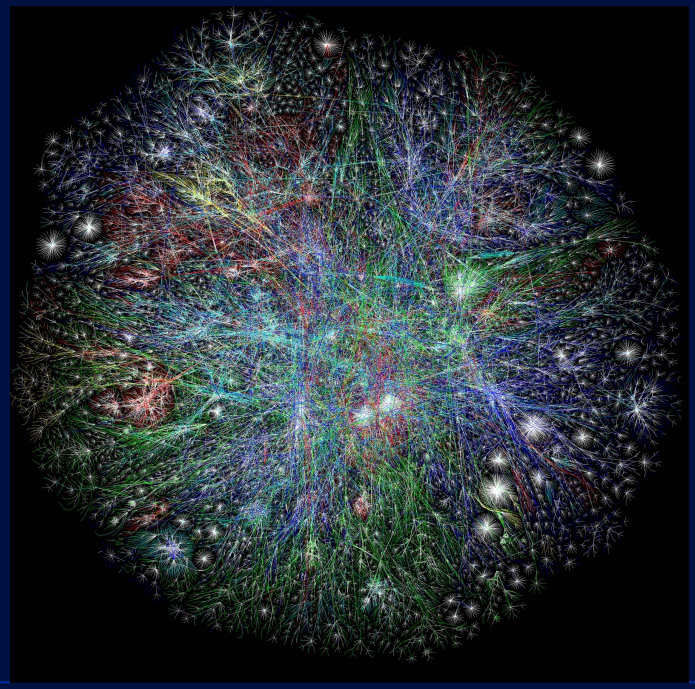
Youtube Link

Complex systems are networks

"*A key* discovery of network science is that *the architecture of networks emerging in various domains of science, nature, and technology are similar to each other, a consequence of being governed by the same organizing principles. Consequently we can use a common set of mathematical tools to explore these systems.*"

Network Science – Barabasi 2016





Thank You

Hack&Craft

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