Transformed

"Rust Belt" to "Midwest Tech Center"

Why Northeast Ohio Will Lead Global IoT Production by 2030

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Contents

Executive Summary

"**Web3** (also known as **Web 3.0**) is an idea for a new iteration of the World Wide Web which incorporates concepts such as decentralization, blockchain technologies, and token-based economics."
- Wikipedia

Blockchain is not a stand-alone technology, but works in concert with AI and IoT, plus Cloud, Edge, 5G, etc.

As the third leg of the Web3 stool, the global business opportunity forecast for IoT production is estimated at $3-4 trillion.

The gap: There is no **global** hub, center of excellence, or standards body for IoT production.

The world is at the beginning of the Web3 migration. At its core, it's about data, privacy, security, ownership, inclusion, research, and speed. It's much more than "a better database."

Revenue Potential, Next 10 years, IoT Production			
		billions	
Manufacturing & Distribution	$	700	
Healthcare Delivery, Pharma, Medical Devices	$	650	
Government	$	400	
Utilities	$	400	
Automotive	$	300	
Military	$	250	
Supply chain	$	200	
Financial Services	$	150	
Real estate	$	150	
Agriculture	$	120	
Insurance	$	100	
Traffic	$	70	
Weather/Climate	$	50	
Academic Research	$	50	
Total	$	3,590	Trillion

The 10-year revenue potential from **IoT production** by industry varies depending on the level of adoption, integration with other technologies like AI and 5G, and specific industry demands. Above is a forecast of the IoT revenue potential by industry from 2024 to 2034, based on various sources and market projections. - ChatGPT, 16Sep2024

The US is already one of the biggest producers of IoT. Silicon Valley leads. Ohio is #10. Manufacturing, Healthcare, Government, Utilities are the top 4 IoT use cases, each of which is a strength of Ohio. Use cases abound across **ALL** industry sectors.

Why Ohio should dominate IoT production:

- Manufacturing in its DNA
- A venture capital base and a pent-up demand for economic development
- A low cost of living, central trade routes, industrious workforce, pleasing culture and lifestyle, and a forceful launch pad powered by Manufacturing and Healthcare
- The academic resources for workforce development and research, launching start-ups

However, there are inevitable barriers to success that would need to be overcome. It will take a unified, community effort. Besides the tangible jobs and revenue available from investing in IoT production, the real payoff from laying this "Midwest Tech" foundation could be what follows. The choice is simple: Ohio can either build an enduring engagement with emerging technologies or get left behind.

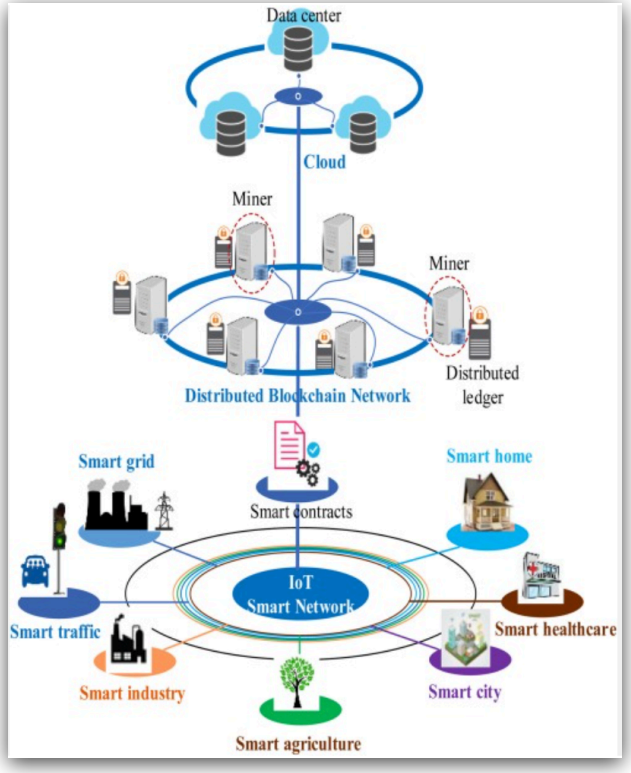
As a next step, a detailed feasibility study should be undertaken in Q4 2024, with the results to be rolled out in Q1 2025 in the form of a stakeholder meet-up in Cleveland or Akron.

If we as a community can act quickly and decisively, with industry, government, and academic support, Ohio can establish global leadership of a $3-4 trillion dollar industry by 2030. We can then build on top of that with whatever comes next. And there's always something next.

Let us seize this golden opportunity.

Remember: "All boats rise with the tide." And, "The flak is heaviest when you're over the target."

1. Why Web3?



(c) Convergence of blockchain and artificial intelligence in IoT network for the sustainable smart city

"**Web3** (also known as **Web 3.0**) is an idea for a new iteration of the World Wide Web which incorporates concepts such as decentralization, blockchain technologies, and token-based economics." - Wikipedia

What is the problem being solved?

Decentralization & Trust – Digital-first, Immutable, Verifiable
> Problem: Centralized entities – GAFA* – have significant control over data, influence, and economics, creating monopolistic practices.
< Web3: Due to the nature of decentralized architecture, participants can transact and interact without the need for trusting a central authority (e.g. bank, auditor, etc.).

Data Ownership & Privacy
> Problem: Users typically give up ownership of their data to platforms in exchange for services. Companies often exploit this data for profit without giving users any control or compensation.
< Web3: Decentralized storage and self-sovereign identity management allow individuals to control, manage, and even monetize their data.

New Economic Models, driven by Tokenization, Digitalization
> Problem: Centralized financial systems lead to value extraction by intermediaries, such as banks and payment processors, and often unfair distribution of value.
< Web3: Programmable money and tokens allow participants to own a stake in networks and benefit directly from their contributions.

Interoperability and Inclusiveness
> Problem: Current platforms are siloed, creating "walled gardens" giving users little ability to transfer value or data across platforms.
< Web3: Open-source tech with industry standards enables accessibility of assets, identities, and data across different platforms, both anonymized for research and personally identifiable for utility.

Democratizing Participation and Governance
> Problem: Decision-making is concentrated in the hands of a few company executives or shareholders, enabling predatory pricing, fraud & corruption.
< Web3: Programmable governance structures allow community members to participate directly in decision-making processes.

Resilience and Censorship Resistance
> Problem: Content or services can be removed or restricted by governments or corporations. Servers, systems, and data can be hacked/ransomed.
< Web3: Open-source systems, programmable governance, and decentralized architecture enable resilience and thwart bad actors.

* Google, Apple, Facebook, Amazon

Why is Web3 the Next Generation Globally? *(Web3 = Blockchain + AI + IoT)*

- ✓ **Economic Empowerment:** Web3 gives users AROUND THE GLOBE new ways to participate in the digital economy.
- ✓ **Shift in Power Dynamics:** From large tech companies to users owning and controlling their online presence and interactions.
- ✓ **Technological Innovation:** As with prior sea-changes in technology, the combination of IoT+AI+Blockchain opens the door to an unforeseen boon in real innovation that will solve some of humanity's most persistent issues.

I. On Blockchain – Why? What is Programmable Business? What is the impact of "Immutable"?

Business Impact

- ✓ **Programmable Security and Trust:** Web2 systems are vulnerable to fraud, hacking, and data manipulation which require third-party intermediaries for oversight, verification and audit to establish trust. (voting, counterfeit drugs)

- ✓ **Automation yields Cost Efficiency and Speed:** Intermediaries for transaction processing, compliance checks, or auditing add costs and friction to the system. (Finance, Real Estate, Logistics, Insurance Claims)

- ✓ **Transparency:** Web2 tech is opaque, difficult to trace the origin of goods or monitor ethical & compliant practices. (Supply Chain, Organic, Counterfeit Drugs, Audit & Regulatory nodes)

- ✓ **New Business Models and Revenue Streams:** Web2 has tech-enabled monopolistic control over data and revenue streams. Because Web3 is secure, open, and available anywhere/anytime, Web3 creates opportunities for revenue generation for producers at every economic strata. Food and clothing producers in rural areas, urban artists around the world to sell their work directly to buyers, consumers can lend and borrow money without TradFi, each with built-in compliance to regulatory requirements by country and/or state.

- ✓ **Cross-Border Transactions:** Eliminating currency conversion issues and fees, reducing the need for international intermediaries, save money & time.

Social Impact

- ✓ **Financial Inclusion:** Billions of people worldwide remain unbanked or underbanked due to lack of documentation, geography, or resources. This empowers marginalized communities and boosts economic participation.

- ✓ **Censorship Resistance and Freedom of Expression:** Social platforms like Steemit and decentralized cloud storage solutions like Filecoin

- ✓ **Data Privacy and Ownership:** Blockchain enables micro-transactions which in turn enable individuals to monetize and use their own data or engage in more, or less, transparent interactions with platforms. Brave Browser and Basic Attention Token (BAT) reward users for sharing their attention and data with advertisers, disrupting the traditional ad-driven, Web-browser model.

- ✓ **Decentralized Governance and Community Empowerment:** DAOs (programmable governance) enable a participatory governance structure that is transparent and decentralized. e.g. Residents of a housing community can form a DAO and be their own landlord – with all the above benefits of programmable business (security, costs, transparency, etc.).

II. AI – We've been doing this for a while. What is different? Key advancements in technology, data availability, and human-AI interaction.

✓ Advances in Machine Learning (ML) and Deep Learning

- ➡ Earlier AI systems were based on rule-based logic and simple algorithms, with limited processing power and smaller datasets.
- ➡ AI now leverages powerful machine learning and deep learning algorithms, enabling it to learn from massive amounts of data.
- ➡ These models have become more efficient and accurate through reinforcement learning, neural networks, and sophisticated architectures like GPT and BERT.

✓ Big Data and Cloud Computing

- ➡ With big data, AI can access vast amounts of information to train models more effectively.
- ➡ Cloud computing provides scalable computing power, meaning that even small companies can build AI models without needing massive infrastructure.

✓ Human-AI Interaction (HCI)

- ➡ AI has become more intuitive and conversational through Natural Language Processing (NLP), enabling direct interaction between humans and machines.
- ➡ AI chatbots, virtual assistants like Siri and Alexa, and systems like ChatGPT have transformed how humans interact with machines in real-time, making it more seamless and natural.

✓ AI's Broader Impact Across Industries

- ➡ AI is being applied to a broad range of industries including healthcare, autonomous vehicles, finance, and marketing.
- ➡ Its predictive and automation capabilities are now pivotal in processes like medical diagnostics, personalized recommendations, and automated trading systems.

✓ Ethics and Responsible AI

- ➡ The rise of AI's capabilities has brought ethical concerns to the forefront, like potential bias in algorithms, job displacement due to automation, and data privacy issues.
- ➡ There's also a growing focus on creating transparent, fair, and accountable AI systems.

✓ Human Interaction: The Evolution

- ➡ Modern AI can now understand context, remember previous interactions, and even demonstrate creativity or empathy.
- ➡ AI and humans work together, particularly in creative fields, customer service, and healthcare, to combine computational efficiency with human empathy and judgment.

III. IoT – Recording the source of the data – Retrieve, transform, access, store.

IoT is rising because it solves a critical need: collecting and utilizing data at its source for real-time decision-making, optimization, and automation across a wide range of sectors. This ultimately leads to more efficient, responsive, and intelligent systems.

Top 7 Reasons on Why the rise of more efficient, responsive, and intelligent systems:

1. **Proliferation of Connected Devices**
   a. IoT allows for billions of devices—from appliances to industrial equipment—to be interconnected, creating an ecosystem where data flows freely between them.
   b. This enables **real-time monitoring, automation, and optimization** across industries like healthcare, transportation, and manufacturing.

2. **Data Collection at the Source -** This allows for **real-time analytics** and decision-making.
   a. Devices can continuously monitor conditions like temperature, motion, or machine status.
   b. Immediately share data for analysis or trigger responses.

3. **Edge Computing**
   a. Data processing occurs closer to where the data is generated (the "edge" of the network)
   b. This reduces latency, bandwidth costs, and reliance on central cloud infrastructure, making real-time decision-making faster and more efficient.

4. **Increased Efficiency and Automation**
   a. Instant feedback loops
   b. Smart homes, energy usage can be optimized
   c. Monitor soil conditions and automatically optimize irrigation

5. **Predictive Maintenance and Reduced Downtime**
   a. Sensors detect abnormalities in equipment, allowing businesses to repair or maintain machines before a failure occurs

6. **Integration of AI and Machine Learning**
   a. With IoT generating vast amounts of data, AI and machine learning algorithms can analyze this data in real-time.
   b. This combination allows for **smarter systems** that can adapt to new data patterns, automate processes, and predict future behaviors.

7. **A Few Applications Across Sectors** *(more detail below)*

Healthcare: IoT in healthcare (e.g., wearables) allows for continuous monitoring of patients, providing data on vital signs in real-time.

Smart Cities: IoT enables urban infrastructure like traffic systems, streetlights, and waste management to be automated and optimized.

Supply Chain: IoT provides greater visibility and tracking of goods, reducing inefficiencies and losses.

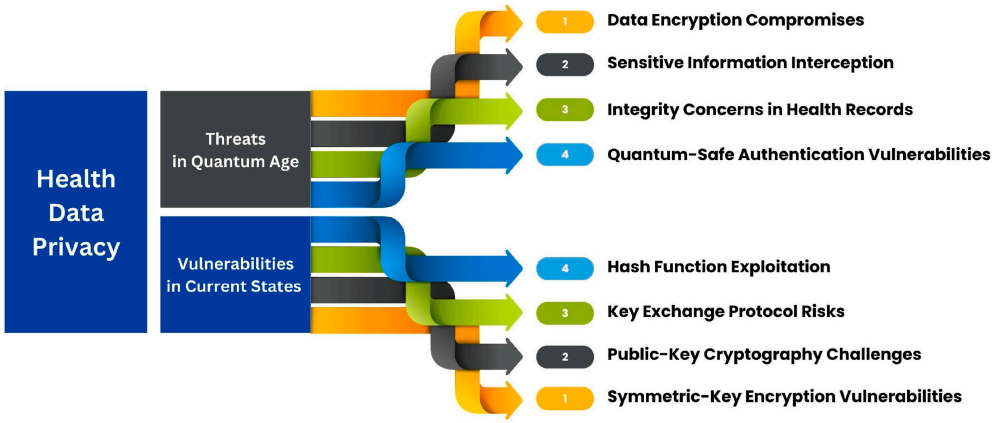
Why Now?

✓ **Cost of Technology:** The cost of sensors, connectivity, and data storage has decreased significantly, making IoT implementations more accessible.

✓ **Ubiquitous Connectivity:** Widespread use of 5G and broadband connectivity allows for faster, more reliable communication between IoT devices, even in remote areas.

✓ **Data-Driven Decision-Making:** As more industries shift toward data-driven strategies, IoT becomes a crucial tool in providing real-time, granular data that can be acted upon almost instantaneously.

2. Post-Quantum Resilience



(c) Post-quantum healthcare: A roadmap for cybersecurity resilience in medical data

Top 7 Reasons why **Web3 architecture** offers the best hope for Post-Quantum Resilience**:**

1. **Decentralization and Trustlessness**
   a. Web3 is fundamentally decentralized which reduces the reliance on central points of failure
   b. Quantum computers have the potential to break conventional cryptographic algorithms, e.g. RSA, ECC

2. **Post-Quantum Cryptography (PQC) to ensure future-proof security.**
   a. PQC algorithms are resistant to the quantum algorithms expected to break classical encryption.
   b. Protocols like lattice-based cryptography, hash-based cryptography, and multivariate quadratic equations are being explored for securing blockchain networks

3. **Smart Contracts and Autonomous Systems**
   a. With AI and IoT integration, smart contracts can automate complex interactions, verify data integrity in real-time, and provide greater efficiency across networks.
   b. dApps can be built to automatically upgrade or adjust security protocols based on the threat landscape.

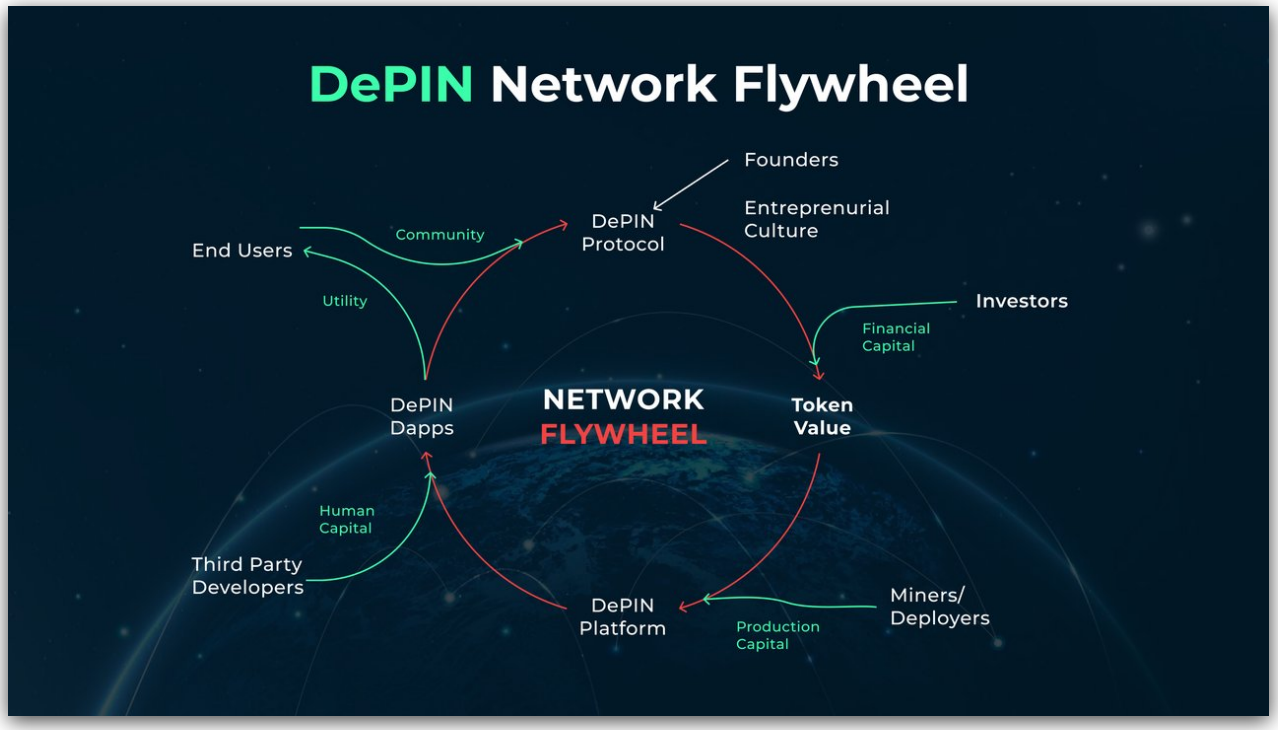
4. **AI and IoT Integration**
   a. AI algorithms can be enhanced to monitor and predict quantum threats or any suspicious activity on IoT devices and blockchains
   b. A decentralized Web3 can ensure that IoT devices maintain strong security and privacy standards.

5. **Immutable and Transparent Security Models**
   a. Immutability becomes even more crucial when considering the increased threat quantum computers pose to traditional encryption.
   b. Web3's transparent and auditable architecture enables researchers and developers to monitor and evolve security models, making implementation of **PQC** easier and more widespread.

6. **Zero-Knowledge Proofs and Homomorphic Encryption**
   a. These methods allow users to prove the validity of information **without** revealing the actual data, which enhances both privacy and security in a quantum-resistant manner.
   b. These cryptographic techniques are expected to provide enhanced protection for sensitive data and maintain the integrity of Web3 transactions, even in a post-quantum world.

7. **Resilience and Scalability**
   a. The decentralized, peer-to-peer architecture of Web3 scales better in terms of **resilience** to both traditional and quantum threats.
   b. With the introduction of **sharding**, **layer-2 solutions**, and **interoperability** between blockchains, Web3 is evolving to handle large volumes of transactions and data in a secure and quantum-resilient manner.

3. DePIN as a Driving Force



(c) Coingecko: What Is the Decentralized Physical Infrastructure (DePIN) Narrative in Crypto?

How does the "DePIN" movement intersect with and impact the manufacturing of Internet of Things devices?

First, **What is DePIN?**

"The core promise of DePIN is to bring the principles of blockchain applications – as community owned, publicly verifiable, and incentive-aligned – to the world of physical "things" and infrastructure, whether that is WiFi stations, security cameras, or computation servers." - via VeradiVerdict - Issue #276

The **DePIN (Decentralized Physical Infrastructure Networks) movement** is having a notable impact on the manufacturing of IoT devices by shifting the infrastructure model from centralized to decentralized, incentivizing participation in building and operating IoT networks.

This change intersects with IoT manufacturing in several key ways:

1. Decentralization of Device Manufacturing

DePIN enables decentralized ownership of physical infrastructure, which includes IoT devices like sensors, routers, and hotspots. With blockchain-driven token incentives, individuals and companies are encouraged to contribute to building and maintaining networks by purchasing and operating IoT devices. This decentralized model contrasts with traditional manufacturing models, which rely on large corporations to handle production, distribution, and operation.

For example, the Helium network has successfully implemented a decentralized IoT network with over 400,000 user-operated hotspots globally. This has proven that decentralized IoT networks can scale faster and more cost-effectively than centralized counterparts, which rely on fewer operators and more capital-intensive infrastructures. - via Rapid Innovation, IoTeX

2. Token Incentives Driving Demand

DePIN relies heavily on token economies to incentivize users to host and operate IoT devices. This increases the demand for devices like smart sensors, tracking equipment, and environmental monitoring tools, as users are motivated to participate in decentralized networks for token rewards. These devices generate data that is recorded on blockchain networks and analyzed for various applications like logistics, energy management, and smart cities. - via Orochi Network, HackerNoon

As a result, IoT manufacturers are seeing growing demand for devices that integrate easily with decentralized networks. This demand will likely push manufacturers to produce more decentralized and blockchain-integrated IoT hardware.

3. Lower Barriers to Entry and Scalability

The decentralized model of DePIN significantly lowers the barriers to infrastructure development by enabling individual operators to contribute. This decentralization creates more opportunities for IoT manufacturers to sell devices directly to consumers and small businesses, rather than depending solely on large enterprise contracts. In turn, this increases the scalability of IoT networks as more participants can enter the market with minimal upfront investment. - via IoTeX

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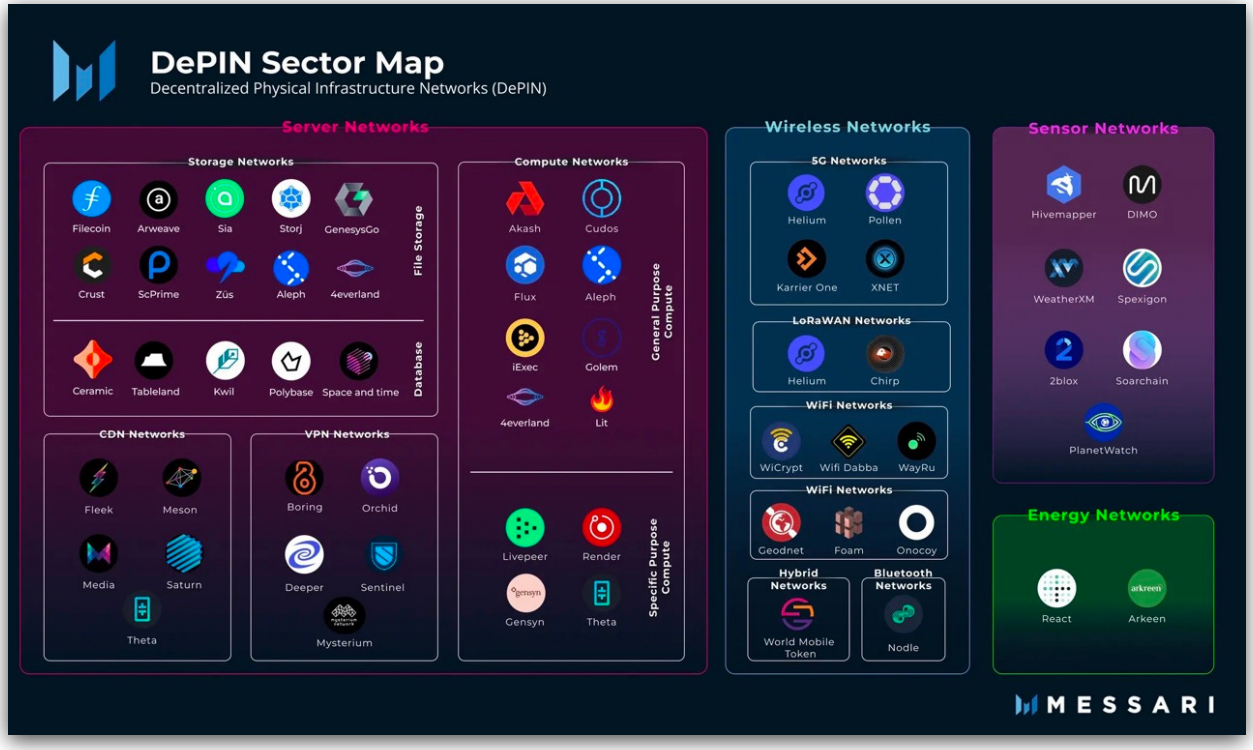
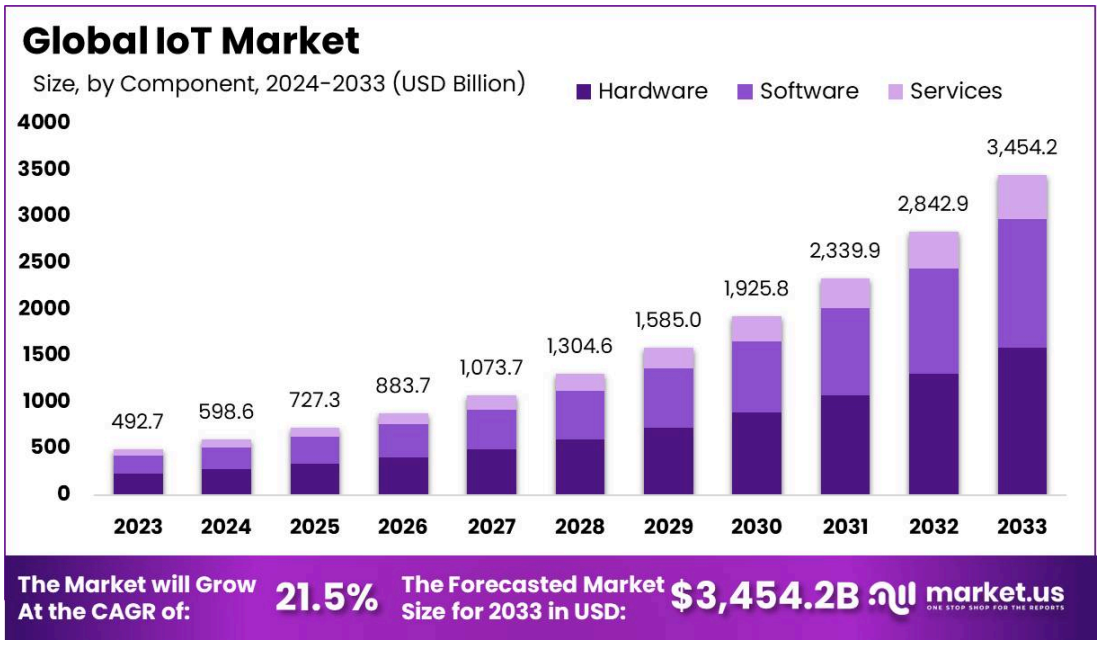
4. Intersection with AI and Data

DePIN leverages IoT devices to collect massive amounts of real-time data, which is then processed and analyzed by decentralized AI systems. This data can be used to enhance the efficiency of manufacturing operations and improve product designs. As AI algorithms process the data generated by IoT devices, manufacturers gain insights into device performance, usage patterns, and potential optimizations, leading to better product iterations and cost savings. - via IoTeX

In conclusion, the DePIN movement is transforming IoT device manufacturing by decentralizing infrastructure ownership, leveraging token incentives, and opening new opportunities for scaling IoT networks. This shift enhances innovation and competition while driving the adoption of blockchain-integrated devices across industries like energy, transportation, and smart cities.



4. IoT Market Size & Growth



(c) Global Internet of Things (IoT) Market By Component

IoT Market Size and Forecast:

The global trend-line for IoT production from 2020 to 2030 is marked by significant growth, driven by the increasing demand for connected devices, advancements in technologies such as 5G, edge computing, AI, and the growing importance of IoT in smart cities, healthcare, manufacturing, and other industries. The global IoT market was valued at $300 billion in 2020 and is expected to grow to more than $1.5 trillion by 2030. This growth is supported by the rapid proliferation of connected devices, estimated to reach over 75 billion IoT devices by 2030.

Key Phases of IoT Production Growth:

2020-2025: Rapid Growth and Adoption

✓ **Consumer IoT Expansion:** In this phase, IoT production was heavily focused on consumer applications such as smart homes, wearables, and connected devices. Consumer IoT products saw rapid adoption due to increasing interest in automation and connectivity.

✓ **Industrial IoT (IIoT) Adoption:** Industries began implementing IoT solutions for predictive maintenance, asset tracking, and process optimization. The manufacturing and logistics sectors, in particular, started integrating IoT devices to enhance productivity and reduce downtime.

✓ **5G Rollout Impact:** The rollout of 5G networks accelerated IoT production, enabling faster data transmission and connectivity for more devices simultaneously. This opened the doors for more complex, high-volume IoT applications.

2025-2030: Maturation and Scaling

✓ **Proliferation of Edge Devices:** With increased adoption of edge computing, IoT devices will be capable of processing more data locally, reducing the load on central systems. This will drive the production of more intelligent IoT devices.

✓ **Smart Cities and Infrastructure:** IoT production will be increasingly focused on applications in smart cities, smart grids, and infrastructure management. Government initiatives and public-private partnerships will play a crucial role in driving this trend. IoT in connected vehicles, including autonomous driving and advanced telematics.

✓ **IoT in Healthcare and Automation:** The healthcare sector will see significant investments in IoT-enabled devices for remote monitoring, telemedicine, and personalized care.

5. Top 5 Global IoT CoIs

Global Trends:

North America and Asia-Pacific (especially China and India) are leading the charge in IoT production and deployment, with strong contributions from sectors such as manufacturing, automotive, and healthcare Europe is also investing heavily in IoT to drive innovation in smart cities and green technologies.

The Top 5 Global Centers of Influence for IoT Production are regions that lead in research, development, and manufacturing of Internet of Things (IoT) technologies. These areas have strong industrial bases, advanced technology ecosystems, government support, and investments in smart infrastructure.

1. Silicon Valley, USA

Overview: Silicon Valley is a global leader in technology innovation and development. It has the highest concentration of tech companies, venture capital funding, and talent in IoT, AI, and machine learning.
Key Players: Companies like Google, Apple, Cisco, and Intel are major drivers of IoT research and product development.
Influence: Silicon Valley's ecosystem fosters cutting-edge IoT innovations in smart cities, connected homes, autonomous vehicles, and industrial IoT (IIoT).
Support: U.S. government initiatives and investments in smart infrastructure further enhance its influence on the global IoT stage.

2. Shenzhen, China

Overview: Shenzhen has emerged as a global manufacturing hub and a significant player in IoT production, particularly in hardware manufacturing. The city is a central part of China's "Made in China 2025" initiative, which emphasizes smart manufacturing and IoT.
Key Players: Companies such as Huawei, Xiaomi, and DJI are global leaders in IoT products and smart devices.
Influence: Shenzhen is known for its rapid prototyping, large-scale production capabilities, and innovations in smart cities and consumer IoT devices.
Support: Chinese government policies support massive investments in IoT and other emerging technologies like AI and 5G.

3. Berlin, Germany

Overview: Berlin has become Europe's leading center for IoT innovation, particularly in industrial applications and smart manufacturing. It benefits from Germany's strong engineering and industrial background.
Key Players: Companies such as Siemens, Bosch, and SAP are leading IoT developments in the region.
Influence: Berlin is pivotal in Industry 4.0, focusing on integrating IoT into manufacturing, supply chains, and logistics. Germany's engineering excellence and investments in automation technologies further enhance its leadership in the IoT space.
Support: The German government promotes policies around Industry 4.0, which integrates IoT solutions for smart factories and manufacturing optimization.

4. **Bangalore, India**

Overview: Bangalore, often referred to as the "Silicon Valley of India," is a major hub for IoT software development and solutions, with a growing hardware ecosystem. It leads in IoT innovation in both industrial and consumer sectors.
Key Players: Companies like Tata Consultancy Services (TCS), Infosys, and startups focused on IoT are key drivers of innovation.
Influence: Bangalore is pivotal in IoT-enabled automation for industries like manufacturing, healthcare, and logistics, with a growing influence in smart cities and agriculture IoT.
Support: The Indian government has launched several initiatives to support IoT growth, including the Digital India initiative, which focuses on smart cities, and policies promoting innovation in IoT sectors.

5. **Tel Aviv, Israel**

Overview: Tel Aviv is a global leader in cybersecurity, innovation, and IoT technologies. Israel's strong tech ecosystem and thriving startup culture make Tel Aviv a key player in IoT development.
Key Players: Companies like Check Point Software and various IoT startups are focusing on cybersecurity for IoT, smart cities, and industrial applications.
Influence: Tel Aviv plays a crucial role in developing secure IoT infrastructure, with a focus on military applications, automotive IoT, and smart city projects.
Support: The Israeli government actively supports IoT innovation through grants and investments, particularly in sectors like defense, healthcare, and transportation.

6. IoT Production by State

The global trend-line for IoT production from 2020 to 2030 shows significant growth, with strong contributions from key countries. By 2024, North America, particularly the U.S., leads IoT production. The U.S. has several top centers for IoT production, driven largely by advanced industries like manufacturing, healthcare, and smart city technologies.

Top 10:

1. **California** - Home to Silicon Valley, California dominates IoT innovation and production, driven by tech giants like Apple, Google, and many startups.
2. **Texas** - With its growing tech hubs in Austin and Houston, Texas is a leader in IoT production, particularly in sectors like energy and healthcare.
3. **New York** - New York's strong presence in finance and healthcare is pushing the growth of IoT technologies in these industries.
4. **Massachusetts** - Known for its biotech and healthcare sectors, Massachusetts is a key player in developing IoT solutions for medical devices and healthcare management.
5. **Washington** - With Microsoft leading the way, Washington contributes significantly to IoT, especially in cloud and AI-driven IoT solutions.
6. **Illinois** - Chicago is a hub for industrial IoT (IIoT) with a focus on manufacturing and logistics.
7. **Michigan** - The auto industry is leveraging IoT for smart manufacturing and autonomous vehicles.
8. **North Carolina** - The Research Triangle area in North Carolina is fostering growth in IoT, particularly in healthcare and agriculture technologies.
9. **Florida** - IoT applications in smart cities, especially in transportation and tourism, are prominent.
10. **Ohio** - Ohio's industrial sector is integrating IoT to improve manufacturing processes and logistics.

7. Sample IoT Use Cases

1. **Manufacturing & Distribution**

(c) Source: https://www.themanufacturer.com/

   a. **Smart Manufacturing:** IoT-enabled sensors and devices are used for predictive maintenance, machine monitoring, and automation in manufacturing processes.
   b. **Inventory Management:** IoT tracks inventory in real-time, optimizing supply levels and distribution logistics.

2. **Supply Chain**

   a. **Asset Tracking:** IoT solutions allow for real-time tracking of goods during transit, ensuring efficiency and transparency.
   b. **Fleet Management:** IoT in vehicles helps optimize routes, monitor vehicle conditions, and reduce delivery times.

3. **Healthcare Delivery, Pharma, Medical Devices**

(c) Source: Telit Centurion

   a. **Remote Patient Monitoring:** Wearables and connected medical devices enable healthcare providers to monitor patient conditions in real-time.
   b. **Smart Medical Devices:** IoT allows for real-time data collection from medical equipment, improving treatment outcomes and equipment efficiency.

4. **Financial Services**

   a. **IoT in Payments:** IoT devices are being used for seamless and secure payments, such as connected wearables or mobile wallets.
   b. **Risk Management:** Financial institutions are using IoT data for fraud detection and improved customer personalization.

5. **Insurance**

(c) Source: Nasscom Community

   a. **Usage-Based Insurance (UBI):** IoT devices, such as telematics in vehicles, allow insurance companies to track driver behavior for personalized premiums.
   b. **Property Monitoring:** Connected home devices reduce risk by detecting leaks, fires, and intrusions, which impacts insurance claims.

6. **Government**

   a. **Smart Cities:** Governments are deploying IoT in traffic management, street lighting, and waste management to enhance public services.
   b. **Public Safety:** IoT is used in surveillance systems and emergency response operations.

7. **Real Estate**

   a. **Smart Buildings:** IoT automates climate control, lighting, and security in commercial and residential buildings, leading to energy efficiency and better security.
   b. **Tenant Experience:** Smart homes and buildings enhance tenant satisfaction through smart locks, connected thermostats, and app-based control systems.

8. **Agriculture**

(c) Source: VinyardVantage

   a. Precision Agriculture: IoT sensors monitor soil conditions, irrigation systems, and crop health, allowing farmers to optimize resource use.
   b. Livestock Monitoring: IoT devices help in tracking the health and location of livestock.

9. **Weather/Climate**

   a. Environmental Monitoring: IoT sensors collect data on air quality, temperature, and other climate variables, assisting in environmental protection and disaster management.
   b. Weather Forecasting: IoT networks provide high-resolution data, improving the accuracy of weather forecasts.

10. **Traffic**

   a. Traffic Management: IoT enables smart traffic lights, vehicle tracking, and route optimization, reducing congestion and improving urban mobility.
   b. Smart Parking: IoT-based parking solutions allow drivers to find available parking spaces in real-time.

11. **Utilities**

(c) Source: Telit Centurion

   a. Smart Grids: IoT enables real-time monitoring of electricity usage, detecting outages and optimizing energy distribution.
   b. Water Management: Smart meters and sensors in water utilities help detect leaks and manage consumption.

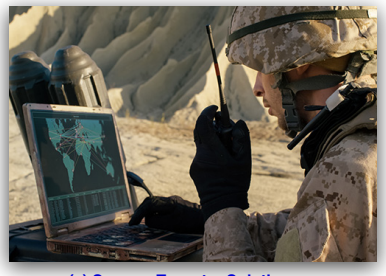
12. **Automotive**

   a. Connected Cars: IoT in vehicles enables features like real-time diagnostics, autonomous driving, and enhanced navigation systems.
   b. Fleet Telematics: IoT solutions for fleet management provide real-time tracking, fuel efficiency monitoring, and maintenance alerts.

13. **Academic Research**

   a. Data-Driven Research: IoT sensors in research labs help in collecting data for a wide range of experiments, from environmental studies to robotics.
   b. Campus Automation: IoT improves campus safety and facility management through smart systems.

14. **Military**



(c) Source: Tapestry Solutions

   a. Battlefield Monitoring and Situational Awareness
   b. Connected Vehicles and Autonomous Systems
   c. Wearable Technologies and Soldier Health Monitoring
   d. Logistics and Supply Chain Management
   e. Smart Bases and Infrastructure
   f. Cybersecurity and Network Monitoring
   g. Drones and Autonomous Surveillance
   h. Enhanced Communication Systems
   i. Training Simulations and Virtual Reality

8. IoT Revenue Potential

Overview:

The 10-year revenue potential from **IoT production** by industry varies depending on the level of adoption, integration with other technologies like AI and 5G, and specific industry demands. Below is a forecast of the IoT revenue potential by industry from 2024 to 2034, based on various sources and market projections.

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Financial Services	$150
Real Estate	$150
Agriculture	$120
Insurance	$100
Traffic	$70
Weather/Climate	$50
Academic Research	$50
Total	$3,590

9. Top 5 Management Schools for IoT

What are the Top 5 management schools world-wide that offer degree courses or certification courses on IoT?

1. **Northeastern University** – Offers an MS in Internet of Things, combining coursework with research and industry experience. The program focuses on IoT's role in diverse fields, such as healthcare, smart infrastructure, and transportation, while allowing students to engage with cutting-edge research in wireless communications and machine learning Graduate Programs

2. **École Polytechnique, France** – Provides a Master's in Internet of Things: Innovation and Management, a two-year program aimed at preparing students to lead digital transformation efforts. This program covers electronics, data transmission, embedded systems, and related legal challenges, helping students develop expertise in IoT technologies École Polytechnique

3. **Carnegie Mellon University** – Known for its pioneering work in computer science and IoT, Carnegie Mellon offers various courses and degrees that incorporate IoT technologies, particularly through its School of Computer Science and its integrated approach to robotics and machine learning.

4. **University of California, Berkeley** – The Sutardja Center for Entrepreneurship and Technology at UC Berkeley offers an IoT certification program designed to give professionals insight into IoT technologies, use cases, and market trends.

5. **MIT (Massachusetts Institute of Technology)** – Offers a Professional Certificate in Internet of Things, targeting professionals in industries such as smart cities, manufacturing, and healthcare, covering both technical and business implications of IoT.

10. Top 5 Global IoT Conferences

What are the Top 5 Global IoT Conferences that feature use case education, industry networking, tech hackathons, and reverse pitches?

1. **IoT Tech Expo North America (Santa Clara, USA) – June 5-6, 2024**

   This major IoT event covers topics like smart cities, healthcare, industrial IoT, and IoT security. With 250+ speakers and 250 exhibitors, it offers excellent networking opportunities, case studies, and hackathons, making it a go-to event for industry professionals.

2. **Bosch ConnectedWorld (Berlin, Germany) – February 26-28, 2024**

   Bosch ConnectedWorld is renowned for its BCX Hackathon, one of Europe's largest AI and IoT hackathons. The event brings together IoT innovators to collaborate on real-world challenges, with opportunities for use case development and reverse pitches.

3. **IoT Solutions World Congress (Barcelona, Spain) – May 21-23, 2024**

   A leading global IoT event focused on cutting-edge technologies like AI, digital twins, and blockchain. The congress features use case sessions, industry networking, and is a platform for IoT-driven innovation.

4. **Hardware Pioneers Max (London, UK) – May 28-29, 2024**

   This event focuses on the latest innovations in IoT hardware, embedded systems, and edge AI. It includes expert speakers, exhibitions, and sessions tailored for IoT engineers and developers.

5. **Smart Manufacturing & Industrial IoT Summit (Berlin, Germany) – May 7-8, 2024**

   This exclusive event focuses on the integration of IoT in manufacturing, with expert-led sessions on smart factories, industrial automation, and supply chain advancements.

11. Top 10 Barriers

What are the Top 10 Barriers and Roadblocks to faster IoT adoption globally?

1. **Data Security and Privacy Concerns**

   Barrier: IoT devices collect vast amounts of sensitive data, making them attractive targets for hackers. Ensuring that IoT systems remain secure and user privacy is protected remains a major challenge.
   Impact: Widespread data breaches and cybersecurity issues could erode trust in IoT solutions, limiting adoption in sectors like healthcare and financial services.
   Example: The lack of standardized security protocols across IoT devices leaves them vulnerable to attacks like Distributed Denial of Service (DDoS) and unauthorized data access.

2. **Interoperability and Standards**

   Barrier: There is no universal standard for IoT communication protocols, device compatibility, or data formats. This lack of interoperability makes it difficult to integrate IoT devices from different vendors into a cohesive system.
   Impact: Inconsistent standards limit scalability and drive up costs, as organizations need custom solutions to ensure IoT systems work together.
   Example: Competing standards like Zigbee, Bluetooth, and Wi-Fi make device integration complex, especially in industries requiring large IoT networks, like smart cities or industrial IoT.

3. **High Implementation Costs**

   Barrier: The cost of IoT infrastructure, including sensors, devices, cloud storage, and data processing, can be prohibitive for smaller organizations and developing economies.
   Impact: Businesses in industries such as manufacturing or agriculture may face financial barriers to adopting large-scale IoT solutions, slowing down global deployment.
   Example: Initial setup costs, including device installation and network upgrades, combined with the expenses for skilled IoT professionals, make implementation less feasible for many companies.

4. **Limited Connectivity and Infrastructure**

   Barrier: Reliable internet connectivity is essential for IoT devices to communicate and share data. However, in many parts of the world, especially in rural and underdeveloped regions, internet infrastructure is inadequate.
   Impact: IoT adoption is often limited to areas with high-quality connectivity, preventing broader implementation in agriculture, smart cities, or remote industries.
   Example: In developing countries, poor internet access can prevent farmers from using IoT sensors for precision agriculture or cities from implementing smart infrastructure.

5. **Regulatory and Compliance Challenges**

   Barrier: Governments around the world are still developing regulations around IoT, particularly concerning data privacy, cross-border data flows, and cybersecurity. The fragmented regulatory landscape creates uncertainty for companies looking to implement IoT solutions.
   Impact: Slow or inconsistent regulation makes it difficult for companies to expand IoT deployments across borders or industries where compliance is critical, such as healthcare and finance.
   Example: The European Union's General Data Protection Regulation (GDPR) imposes strict rules on how IoT devices handle personal data, creating compliance challenges for businesses.

6. **Energy Consumption and Device Lifespan**

   Barrier: Many IoT devices, especially those used in remote locations, require long-lasting batteries and low-power consumption. Energy efficiency is critical to reducing maintenance and ensuring continuous data flow.
   Impact: Battery limitations and power management issues hinder the adoption of IoT devices in applications like agriculture or environmental monitoring, where frequent maintenance is not feasible.
   Example: IoT devices used in smart grids or rural infrastructure may face challenges due to limited access to power sources or the need for frequent battery replacements.

7. **Data Overload and Management**

   Barrier: The massive amounts of data generated by IoT devices can overwhelm existing data storage and analytics systems. Many companies struggle with managing, processing, and extracting insights from the data collected by IoT sensors.
   Impact: Organizations may not fully benefit from IoT solutions if they cannot effectively process or analyze the data, leading to underutilized potential.
   Example: Industrial IoT systems, which collect data from thousands of machines, can generate petabytes of data daily, creating challenges in storage and analytics.

8. **Skills Shortage**

   Barrier: IoT requires expertise in areas such as embedded systems, network security, data analytics, and cloud computing. There is a growing shortage of professionals with the necessary skills to design, implement, and manage IoT systems.
   Impact: This skills gap is slowing down IoT adoption, as companies are unable to find the right talent to execute their IoT strategies.
   Example: The demand for IoT engineers, data scientists, and cybersecurity experts far exceeds the current supply, leading to delays in deployment and increased costs.

9. **Lack of Consumer Awareness**

   Barrier: Many consumers are unaware of the benefits of IoT or may be hesitant to adopt IoT devices due to privacy or security concerns.
   Impact: Consumer-facing industries, such as smart home devices and wearable technology, may experience slower growth if users do not see the value or remain concerned about their data privacy.
   Example: Smart home adoption has been slower than expected in some regions due to concerns about security breaches and data misuse.

10. **Ethical and Privacy Concerns**

    Barrier: IoT involves the collection of vast amounts of personal data, raising ethical concerns about surveillance, data ownership, and potential misuse.
    Impact: Privacy concerns may prevent wider adoption of IoT solutions in sectors like healthcare, where sensitive personal data is involved.
    Example: Consumers are often wary of IoT-enabled devices, such as smart speakers, which continuously collect data, leading to slower adoption in certain markets.

12. Global IoT Standards Bodies & Associations

1. **IEEE (Institute of Electrical and Electronics Engineers)**

   Role: The IEEE develops a wide range of standards related to IoT, including networking, communications, and device interoperability. It is known for developing the IEEE 802.15.4 standard, which is widely used for low-rate wireless personal area networks (LR-WPANs) and is foundational for Zigbee and other IoT technologies.
   Key Standards: IEEE P2413 (Standard for an Architectural Framework for IoT).

2. **IETF (Internet Engineering Task Force)**

   Role: The IETF is responsible for creating and maintaining standards for internet communication. It plays a key role in ensuring that IoT devices can communicate over the internet efficiently and securely.
   Key Standards: CoAP (Constrained Application Protocol), 6LoWPAN (IPv6 over Low-Power Wireless Personal Area Networks).

3. **OneM2M**

   Role: OneM2M is a global initiative that develops specifications to ensure the interoperability of Machine-to-Machine (M2M) communications systems and the IoT. It works across multiple industries, ensuring that devices can communicate seamlessly.
   Key Standards: OneM2M Release 2 (global standard for IoT systems).

4. **ITU (International Telecommunication Union)**

   Role: The ITU is the United Nations' specialized agency for information and communication technologies. It develops international standards that ensure IoT systems can operate globally.
   Key Standards: ITU-T Y.2060 (Overview of IoT), and various smart city standards.

5. **ISO (International Organization for Standardization)**

   Role: ISO develops international standards that ensure quality, safety, and efficiency across many sectors, including IoT. The ISO/IEC JTC 1 is a joint technical committee that works on standards for information technology, including IoT.
   Key Standards: ISO/IEC 30141 (Reference architecture for IoT), ISO/IEC 27030 (Guidelines for security and privacy in IoT).

6. **AllSeen Alliance**

   Role: A consortium focused on enabling IoT devices to discover, communicate, and interact with one another. It was the force behind the AllJoyn open-source IoT framework, designed for device interoperability.
   Key Contributions: AllJoyn framework for IoT interoperability.

7. **Zigbee Alliance (Now Connectivity Standards Alliance)**

   Role: Focuses on developing open global standards for low-power, low-bandwidth devices. Zigbee is commonly used in smart home devices, industrial settings, and consumer electronics.
   Key Standards: Zigbee protocol, Matter (formerly Project CHIP), which aims to create a unified standard for smart home devices

8. **LoRa Alliance**

Role: The LoRa Alliance develops and promotes the LoRaWAN® protocol for low-power, wide-area networks (LPWANs). It is widely adopted for IoT applications that require long-range, low-power communication, like smart cities and agriculture.
Key Standards: LoRaWAN.

9. **Industrial Internet Consortium (IIC)**

Role: A global organization that drives the development, adoption, and widespread use of interconnected machines and intelligent analytics (industrial IoT). It promotes best practices for IoT in industrial settings.
Key Focus: Industrial IoT standards and frameworks.

10. **Open Connectivity Foundation (OCF)**

Role: OCF aims to unify IoT standards to ensure device interoperability. The foundation develops protocols and frameworks for secure device-to-device communication.
Key Standards: OCF specification (designed to connect billions of IoT devices securely).

11. **Wi-SUN Alliance**

Role: A global non-profit promoting the Wireless Smart Utility Network (Wi-SUN) standards. Wi-SUN focuses on large-scale outdoor IoT deployments like smart grids, utilities, and smart cities.
Key Standards: IEEE 802.15.4g for Field Area Networks (FAN).

12. **GSMA (Global System for Mobile Communications Association)**

Role: GSMA develops standards for mobile networks, including IoT use cases for NB-IoT (Narrowband IoT) and LTE-M. These standards are used for mobile IoT deployments, including smart metering, smart cities, and healthcare.
Key Standards: NB-IoT, LTE-M.

Cleveland/Akron, Ohio:

13. **IoT Global Federation** - IoTGF (tbd)

Role: Short-term
Convene bi-annual IoT conferences
Winter: C-level deal-making, warm climate, nice global venue, etc.
June in Cleveland: Tech, regulatory, and research presentations
Coordinate the develop of foundational academic curriculum for IoT training and certification
Center of Influence for unified regulatory outreach
Role: Longer-term
- Aggregate and unify the global IoT communications standards
- NB-IoT, LTE-M - smart metering, smart cities, and healthcare
- Wi-SUN - smart grids, utilities, and smart cities
- OCF specification - device-to-device communication
- LoRaWAN® protocol - smart cities and agriculture
- Zigbee protocol - smart home devices
- AllJoyn - open-source IoT interoperability framework
- ISO/IEC 30141 - Reference architecture
- ISO/IEC 27030 - Security and privacy
- ITU-T Y.2060 - Smart cities
- OneM2M Release 2 – machine-to-machine communication
- CoAP - Constrained Application Protocol
- 6LoWPAN - IPv6 over Low-Power Wireless Personal Area Networks
- IEEE 802.15.4 - Low-Rate WPANs

Key Standards: tbd

13. 7 Relevant Northeast Ohio Distinctives

1. Economic Development

"Accounting for 18% of the region's gross domestic product (GDP), **manufacturing** is a driving force in Northeast Ohio's economy. The region has all the assets you need to develop, produce, and deliver products and services. A talent pool of 1.8 million workers, a deep and diverse supply chain, and exceptional market access help make innovations more profitable. "
- Team NEO "The future of manufacturing is here."

2. Incubators/Accelerators

Innovation Clusters - Driving innovation, technology adoption, and leadership to support the future of manufacturing.

"Innovation clusters generate continual growth and competitiveness in the Northeast Ohio Region's driver industry companies, strengthening our economy. The Additive Manufacturing Cluster and Smart Manufacturing Cluster facilitate seeker-solver networks, filling innovation gaps identified by driver industry market leaders by matching them with small-to-mid-sized technology companies." – Team NEO

Accelerators and Incubators in NE Ohio
Bounce Innovation Hub
Braintree Business Development Center
Flashstarts
Glide
JumpStart
LaunchHouse
Lorain County Community College Innovation Fund
Youngstown Business Incubator
Several more

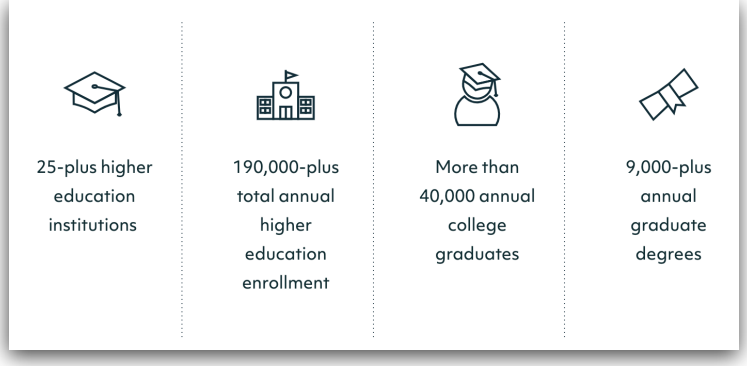
3. Venture Capital

While not on the scale of Silicon Valley, New York, Boston, etc., NEO does have a legacy of investment capital and an appetite for tech investing that produces economic development and Ohio jobs.

Venture Funds in NE Ohio
Akron Fusion Ventures
Ariel Ventures
Bratenahl Capital Partners
Comeback Capital
Drummond Road Capital
EPOCH Pi
Forester Capital Management
Fund for Our Economic Future
GPI2
Greater Cleveland Partnership
Hatch Partners, LLC
Hunter Valley Company
Interstate Fusion Ventures
Morgan Foundation
Mutual Capital Partners
NEO Student Venture Fund
Newport Investment Advisers
North Coast Ventures
Reach Ventures
RiverCap
RPM International
Ten:34 Partners
The Reserve Group
Tungsten Capital Partners
UBIZ Venture Capital
Victory Capital
Many more

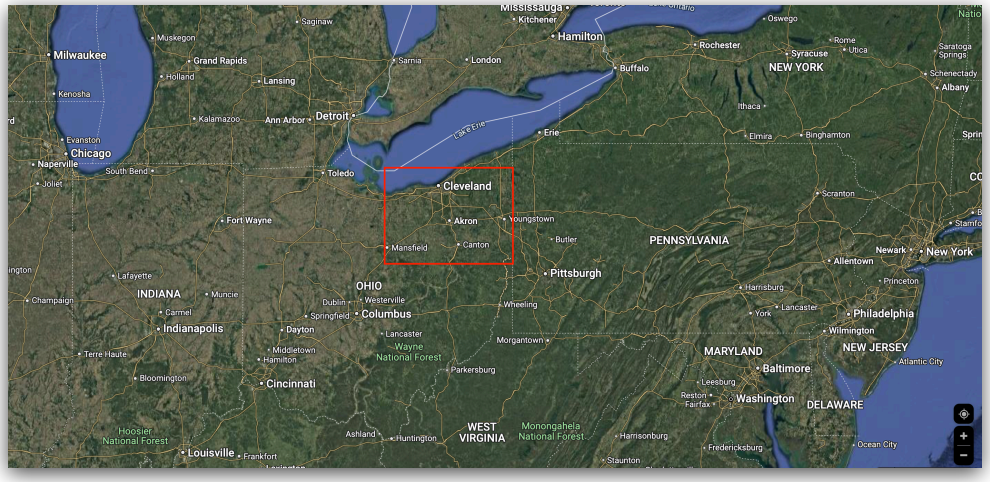
4. Academia

Northeast Ohio Regional Academic Stats >>
- Team NEO, "Explore Our Talent Pool"



5. Centrally Located Transportation Hub

Air: Cleveland Hopkins International Airport (CLE)
Highway: East/West - I-90, I-80, I-76 North/South - I-71, I-77
Rail: CSX Railroad is a major rail operator in and through NEO.
Boat: The Port of Cleveland is a major shipping hub on Lake Erie.



6. Work Ethic, Culture, Cost of Living

"There's a reason Northeast Ohioans are proud of where they come from."
"Why do we love to call Northeast Ohio home? This region defines who we are as individuals: hard-working, optimistic, and spirited. More than that, the region helps us enjoy lives most people only dream of. In Northeast Ohio, we benefit from nationally acclaimed arts and culture, three professional sports teams, some of the top-rated healthcare on the planet, 25-plus higher education institutions, and ample green and blue space – all with an amazingly low cost of living. People don't just live in the Northeast Ohio Region – they thrive here." - Team NEO

7. Intangibles – Traffic, Friendly, Creative, Manufacturing DNA

In the post-pandemic environment with hybrid work-from-home policies taking hold, visitors will be pleasantly surprised by road relatively free of congestions. Mobility and accessibility promotes a relatively stress-free culture. This in turn enables a friendly, open, and creative culture featuring solid, midwest traits of work/life balance, faith, sports, leisure, and industry.

With manufacturing in its generational DNA, plus the intangibles, the work ethic, the cost of living, the transportation hub, the academic core, plus access to innovation, acceleration, and venture funding all combine to make Northeast Ohio a diamond in the rough. Yes, the weather is infamously dreary from November through April. But that makes May through October all the more joyful.

14. IoT Sandbox Roadmap & Success Metrics

Year 1:

Q1,2 ’25 - Feasibility Study, Companion Presentation to Stakeholders - $50k

Q2,3 ’25 - Initial Formation and Funding of the **IoT Sandbox**, an IoT-only NEO launch pad - $2million

Outreach to Funding Sources

1. Economic Dev Orgs (Team NEO, Greater CLE Partnership, Jump Start, etc.)
2. Manufacturing employers and associations (Worthington, MAGNET, etc.)
3. Healthcare employers and associations (CCF, UHFoundation)
4. Supply Chain employers and associations
5. Agriculture employers and associations
6. Venture (Morgan Foundation, Greater Cleveland Partnership, etc.)

Planning bi-annual IoT conferences

- ➡ September 2025 in Cleveland: Tech, regulatory, and research presentations
- ➡ March 2026: C-level deal-making, warm-weather (South FL, TX, AZ)

Coordinate initial curriculum for Certifications or Minor programs for ’25-’26 SY

1. CWRU – TBD
2. CSU – Crystal Franklin
3. UA – Prof. Joe Fox
4. Stark State

Area Technical schools and Community Colleges

5. Ashtabula
6. Columbiana
7. Lorain
8. Mahoning
9. Medina
10. Trumbull
11. Wayne

Outreach to the Web3 community globally for inclusion in events, hackathons, committees, etc.

Year 2: TBD

Q1,2 ’26 - Formation and Funding of IoT Global Federation non-profit funding pool - $250k

Year 3: TBD

Year 4: TBD

Year 5: TBD

15. Closing Thoughts

The computer age started a long time ago, but perhaps NASA and the Moon Shot were the catalyst for mass utilization. That was about 60 years ago. The Web also started years ago, but it was probably the threaded discussions amongst techies in the 80s and 90s that turned into “the internet” of the early 2000s. The fiber optic and satellite telecom networks then provided the needed hardware infrastructure for mass adoption by business. And of course, the smartphone, PC, and laptops put the tech in the hands of the people. This rich combination of technology and humanity has led to a massive acceleration of innovation across all sectors of life and work for the benefit of humankind around the world.

On the flip side, the design and architecture for the source code of the internet, and the cascading applications built on top of it, are problematic on a number of levels. We first saw this with the Y2K scare in 1999. We’ve seen an apoplectic rise in code-based hacking in the decade of 2014-2024. Most recently, the Crowdstrike patch debacle almost completely shut down transportation for several days. Mistakes happen, and bad actors will always be with us. And so we press on, always accounting for the frailties of people and systems, always doing our best to make our collective lives better today than yesterday, always striving for better, faster, cheaper ways of working and living.

To that end, we are now given the gift of Web3 and the combination of blockchain, AI, and IoT. Web3 architecture puts the distribution and compensation engine of the internet in the hands of anyone, anywhere with a connected device. Web3:

- automates the governance needed for a continued and advancing civil social structure
- provides greatly enhanced security and privacy of data
- provides access to new sources of anonymized data for research and corresponding innovation

However, looming on the horizon is the threat – and the opportunity – of what many call Web5, which is Web2.0 + Web3, likely to be driven by quantum computing. In a nutshell, quantum architecture compared to current computing power is like the Saturn 5 rocket compared to the horse and buggy. It’s exponentially more powerful. Yes, it’s still in development, but with GenAI, that dev cycle is widely considered to be accelerating. That being said, our hope for early-stage defense against quantum attacks has to be quantum-resistant architecture, which includes deep cryptography, hardware-based security, and AI-enabled threat detection and elimination.

To summarize this opportunity:

- Web3 architecture is crucial for securing data
- IoT, the most tangible leg of the Web3 stool, is essential for the effectiveness of Web3
- Northeast Ohio sits at the center of the Venn diagram for IoT manufacturing.

With that being said, it will take an immediate and massive effort across all sectors to seize the opportunity.

If not us, who? If not now, when?

Acknowledgements

In Appreciation…

Diane, my adorable, savvy, fun, lively, faithful wife - a true Proverbs 31 Woman - and a great enabler.
Son Zach, you (and Kelle) have always been my inspiration.
Daughter Kelle, it was you who motivated the return from Boston to Northeast Ohio.
John Hargrave in Boston, formerly from Ohio, a mentor and collaborator, now cheerleader.
Evan Karnoupakis in Hudson, Ohio. You have laid so much groundwork across the state.
Gerard Dache at the Government Blockchain Assn in DC, the catalyst and conduit for Web3 in gov.
Alexander Mann, Agritech - Your demo in Fairfax was the spark that lit the fire of IoT inspiration.

And to many others in Northeast Ohio who have accomplished so much and now sit at just the right place, at just the right time in history, and with just the right wisdom and resources to make this happen.

To the Triune God.

“All boats rise with the tide.”

About Mike Wise, briefly

After five productive years building the Boston Blockchain Association from a small monthly co-working space meetup into a globally respected catalyst for Web3 innovation, Mike has his sights set on advancing IoT, the third and most tangible dimension of Web3 (blockchain, AI, IoT). Most recently certified in “Blockchain Technologies - Business Innovation and Application” by MIT, Mike is a master community-builder, with an emphasis on corporate partnerships, community-building, and board leadership. As a highly experienced B2B leader, Mike has developed multiple long-term partnerships, closed hundreds of blue-chip deals, and demonstrated a commitment to business innovation in the context of Web3. Mike recently relocated from Boston to Cleveland/Akron and is leading this effort.