



TECHNOLOGY TRENDS

FOR DIGITAL TWINS

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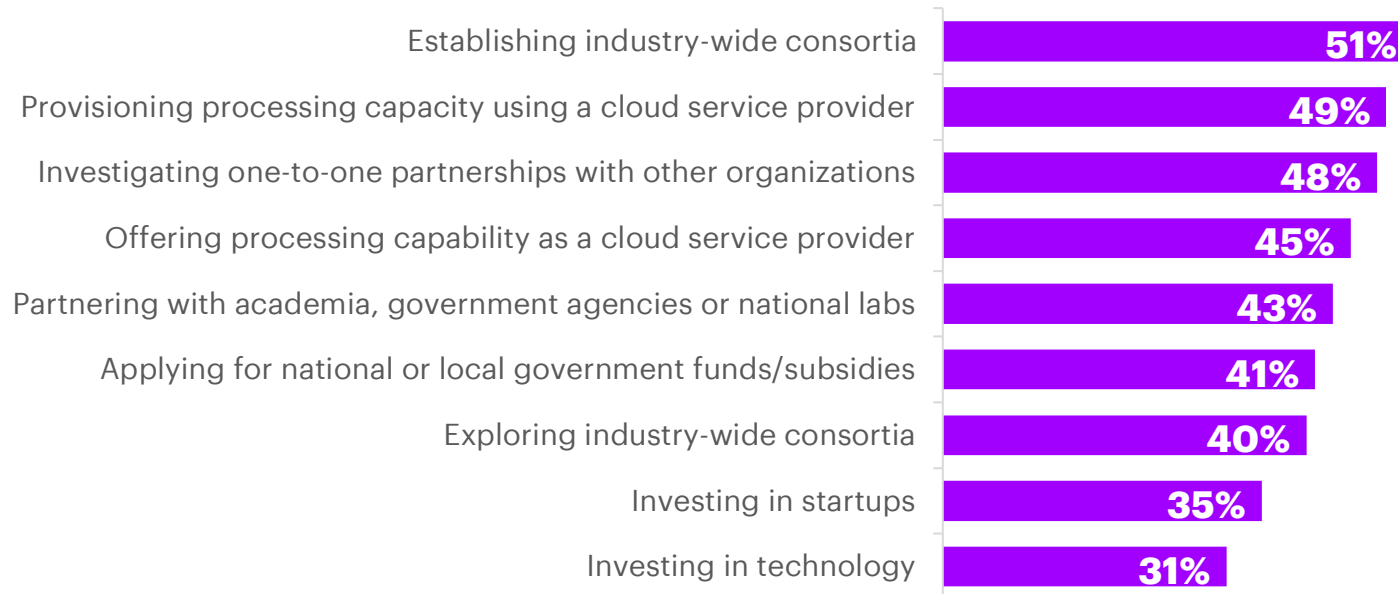
Digital Twins are digital representations of physical things
Metaverse is the bridge between digital and physical
Together they will transform every aspect of business



98%

OF ENERGY EXECUTIVES AGREE THAT EMERGING TECHNOLOGIES ARE ENABLING THEIR ORGANIZATION TO HAVE A BROADER AND MORE AMBITIOUS VISION.

Q. Which of the following actions is your organization planning to take in the next three years to address previously unsolvable problems using next generation computing? *Select all that apply.*



Partner Net = Establishing industry-wide consortia, Partnering with academia, government agencies or national labs
Invest in Technology or Startups Net = Investing in technology, Investing in startups



4 Tech Trends

1. **WebMe** *Putting the Me in Metaverse*

64% of **Energy** executives state that the Metaverse will have a positive impact on their organizations, with **31%** as a breakthrough or transformational impact.

2. **Programmable World** *Our Planet, Personalized*

76% of **Energy** executives believe programming the physical environment will emerge as a competitive differentiation in their industry.

3. **The Unreal** *Making Synthetic, Authentic*

97% of **Energy** executives agree that their organizations are committed to authenticating the origin of their data and genuine use of AI.

4. **Computing the Impossible** *New Machines, New Possibilities*

72% of **Energy** executives are planning to partner with others in the next three years, while another **47%** plan to invest in technology or startups to address previously unsolvable problems using next generation computing.



Trend 01

WebMe

Putting the Me in Metaverse



97%

OF ENERGY EXECUTIVES AGREE THAT FUTURE DIGITAL PLATFORMS NEED TO OFFER UNIFIED EXPERIENCES, ENABLING INTEROPERABILITY OF CUSTOMERS' DATA ACROSS DIFFERENT PLATFORMS AND SPACES

Of the **31%** of executives who believe the Metaverse will have a breakthrough or transformational impact on their organization...

97%

believe it will be within the next 4 years.

81%

of Energy executives agree that the realization of Web3 over the next decade will fundamentally change how businesses engage with users online



DATA MESH PARADIGM TRANSFORMS DATA PROJECTS TO DATA PRODUCTS

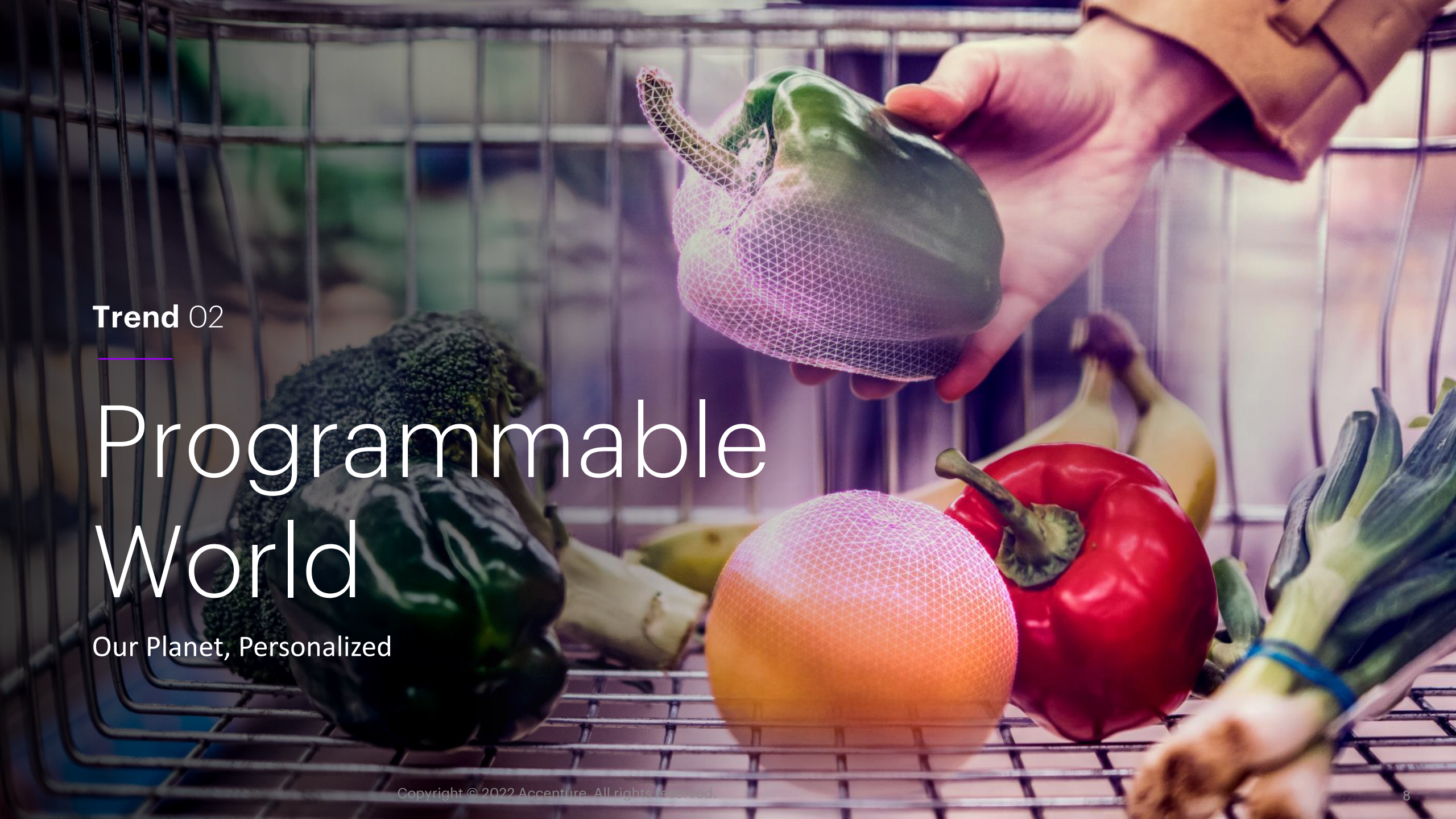
Data Mesh is a paradigm shift towards a decentralized data architecture. Much like the shift from monolithic applications towards microservices in software development.

Data Mesh Shifts

From

To

	From	To
Strategy	Data as an asset to collect	Data as a product to share
Organizationally	Centralized ownership	Decentralized domain ownership
Architecturally	Monolithic	Distributed
Unit	Data as by-product of code	Data and code as one unit
Operationally	Top-down Governance	Federated computational Governance



Trend 02

Programmable World

Our Planet, Personalized

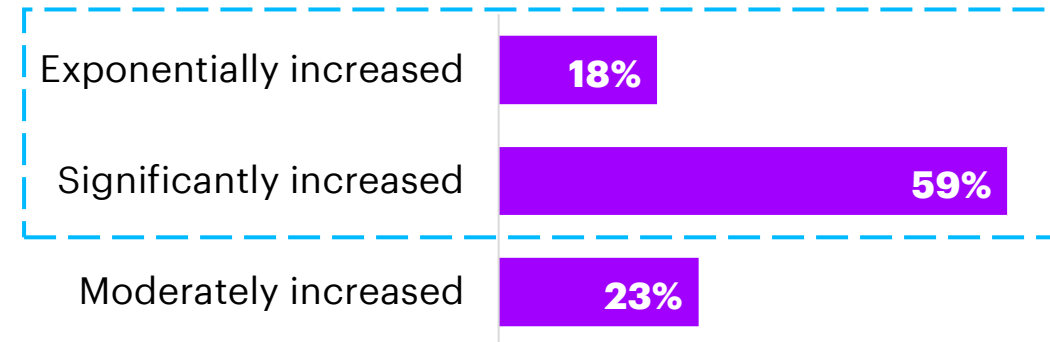
76%

OF ENERGY EXECUTIVES BELIEVE PROGRAMMING THE PHYSICAL ENVIRONMENT WILL EMERGE AS A COMPETITIVE DIFFERENTIATION IN THEIR INDUSTRY

77%

of **Energy** executives report the number of IoT/edge devices deployed in their organization significantly or exponentially increased over the past three years.

Level of increase in **IoT/edge devices deployed** over the past three years



EDGE SCALES DIGITAL TWIN

Edge provides critical enablers to access unique data and make twins actionable



Baseline Digital
Twin



**Proven Deployment
Pattern**



**Edge
Analytics**



Easy Onboarding



**Distributed Digital
Twin**



Trend 03

The Unreal

Making Synthetic, Authentic

97%

OF ENERGY EXECUTIVES REPORT THAT THEIR ORGANIZATIONS ARE COMMITTED TO AUTHENTICATING THE ORIGIN OF THEIR DATA AND GENUINE USE OF AI

ENERGY EXECUTIVES REPORT THAT THEIR ORGANIZATIONS ARE PLANNING TO MITIGATE THE RISK OF DEEPFAKES AND/OR MISINFORMATION ATTACKS BY PREPARING PROACTIVELY (84%) AND IMPLEMENTING VERIFICATION MECHANISMS (88%).

74%

OF ENERGY EXECUTIVES REPORT THAT BLOCKCHAIN IS GOING TO BE CRITICAL TO THEIR ORGANIZATION'S ABILITY TO VERIFY THE ORIGIN OF DIGITAL CONTENT.





PRIVACY PRESERVING TECH ALLOWS DATA ANALYSIS WITHOUT EXPOSING IT



Trusted Execution Environment (Secure Enclave)

An environment with special hardware modules that allow for data processing within hardware-provided, encrypted private memory areas directly on the microprocessor chip only accessible to the running process



Differential Privacy

A data obfuscation mechanism – often used with other traditional anonymization or de-identification techniques – that allows broad statistical information to be gathered and inferred from data without the actual specifics of individual items being exposed



Homomorphic Encryption

A technology that enables computation on encrypted data without the need to decrypt it first (or at all). In this way, sensitive data are encrypted and protected at all stages of transport and processing



Secure Multi Party Computation (MPC)

A technology that provides a mechanism that allows a group of parties to share the benefits of combining their data to create useful outputs while keeping their actual source data private from each other

A person wearing a white lab coat and white gloves is shown in a laboratory setting. They are holding a clear plastic pipette in their right hand, with a small drop of liquid hanging from the tip. In their left hand, they hold a clear petri dish. The background is blurred, showing a person's face in a lab coat. The overall color palette is dominated by purples and blues.

Trend 04

Computing the Impossible

New Machines, New Possibilities

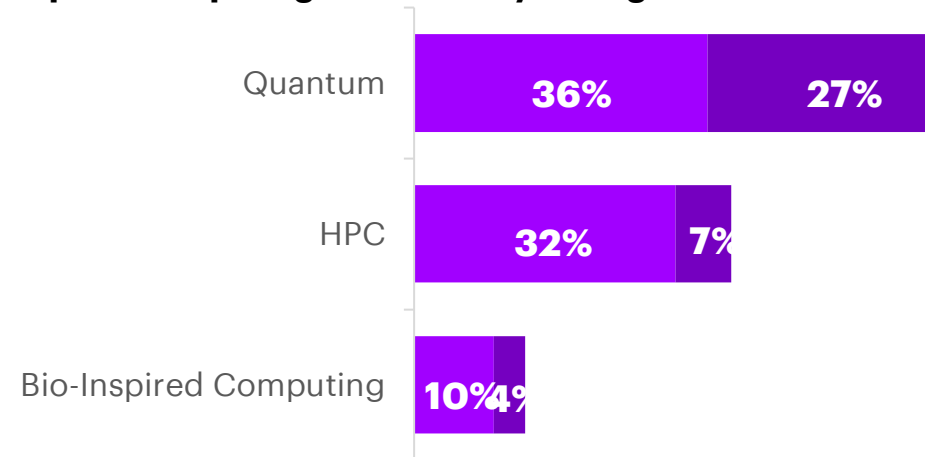
90%

OF ENERGY EXECUTIVES AGREE THAT THEIR ORGANIZATION'S LONG-TERM SUCCESS WILL DEPEND ON THE NEXT GENERATION COMPUTING TO SOLVE THE SEEMINGLY UNSOLVABLE PROBLEMS NOT ADDRESSABLE BY CLASSICAL COMPUTING

63%

OF ENERGY EXECUTIVES SAY QUANTUM COMPUTING WILL HAVE A BREAKTHROUGH OR TRANSFORMATIONAL POSITIVE IMPACT ON THEIR ORGANIZATIONS IN THE FUTURE

























Q. What level of positive impact do you believe the Quantum/HPC/Bio-inspired computing will have on your organization in the future?



- Breakthrough impact (enable new business processes, reach new customers)
- Transformational impact (redefine your industry)



QUANTUM OPPORTUNITIES

 Chemicals & natural resources	 Molecular interaction simulation	 Nitrogen fixation	 Molecular energy	 New material design	 Spectroscopy	 High-temperature superconductors	 Quantum emulation
 Energy	 Electricity trading	 Field development	 Extraction of petroleum	 Electrical grid optimization	 Solar cell design	 Generator commitment	 Gasoline blending
 Utilities	 Service grid optimization	 Service vehicle scheduling	 Waste recycling and cleansing	 Staff management	 Quantum internet services	 Fraud detection	 Data protection

Our Four Technology Trends for 2022



WebMe

Putting the Me in Metaverse

- Data Mesh
- Data Virtualization
- MLOps
- Knowledge Graphs



Programmable World

Our Planet, Personalized

- Edge
- AR/VR
- IoT
- Neuromorphic
- Smart Materials



The Unreal

Making Synthetic, Authentic

- Blockchain
- Privacy Preserving Technology
- Federated Learning
- Synthetic Data
- Responsible AI



Computing The Impossible

New Machines, New Possibilities

- Quantum Computing
- HPC
- Bioinspired Computing
- Dataflow

#TechVision

Technology Vision 2022

MEET ME IN THE METAVERSE

www.accenture.com/technologyvision

THE CONTINUUM OF TECHNOLOGY AND
EXPERIENCE RESHAPING BUSINESS