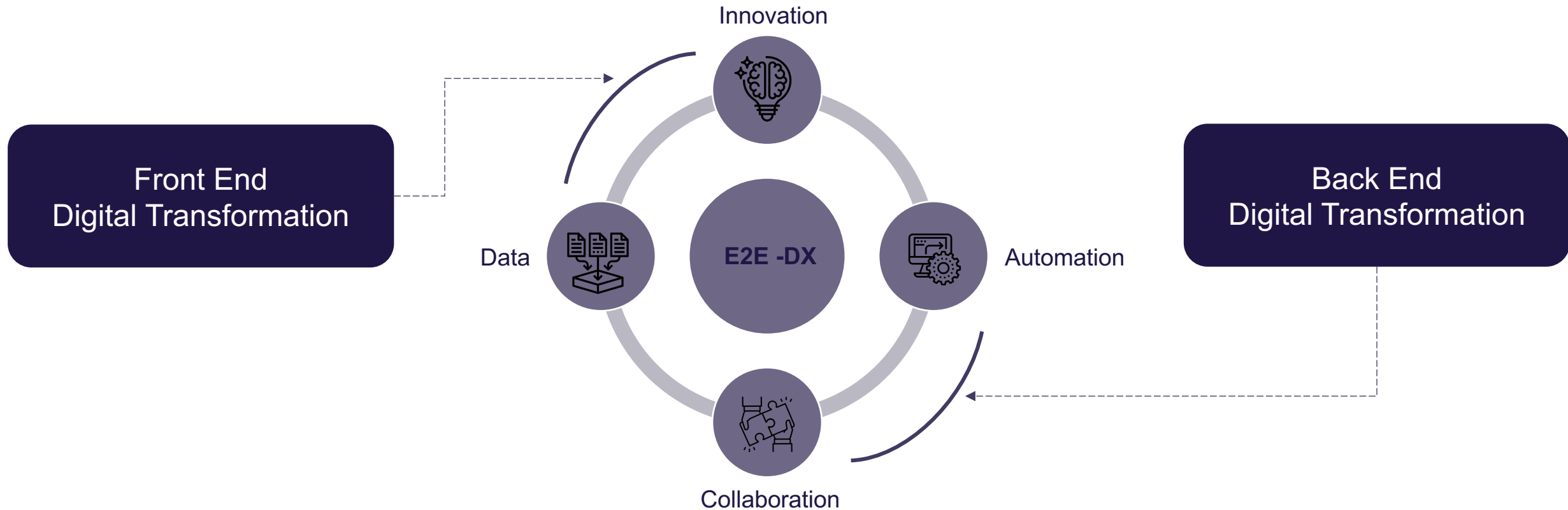# END-TO-END DIGITALIZATION

"Radical End-to-end (E2E) Digital transformation - deploying digitalization efforts at scale - from experience to backend systems and data points is the need of the hour to maximize value capture within and across functional silos."

Front End
Digital Transformation

Back End
Digital Transformation
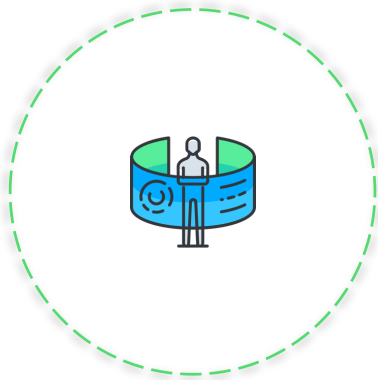
Innovation

Data

E2E -DX

Automation

Collaboration

End to end Digitalization of businesses

- What do we mean by end-to-end digitalization

- Building blocks of end-to-end digitalization – user experience, modular business applications, data driven decisioning

- Rise of composable applications and data

- Digital twins and their ramifications in digitizing an enterprise value chain

- Data Democratization and Responsible AI

BUILDING BLOCKS

" With the next wave of digital change imminent, forward-looking enterprises are provided with an opportunity to re-imagine their current while wiring for the future "

Experience

Solutions that focuses on connected, personalized & immersive experience

Composable Enterprise

Pragmatic innovations and rewires current investments to Digitalized Modular Enterprise
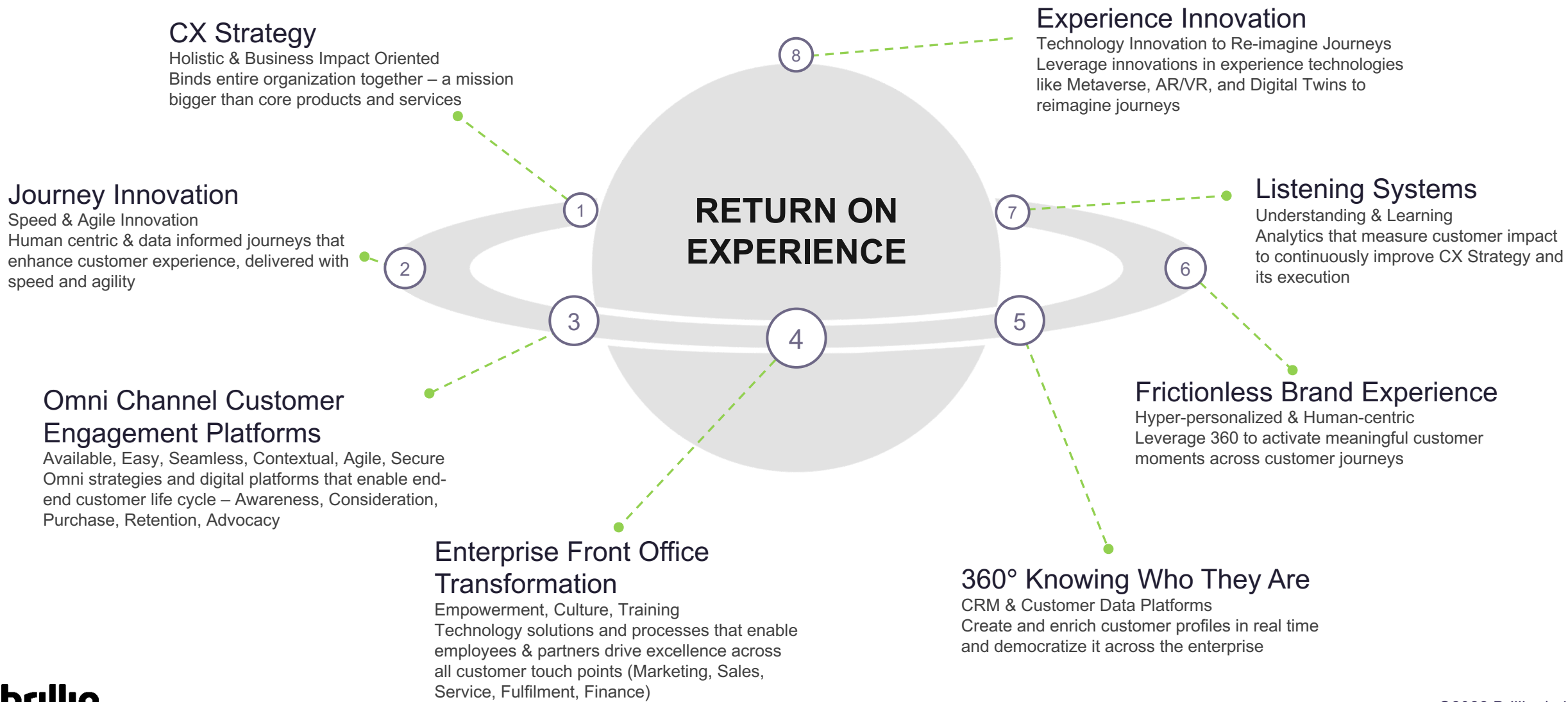
Decisioning

'Data Culture' that relies on data collection and analysis to drive high impact Data Driven Decisioning

The 8 Dimensions of Successful CX Transformation

Driving growth, improving profitability, and enhancing brand connection with end customers

RETURN ON EXPERIENCE

1
2
3
4
5
6
7
8

CX Strategy
Holistic & Business Impact Oriented
Binds entire organization together – a mission bigger than core products and services

Experience Innovation
Technology Innovation to Re-imagine Journeys
Leverage innovations in experience technologies like Metaverse, AR/VR, and Digital Twins to reimagine journeys

Journey Innovation
Speed & Agile Innovation
Human centric & data informed journeys that enhance customer experience, delivered with speed and agility

Listening Systems
Understanding & Learning
Analytics that measure customer impact to continuously improve CX Strategy and its execution

Omni Channel Customer Engagement Platforms
Available, Easy, Seamless, Contextual, Agile, Secure
Omni strategies and digital platforms that enable end-end customer life cycle – Awareness, Consideration, Purchase, Retention, Advocacy

Frictionless Brand Experience
Hyper-personalized & Human-centric
Leverage 360 to activate meaningful customer moments across customer journeys

Enterprise Front Office Transformation
Empowerment, Culture, Training
Technology solutions and processes that enable employees & partners drive excellence across all customer touch points (Marketing, Sales, Service, Fulfilment, Finance)

360° Knowing Who They Are
CRM & Customer Data Platforms
Create and enrich customer profiles in real time and democratize it across the enterprise

CX Transformation Approach

- CX Transformation are non-linear in nature very similar to our consumer journeys. Our approach takes a due cognizance of this and has complete flexibility and agility to adopt to given context.

- The CX opportunities where we have been involved in transformational journeys can be categorized under 3 macro categories:
    - Improving Existing Product & Services (Blue Flow)
    - Enterprise Transformation For CX Excellence (Green Flow)
    - Improve Brand Connections through Customer Delight (Yellow Flow)

- Our approach is based on Industry guidelines and practices which is supported by required toolkits to execute each of necessary activities depicted in the picture on the left.
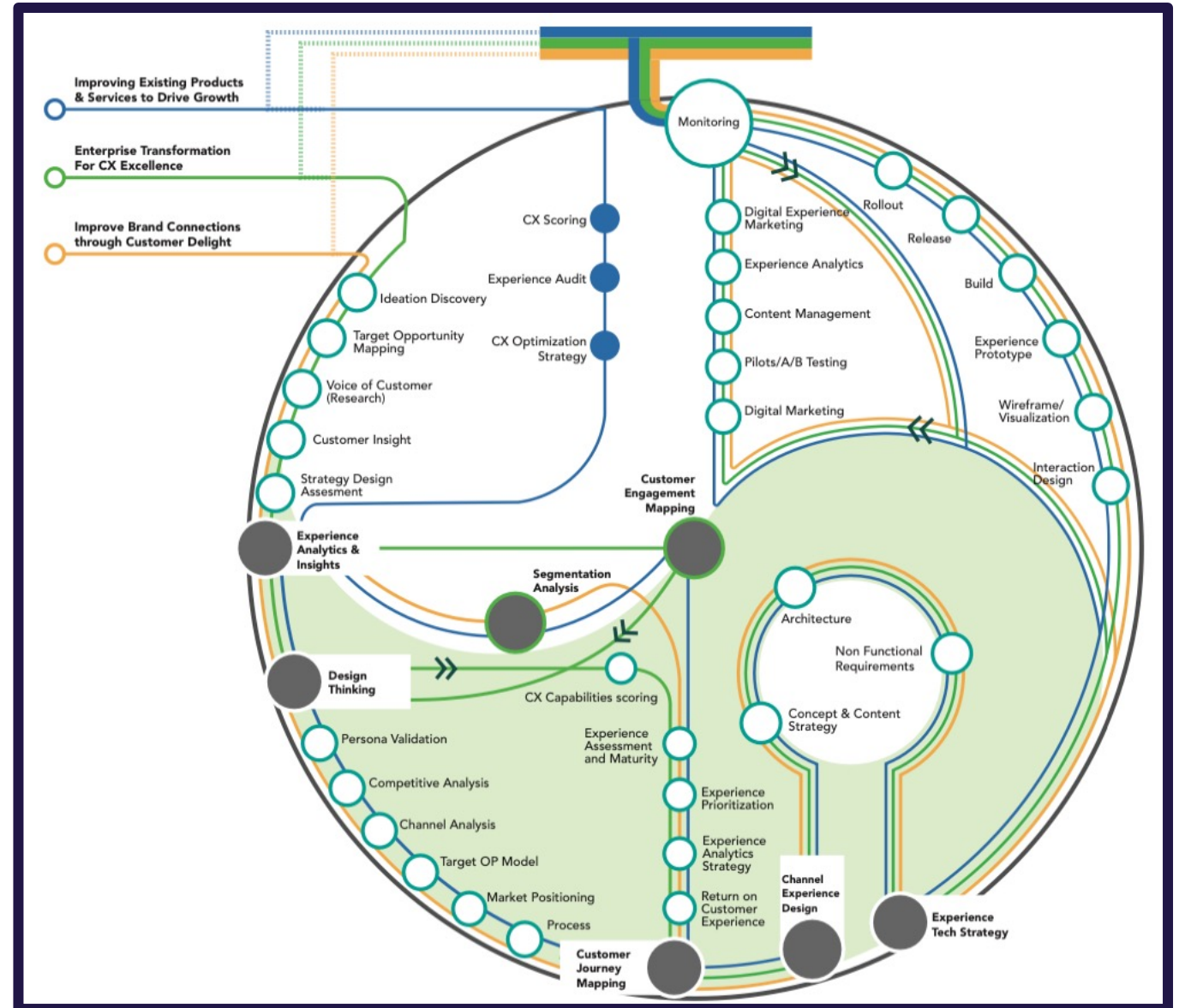
EXPERIENCE EXAMPLES

"Positive customer experience is a way of standing out from competitors. As more brands compete for public attention and more options are readily available, CX provides a way to put your product and brand at the forefront."
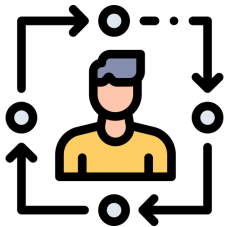
Hyper Personalization

More **contextually relevant** products and services with **personalized communication** to drive engagement and sales

Metaverse

New products, services and **experiences** that **supersede** anything that exists online today.

Omnichannel Delivery

High-touch customer service and **Smooth** buying experience for both physical and virtual interaction

WHAT IS HYPER-PERSONALIZATION

"Hyper-personalization is the most advanced way brands can tailor their services to individual customers. It's done by creating custom and targeted experiences through the use of data, analytics, AI, and automation. Through hyper-personalization, companies can send highly contextualized communications to specific customers at the right place and time, and through the right channel."
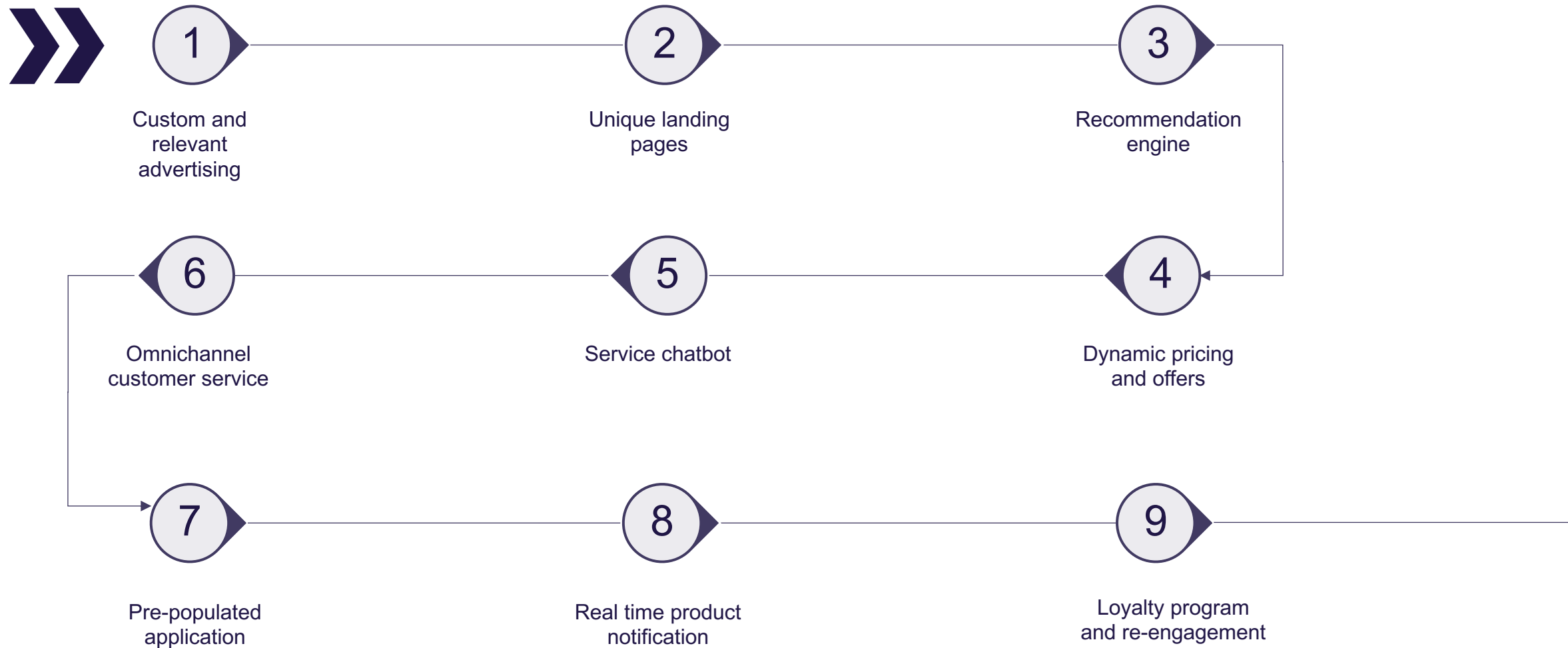
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HOW HYPER-PERSONALIZATION IS DIFFERENT

Individual matching of best offer and best communication, harvested from thousands of options and presented at the right moment and through the right channel, is hyper personalization in action.

	Classic CRM	Personalization	Hyper-Personalization
Scope of Communication	• Sales	**+** Onboarding / Activation	**+** Relationship / Engagement
Content Differentiation	• Content not differentiated • Incidental A/ B-testing	• Content differentiated by macro segment • Parametrized Content • Systematic A/ B-testing	• Multiple communication variants • AI-ML per customer (1:1)
Customer Event	• Single (<10) events handled unconditionally / with basic rules	• Multiple (>20) events handled based on business rules	• ML processes recent customer activity / events / real-time signals
Timeliness	• Monthly & Events	• Monthly & Events	• Real-time

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HYPER-PERSONALIZATION THROUGHOUT CUSTOMER JOURNEY

1 Custom and relevant advertising

2 Unique landing pages

3 Recommendation engine

4 Dynamic pricing and offers

5 Service chatbot

6 Omnichannel customer service

7 Pre-populated application

8 Real time product notification

9 Loyalty program and re-engagement

WHAT IS OMNI-CHANNEL

"Connected, consistent experience across brands, formats and devices, allowing companies to deliver on their revenue, cost and loyalty commitments. Omni-channel is rooted in technology and is enabled by the tools and systems that connect customers to actions."

THREE REASONS WHY OMNI-CHANNEL MATTERS

1

Customer will switch to the competition if they can't find the level of digital service they are looking for in the company

2

Omnichannel customers tends to spend 2-3 times more than single-channel customers

3

E-commerce is more scalable than traditional and allows for faster expansion, enabling companies to capture a significant number of new customers quickly.

FOUNDATIONAL ELEMENTS FOR THE OMNICHANNEL MODEL

	Commerce	Personalization	Ecosystem
	Superior cross-channel shopping experiences in-store and online	Tailored, targeted, and relevant cross-channel engagement, at scale	Rich cross-channel platforms integrated with consumer needs and lifestyles

Capabilities and enablers

	Commerce	Personalization	Ecosystem
Data & Analytics	• Data, decisioning, content management aligned by channel	• Integrated cross channel with strong automation	• 360-degree view of customer
Supply chain	• Cross channel visibility of inventory	• Integrated inventory and delivery (digital fulfillment through stores)	• Full omni channel inventory & delivery with ability to optimize for cost, speed, experience
Site & Mobile	• Strong e-commerce site (Desktop & mobile web)	• Flexible app and site infrastructure with versioning, A/B testing, dynamic content	• Best in class ecosystem and UX-UI across multiple apps and platform
People & Processes	• Significant coordination across teams	• Cross functional teams with strong access to data and KPIs	• Customer Centric, Channel agnostic org structure with Omni channel KPIs

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Composable Enterprise

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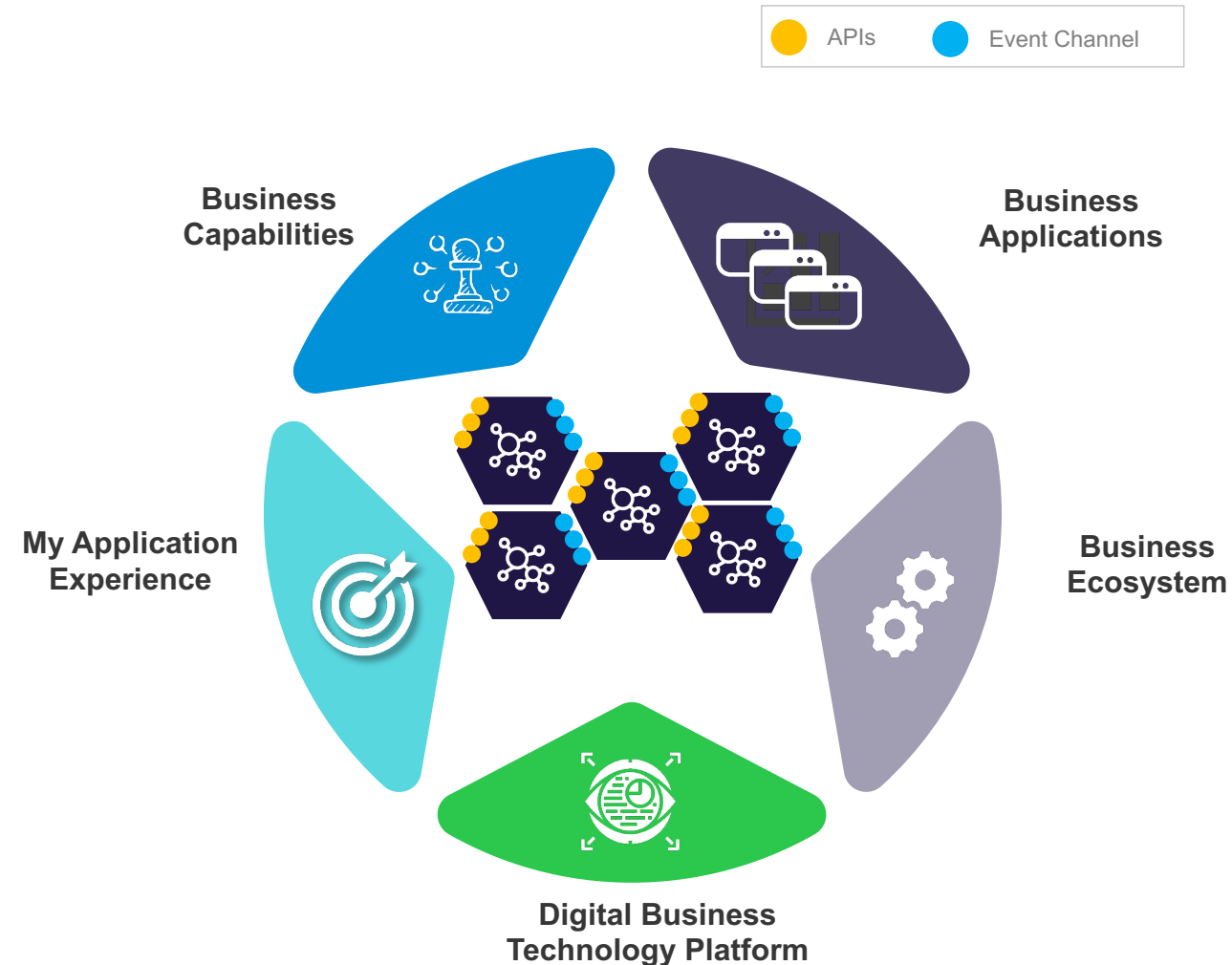# Composable Enterprise – A Business Differentiator - Overview

A composable enterprise is an organization that delivers business outcomes and adapts to the pace of business change. It does this through the assembly and combination of packaged business capabilities (PBCs). PBCs are application building blocks that have been purchased or developed – Gartner

It is next-gen application and software model that disrupts the way the applications are designed, developed, supported, and managed at large.

Characteristic of Composable Enterprise

- **Architecting for resilience** and accepting that disruptive change is the norm

- Supporting a business that **exploits disruptions** by making things modular

- Mixing and acting business functions to **orchestrate the proper outcomes**

- Supporting a business which **discovers when changes needs to happen**

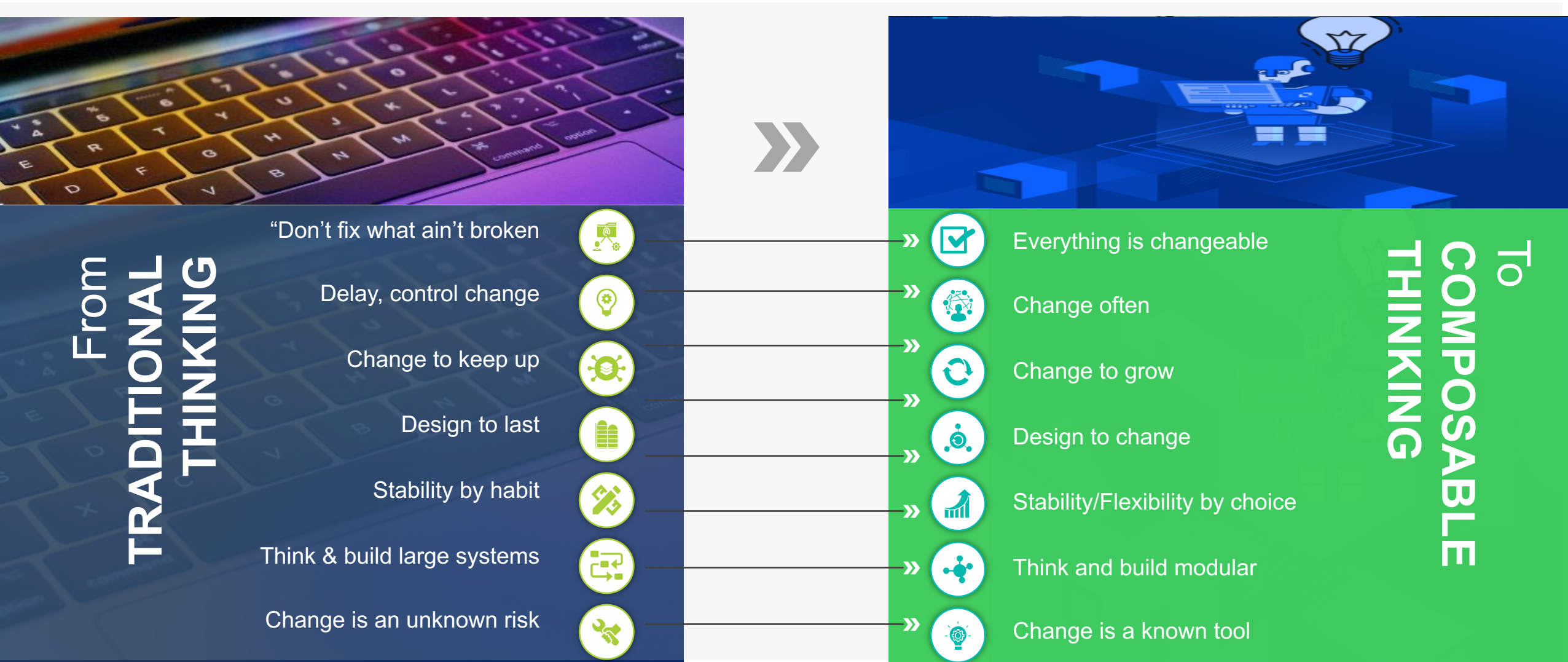- Using **automated business units** to creatively respond

Source: Gartner

APIs   Event Channel

Business Capabilities

Business Applications

My Application Experience

Business Ecosystem

Digital Business Technology Platform

Building Blocks & Core Principles of Composable Enterprise

Orchestration
Prescribing & negotiating interactions between components

Enabling Better **Leadership**

Discovery
Ability to discover & understand design opportunities and components

Enabling Greater **Agility**

Modularity
Partitioning a domain into managed components

Facilitating Greater **Agility**

Autonomy
Minimizing dependence of components from each other

Ensuring **Resilience**

Composable Thinking

Composable Business Architecture

Composable Technologies

Core Principles

Composable digital business applies core principles of composability (modularity, autonomy, orchestration and discovery) to the foundations of its business architecture (business model, enterprise operations and strategy) in order to master the risk of change and reach untapped business value

Building Block # 1 – Adopting Composable Thinking

Embracing a new way of thinking to guide Enterprise approach to conceptualizing what to compose, and when.

From TRADITIONAL THINKING

- "Don't fix what ain't broken
- Delay, control change
- Change to keep up
- Design to last
- Stability by habit
- Think & build large systems
- Change is an unknown risk

To COMPOSABLE THINKING

- Everything is changeable
- Change often
- Change to grow
- Design to change
- Stability/Flexibility by choice
- Think and build modular
- Change is a known tool

Building Block #2 - Composable Business Architecture

Composable business architecture aligns business to IT ensuring enterprise is built to be flexible and resilient. It focuses on creating the structural capabilities on all levels allowing businesses to seamlessly transition into new times and market and global requirements.

Business building blocks agree on their methods of interaction to continuously optimize business outcomes

Business entities (Organizational units, capabilities, products, services, etc.)are partitioned into a system of building blocks

Orchestration

Modularity

Business Model

Customer

Strategy

Value Proposition

Financials

Business Capabilities

Value Streams

Strategic Plans

Resources

Governance

Discovery

Operating Model

Autonomy

Business building blocks are identified, monitored, and managed to support new intersections and discoveries on demand

Business building blocks can be safely changed, independent of each other

Ensuring

Scalability on demand
Adaptability to all devices and clients
Service-oriented architecture
Automation
Self-service
Accessible enterprise data layer

Source: Gartner

Core Principles of composability applied to business architecture

Building Block #3 - Composable Technologies
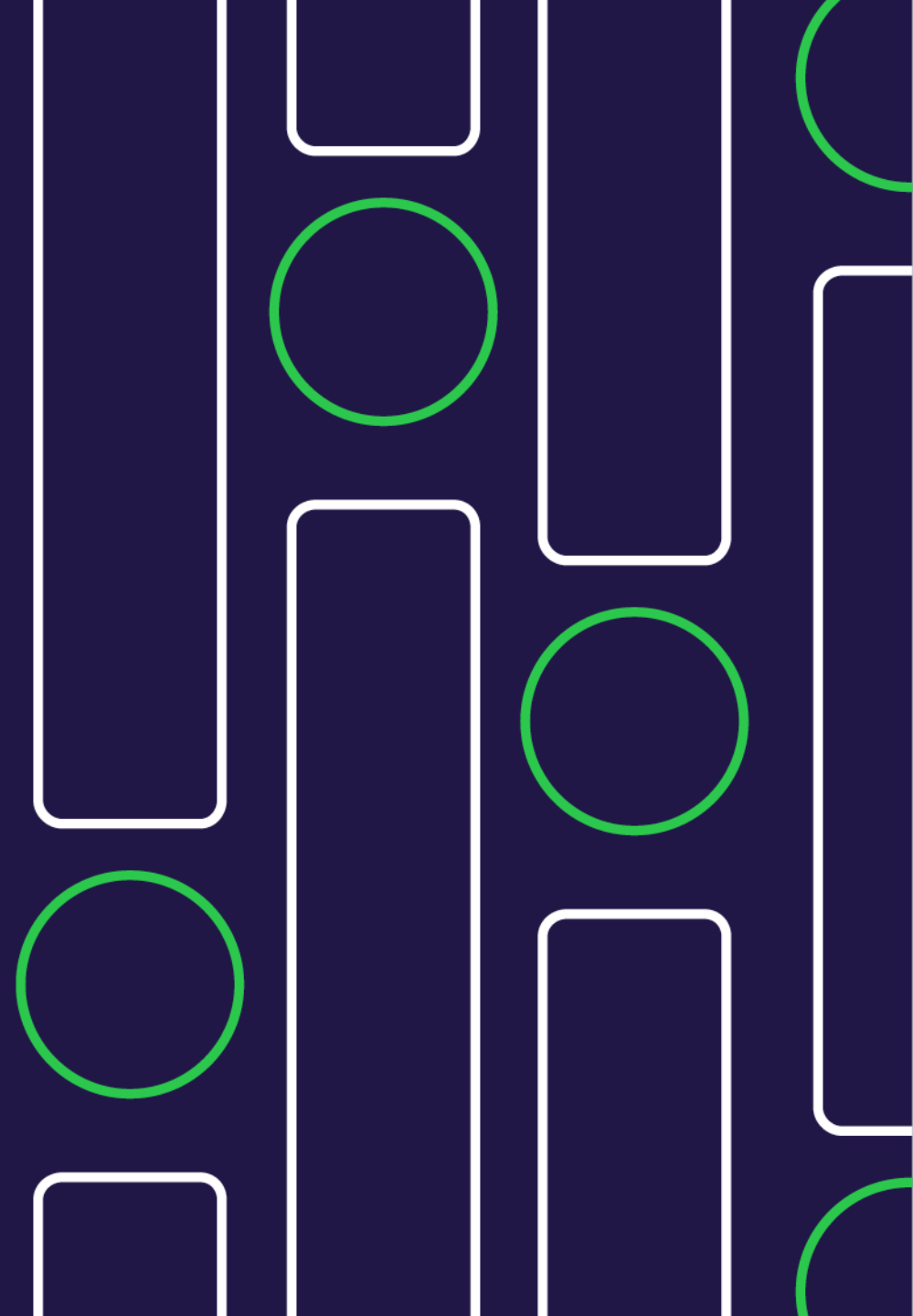
Tools for today and tomorrow - systems and data that integrate quickly and easily

Layer	Technology
UI	Micro frontend, Micro apps
Integration	Prefabricated components, Experience APIs, API widgets
Bussiness Logic	Microservices, API flows
Data Persistence	Virtual data source, Data hubs
Deployment	Infra-as-code, Terraform
Physical Infra	Containers

+

- Low Code No Code
- Reusable open-source software components
- Cloud Native Applications/SaaS Platforms
- Headless Content Management System

Managed Multidisciplinary digital business teams — or "fusion teams"

By 2024, the design mantra for new SaaS and custom applications will be "composable API-first or API-only," rendering traditional SaaS and custom applications as "legacy – Gartner

Metaverse

WHAT IS METAVERSE

"The Metaverse is a collective virtual open space, created by the convergence of virtually enhanced physical and digital reality. It is physically persistent and provides enhanced immersive experiences."

- Gartner

CHARACTERISTICS & ELEMENTS OF METAVERSE

Boundless
No Barriers between Real & digital, and the metaverse is endless
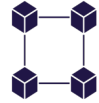
Decentralized
No single entity has control over the metaverse

Persistent
The metaverse is always active & can't be reset or unplugged

Economic System
Digital currencies help power fully functioning virtual economies

Immersive
Users can achieve a realistic sensory experience with XR tools

Social Experience
Digital currencies help power fully functioning virtual economies

Digital currency

Concerts, Social & Entertainment events

Marketplace / Digital Commerce

Online Shopping

NFTs

Metaverse

Workplace

Infrastructure

Social Media

Device Independence

Digital Humans

Gaming

Digital Assets

NLP
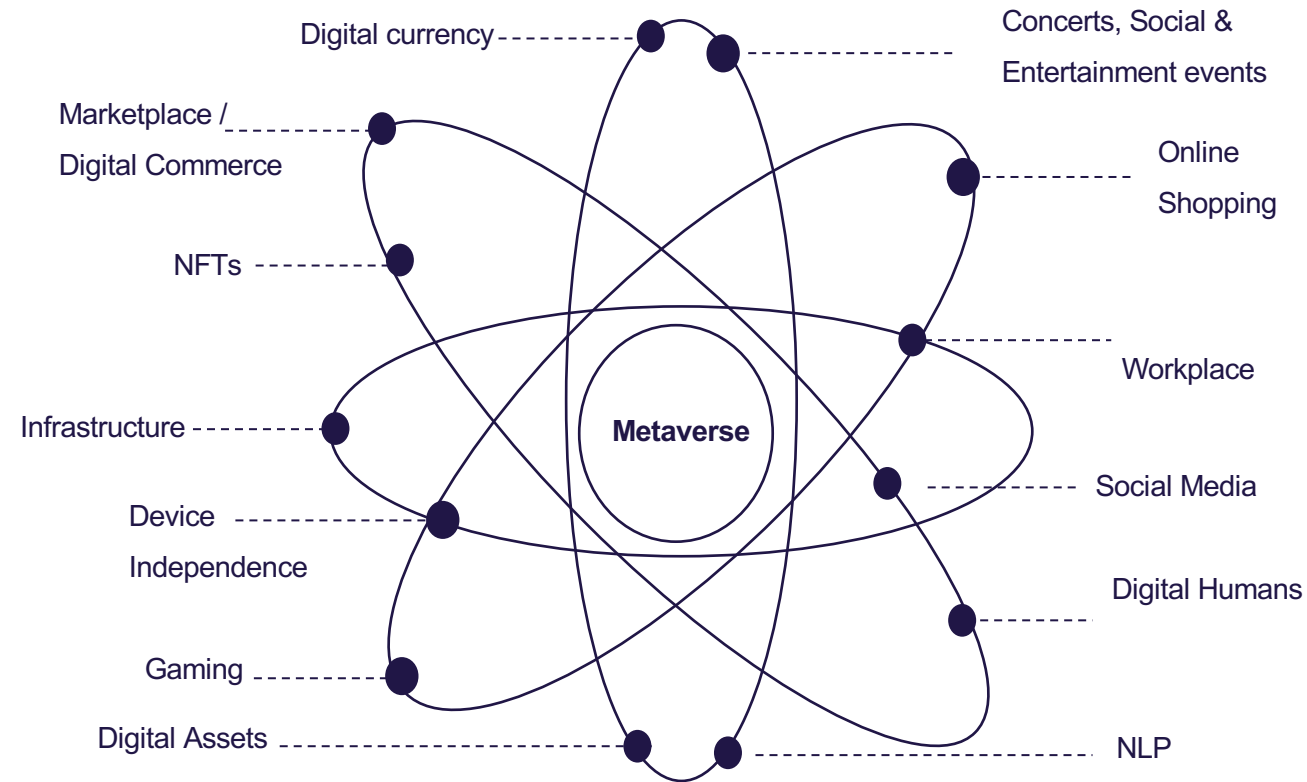
Source : Gartner

WHAT IS DRIVING THE METAVERSE BOOM

Building shared value communities (multi-purpose online engagement & collaboration)

Massive adoption of Digital Assets & hyper consumerism in virtual worlds

Expanded opportunities for business stakeholders across industries

Enabling people for a digitally deeper interactions

Expansion of Decentralized Infra boosted by mainstream interest of Crypto

Technical advances in Hardware, Network Infra (5G), Visualization, AI, Spatial & Edge Computing,

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ENABLERS & ENTRY POINTS OF METAVERSE
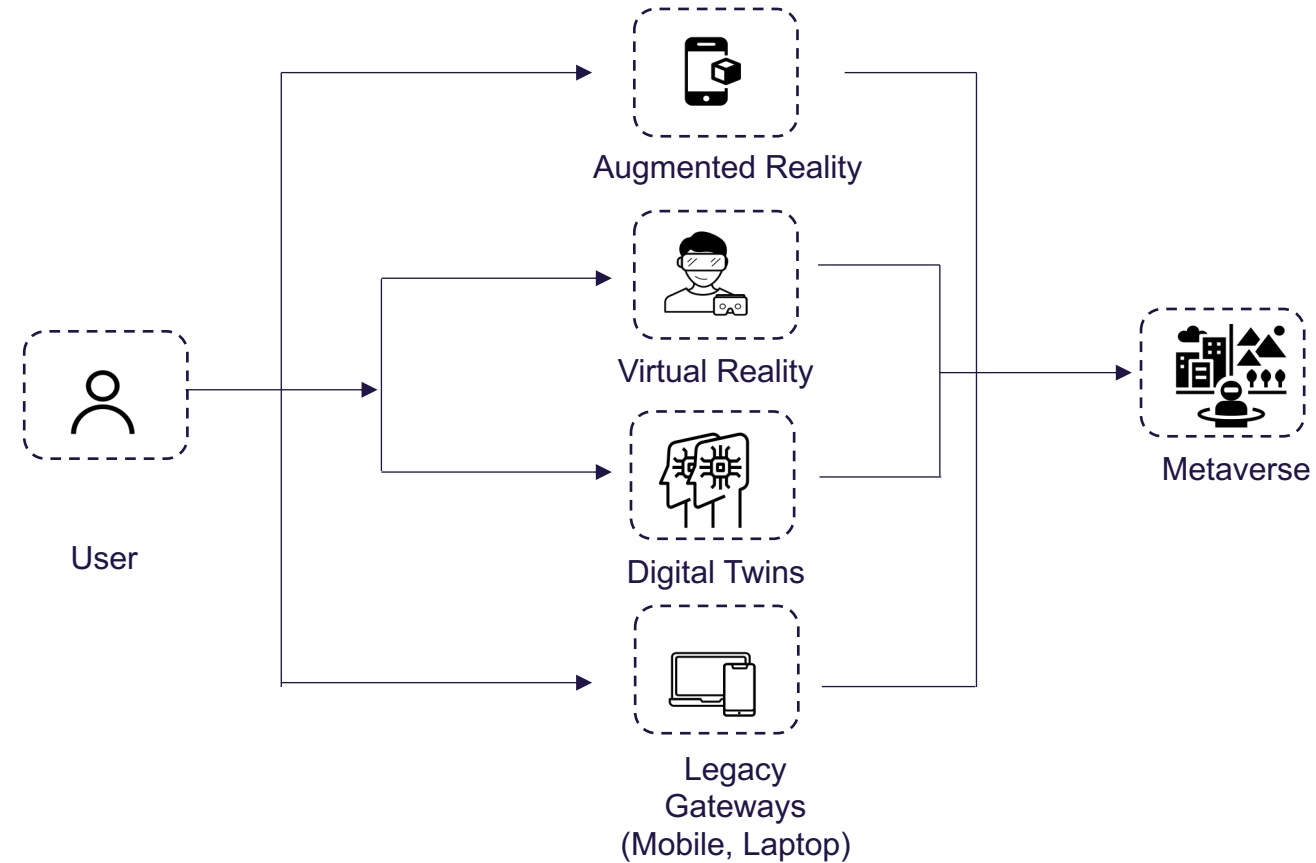
KEY TECHNOLOGY ENABLERS

User

Augmented Reality

Virtual Reality

Digital Twins

Legacy Gateways (Mobile, Laptop)

Metaverse

Blockchain, NFT & Crypto assets

AR & VR

5G Networks
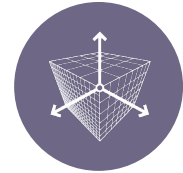
3D Reconstruction

AI

IOT

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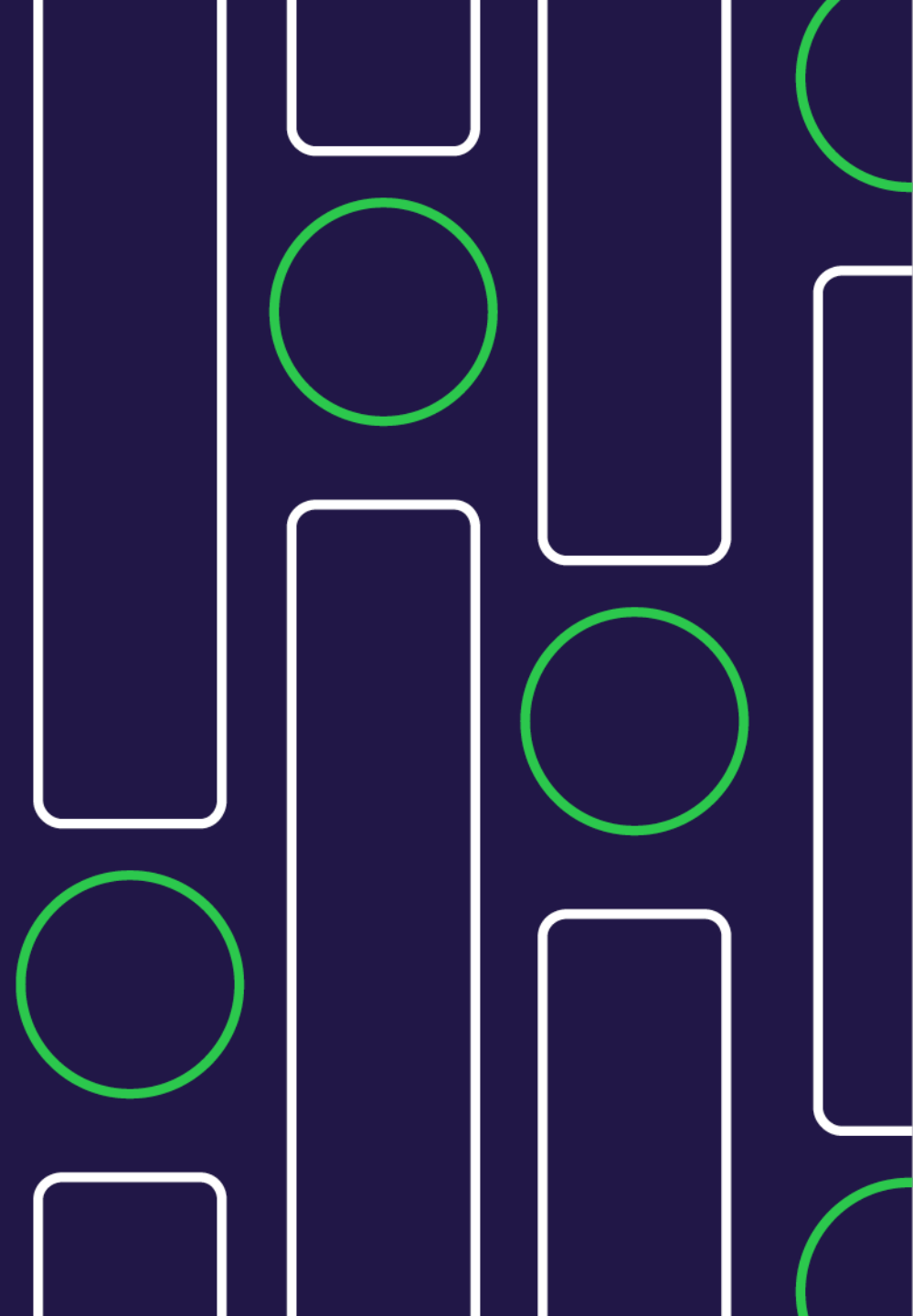
Digital Twin

WHAT IS DIGITAL TWINS

"A digital twin is a digital representation of a real-world entity or system. The implementation of a digital twin is an encapsulated software object or model that mirrors a unique physical object, process, organization, person or other abstraction. Data from multiple digital twins can be aggregated for a composite view across several real-world entities, such as a power plant or a city, and their related processes.."

- Gartner

OVERVIEW
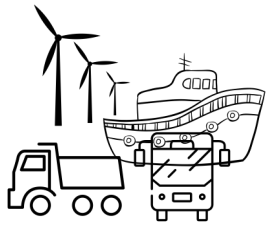
CONNECTED WORLD
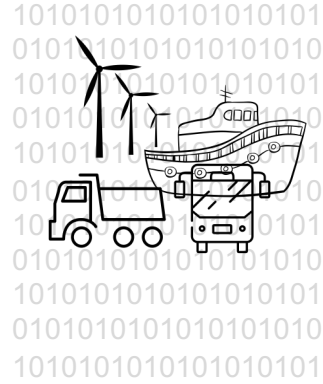
PHYSICAL SYSTEM　　　　　　　　DIGITAL TWIN　　　　　　　　BUSINESS OUTCOME

KEY TECH ENABLERS

| Sensors | IOT connectivity | Modelling | At Scale Computing |
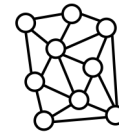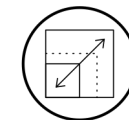
DIGITAL TWIN SYSTEM
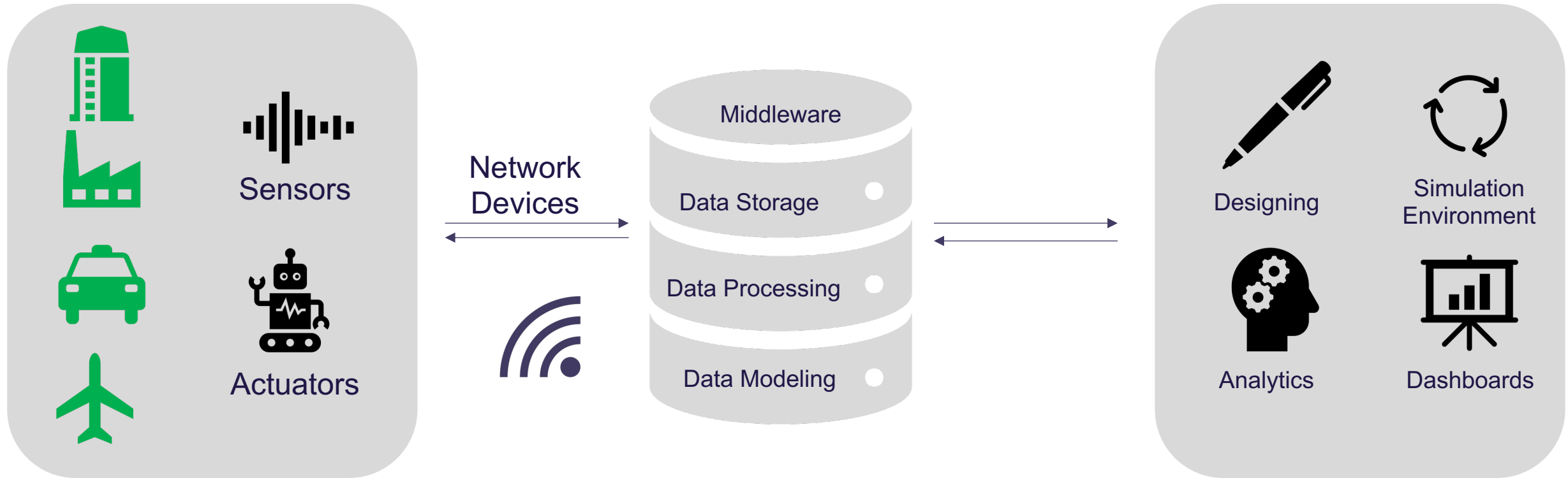
DIGITAL THREAD: A BRIDGE BETWEEN PHYSICAL AND VIRTUAL WORLDS

1. Collect Data

2. Analyze Data

3. Run Simulations, make predictions

Real Environment

Digital Twin

6. Optimize & Run

5. Enable Data Driven decisions

4. Visualize Insights
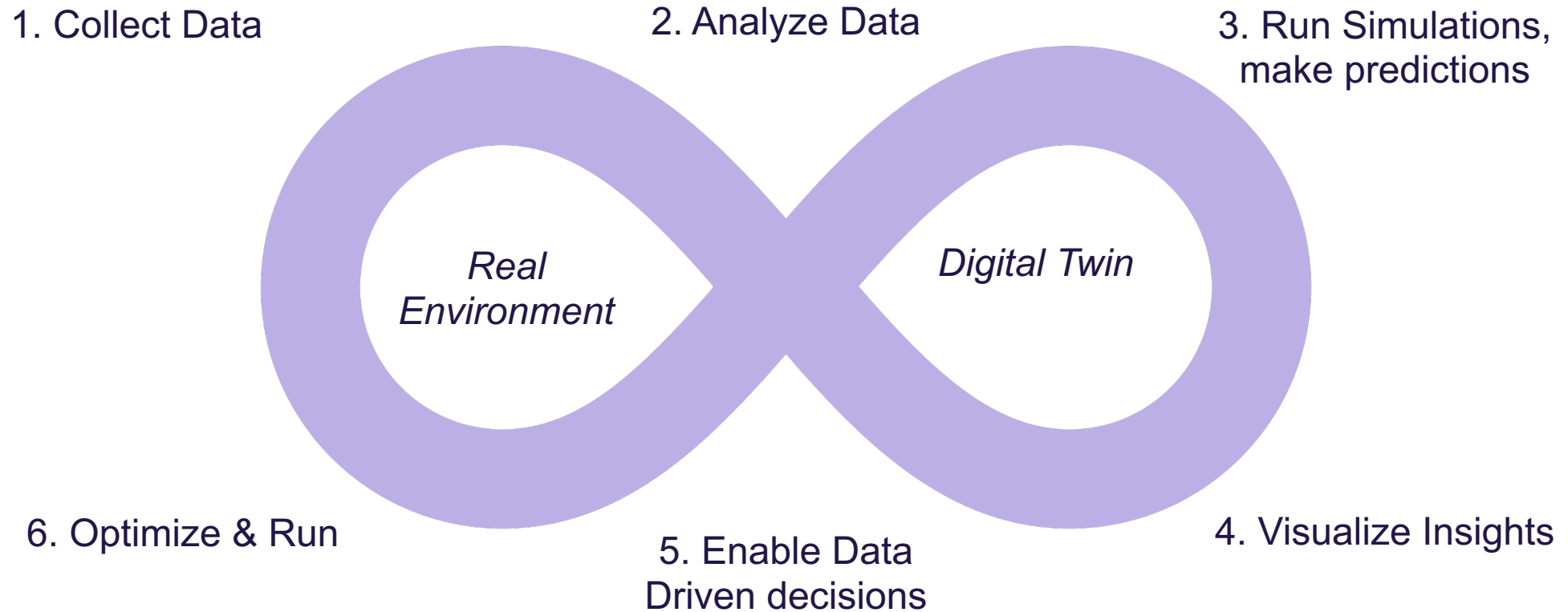
TYPES OF DIGITAL TWINS
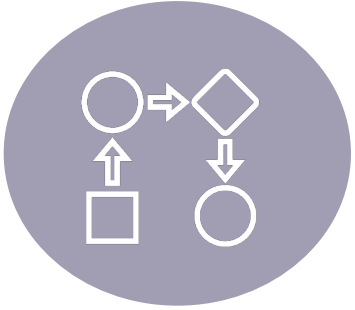
Component Twins

Component twins are the basic unit of digital twin, the smallest digital replica of a functioning component

Asset Twins

Asset twins provides details on interaction of components, creating a wealth of performance data that can be processed and then turned into actionable insights
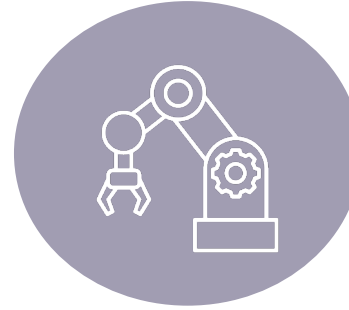
System Twins

The next level of magnification involves system or unit twins, which enable one to see how different assets come together to form an entire functioning system

Process Twins

Process twins, the macro level of magnification, reveal how systems work together to create an entire production facility. Process twins can help determine the precise timing schemes that ultimately influence overall effectiveness

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VALUE PROPOSITION OF DIGITAL TWINS FOR ENTERPRISES

Operational efficiency

Digital twins can profoundly enhance an enterprise's ability to make proactive, data-driven decisions resulting in an overall increase in efficiency through combination of assets - sensors and analytics platforms

Risk mitigation

Digital twins can calculate the risks, estimate the impact on a supply chain, and suggest steps to minimize disruption in the actual event by providing the ability to run multiple what-if scenarios and pick the optimal one

New business opportunities

Digital twins significantly enhances the level of accuracy and digitized detail; hence everything starts to open, and it becomes a lot easier to look at other business models
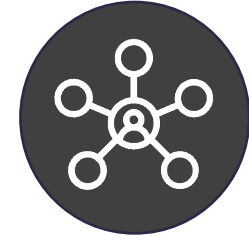
Environmental, Social & corporate governance (ESG)

Digital twins can virtually help to look beyond the current industrial model of extract, produce, consume, and dispose. They can bring changes that help create a more sustainable world and make business more successful
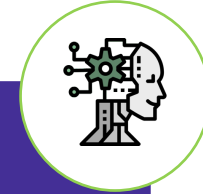
Decisioning

DECISIONING

Data Democratization

Developing a Data-Product centered mindset and approach Benefits include improved business agility, scalability and speed to value from data. It replaces the bottleneck of the centralized monolithic lake or warehouse by decentralizing data operations, ensures greater autonomy to functional owners

Responsible AI

Responsible AI helps build trusted customer relationships. As enterprises take proactive action to combat bias and improve transparency for their AI systems, trust grows their customers, leading to improved retention, spending and adoption of new services/products.

WHAT IS DATA DEMOCRATIZATION

"Data democratization is a concept that refers to making data accessible and usable to a wider range of people within an organization, beyond just data scientists and analysts. The goal of data democratization is to empower decision-makers at all levels with the data they need to do their jobs more effectively."

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Enablers of Data Democratization
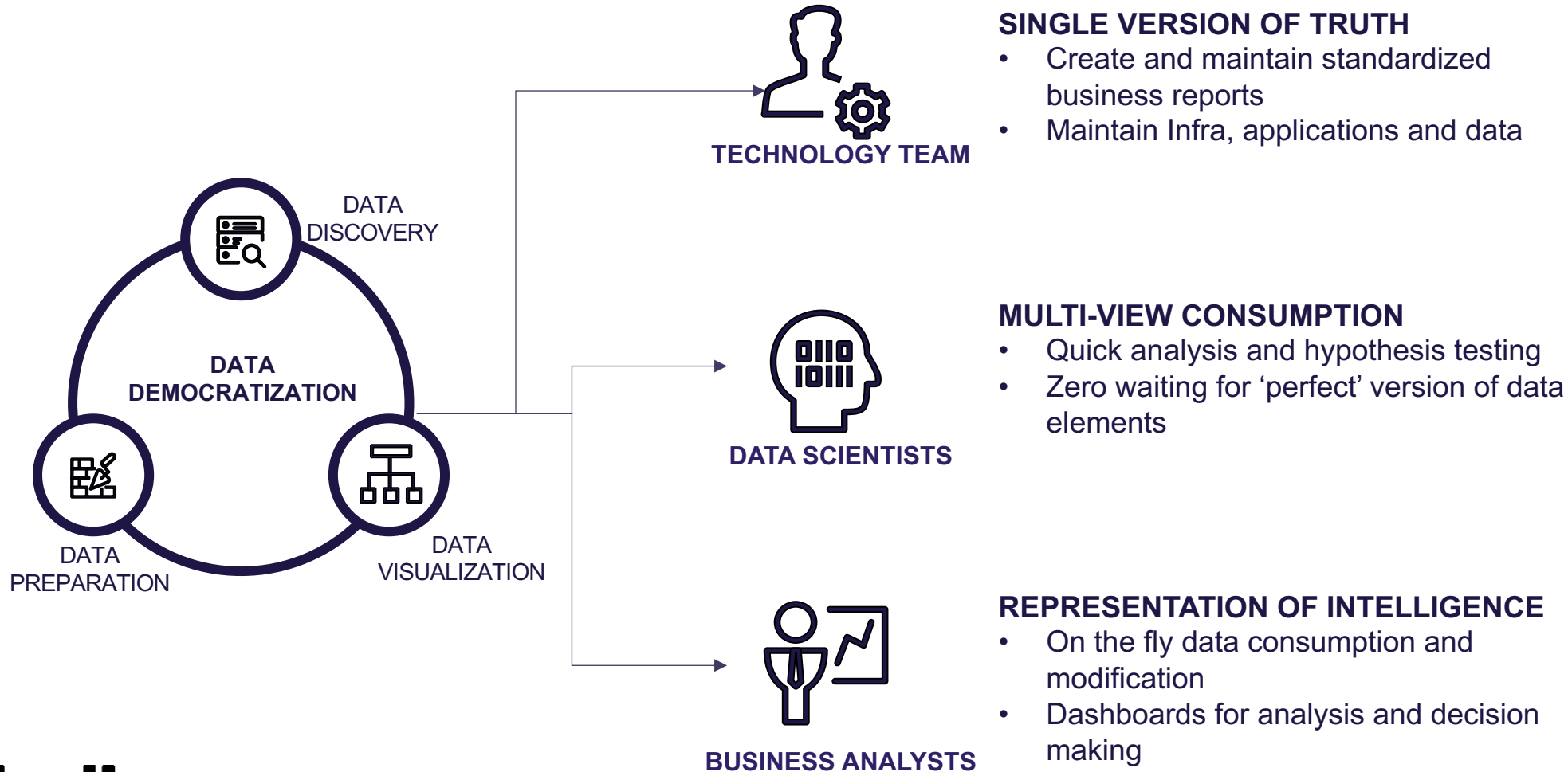
CORE CAPABILITIES
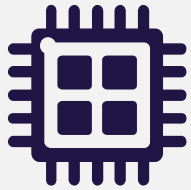
Data Foundation

Human Centric Design

Right speed governance

How is Data Democratization leading Organizations towards Data Literacy?

DATA DISCOVERY

DATA DEMOCRATIZATION

DATA PREPARATION

DATA VISUALIZATION

TECHNOLOGY TEAM

SINGLE VERSION OF TRUTH
- Create and maintain standardized business reports
- Maintain Infra, applications and data

TRUST

DATA SCIENTISTS

MULTI-VIEW CONSUMPTION
- Quick analysis and hypothesis testing
- Zero waiting for 'perfect' version of data elements

SPEED

BUSINESS ANALYSTS

REPRESENTATION OF INTELLIGENCE
- On the fly data consumption and modification
- Dashboards for analysis and decision making

LEAN

WHAT IS RESPONSIBLE AI

"Responsible AI is the practice of designing, developing, and deploying AI with good intention to empower employees and businesses, and fairly impact customers and society allowing companies to engender trust and scale AI with confidence."

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Responsible AI – An Overview

PEOPLE

ACCOUNTABILITY & TRANSPARENCY

TECHNOLOGY

BIAS & FAIRNESS
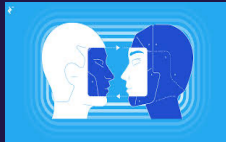
INTERPRETABILITY & EXPLAINABILITY

ETHICS & REGULATIONS

PROCESS

GOVERNANCE

Responsible AI - Principles

AI FAIRNESS

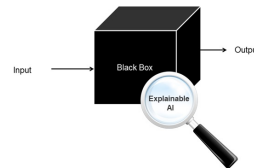Justness
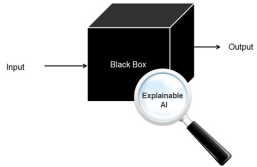
Transparency

ETHICAL AI
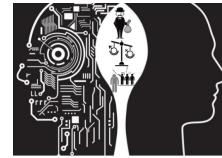
Governance

Privacy

Responsible AI - Principles

The principles of responsible AI refer to the ethical and societal considerations that should guide the development and deployment of artificial intelligence systems
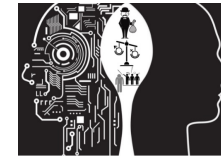
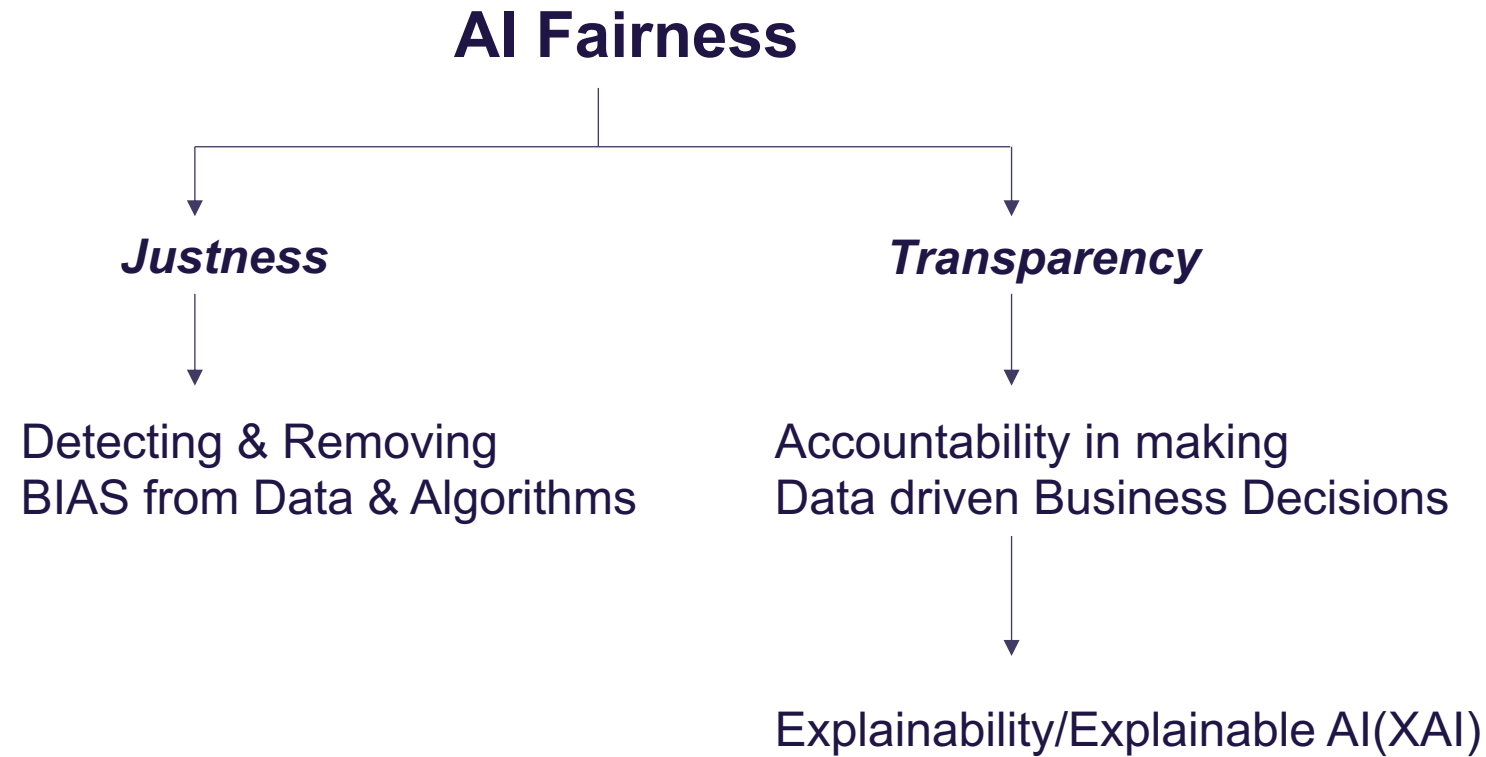## AI FAIRNESS

Justness   Justness

ETHICAL AI

Governance   Privacy

AI Fairness - Overview

AI Fairness

Justness

Detecting & Removing
BIAS from Data & Algorithms

Transparency

Accountability in making
Data driven Business Decisions

Explainability/Explainable AI(XAI)

A formal definition:

" Explainable AI is a set of tools and frameworks to help you understand and interpret predictions made by your machine learning models. With it, you can debug and improve model performance, and help others understand your models' behaviour "

Governance

Data Governance

- Data Security & Data Loss Prevention

- Data Integrity

- Data Lineage

- Data Completeness

Process Governance

- Formalizing steps in ML Lifecycle

- Formalize bringing Human in the Loop

- Ensure validation checks before Deployment

- Example of actions involved:
  → Reviews
  → Sin-Offs
  → Capturing supporting Materials
     (Documentation)

Model Governance

- Versioning to ensure traceabilit

- Experiment Tracking to select appropriate model

- Continuous Integration

- Continuous Deployment

**Responsible AI sees strong Governance as the key to achieving fairness and trustworthiness.**

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Ethical AI - Privacy

Methods to achieve Privacy in AI

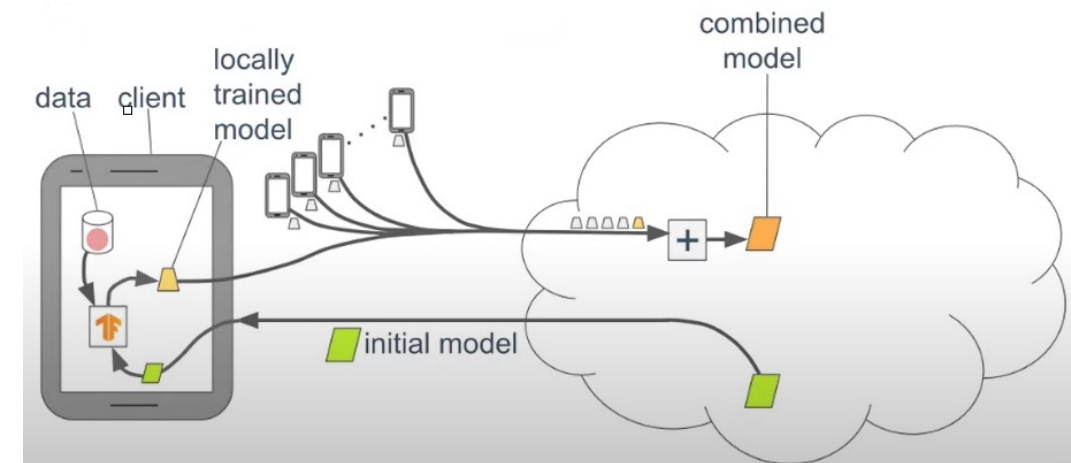*"Protect the data before it enters the model"*
Differential Privacy

- Differential Privacy is a property & not a Technology

- AI system that is *differentially private* allows analysis while protecting sensitive data behind a veil of uncertainty
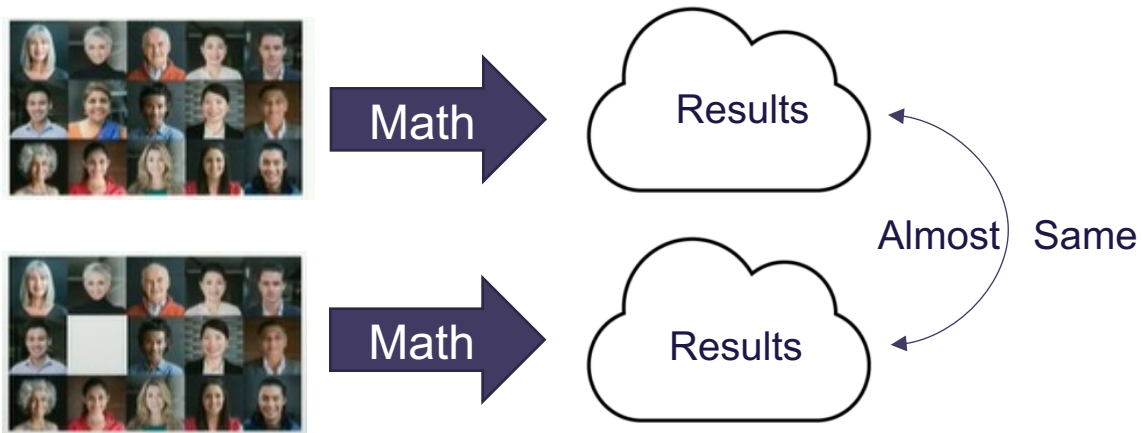
"Building protection into the Model"
Federated Learning

- Federated Learning is Decentralized Machine Learning

- Equivalent of pooling your data without sharing it

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Thank you…