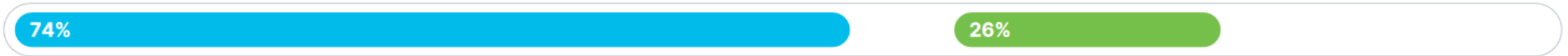
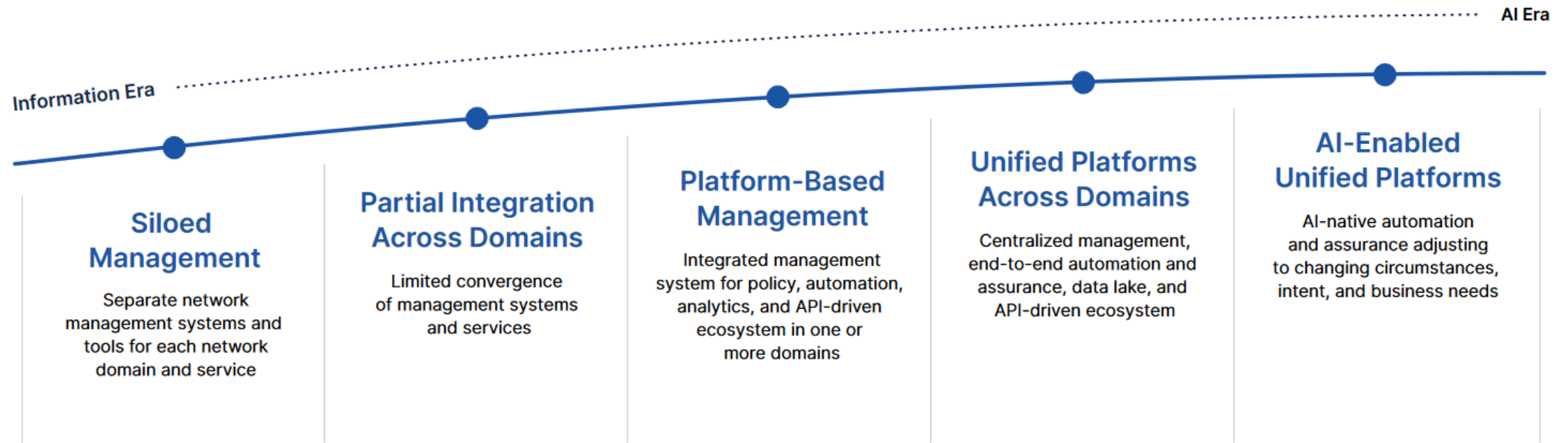


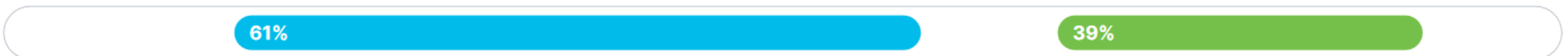
Introduction

ITN 4252 Advanced Topics in Networking

Cisco 2024 Global Networking Trends Report



Where organizations are now

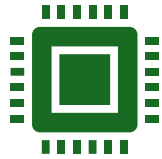


Where they expect to be in two years

Course Overview



**Driving Technological
Innovation**



**Supporting Business
Operations**



Enhancing Security



Enabling Global Connectivity

Course Objectives

- Deep Understanding of Advanced Networking Concepts:
 - Gain in-depth knowledge of cutting-edge networking technologies and methodologies.
 - Understand the theoretical foundations and practical applications of advanced networking topics.
- Preparation for Industry and Research:
 - Equip yourself with the knowledge and skills needed for careers in networking and cybersecurity.
 - Prepare for advanced studies and research in networking technologies.

Course Structure

- Assessment methods (assignments, exams, projects)
- Participation and attendance requirements

Key Topics

- Software-Defined Networking (SDN)
- Cloud Networking
- IoT Networking
- Identity and Access Management (IAM)
- Cloud Security
- Network Management
- Security Information and Event Management (SIEM)
- Operational Network Security
- ... and anything else ...

Story Time

The ANOM Phone



https://en.wikipedia.org/wiki/Operation_Trojan_Shield

The Ghost App



<https://www.afp.gov.au/news-centre/media-release/afp-operation-kraken-charges-alleged-head-global-organised-crime-app>

Breach... Breach... Breach...

Cisco Data Breach (October 2024)

- Hackers known as “IntelBroker” breached Cisco’s IT network.
- Stolen data included GitHub projects, GitLab projects, SonarQube projects, and source code.
- Possible significant exposure of proprietary information.
- **How:** due to exposed API tokens

Fortinet Data Breach (September 2024)

- Data belonging to a small number of Fortinet's 775,000 customers was compromised.
- The breach involved information obtained from an Azure SharePoint site.
- The hacker leaked the data after Fortinet refused to pay a ransom
- **How:** a missing authentication for critical function flaw

Ticketmaster Data Breach (2024)

- Ticketmaster confirmed a significant data breach that occurred earlier in the year.
- The breach involved customer records, including names, addresses, phone numbers, email addresses, order histories, and partial payment information.
- Over 560 million customers are expected to be affected, with their data being offered for sale by hackers.
- **How:** vulnerabilities in a third-party cloud database environment, Snowflake.

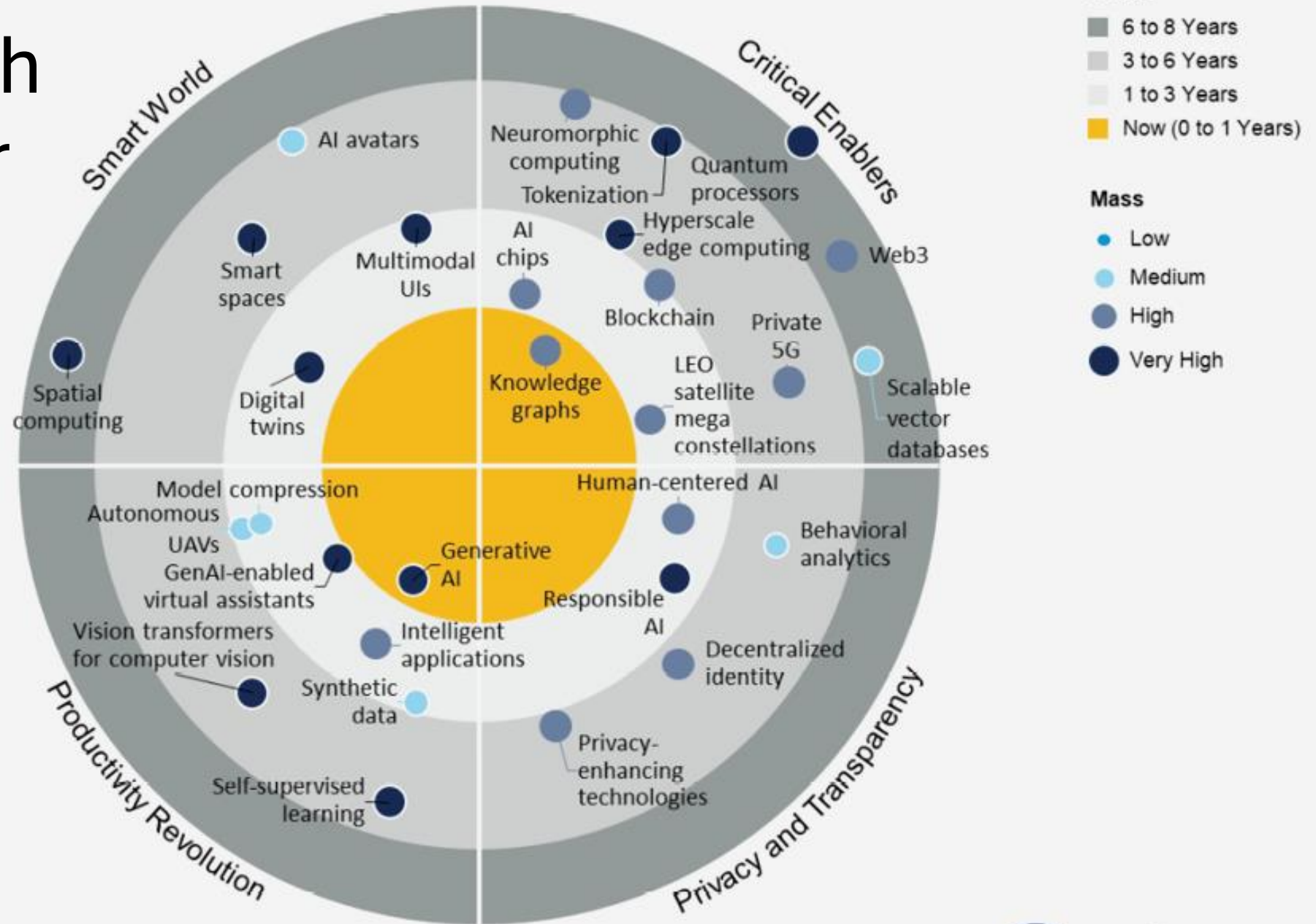
Indian Council of Medical Research Data Breach (2024)

- A significant data breach potentially exposed the health data of around 815 million Indian citizens.
- The breach involved Covid test data and other health information, including names, addresses, and phone numbers.
- A threat actor known as “pwn0001” claimed to have this data for sale, prompting a US security firm to alert Indian authorities in mid-October.
- **How:** vulnerabilities in their database security

XZ Utils Compromise (March 2024)

- Red Hat and CISA issued warnings about the compromise of the two latest versions of XZ Utils, a widely used set of data compression tools and libraries in Linux distributions.
- The software supply chain hack was described as a “nightmare scenario” by multiple experts.
- Fortunately, a Microsoft engineer discovered the compromise before the affected software could be widely distributed.
- **How:** contributed malicious code created a backdoor

Emerging Tech Impact Radar



Wi-Fi 7

- Wi-Fi 7 is the latest IEEE standard for wireless networks
- Market size projected to reach \$24.2 billion by 2030
- 2.4 times faster than Wi-Fi 6
- Capable of speeds up to 30Gbps, compared to 9.6Gbps in Wi-Fi 6
- Supports advanced applications like 4K/8K video streaming and cloud computing

Growth of Public Cloud Services

- End-user spending on public cloud services is forecast to grow by 20.4%, reaching a total of \$675.4 billion in 2024.
- This growth is driven by the increasing adoption of generative AI (GenAI) and the modernization of applications.
- **Infrastructure-as-a-Service (IaaS)** is projected to experience the highest growth in end-user spending at 25.6%, followed by Platform-as-a-Service (PaaS) at 20.6%.
- Software-as-a-Service (SaaS) remains the largest segment of the cloud market, with spending expected to grow by 20% to \$247.2 billion in 2024.

Projected Growth in Edge Computing

- Edge computing reduces server load and increases bandwidth by processing data at outer nodes.
- Brings processing closer to data sources, enhancing control and performance across network nodes.
- The market grew 48.4% year-over-year, from \$9 billion in 2022 to \$13.5 billion in 2023, with early-stage adoption.
- Expected to double by 2028, reaching \$27.9 billion, and soar to \$157.7 billion by 2032 with a CAGR of 34.3%.
- Signals a shift to distributed network infrastructure, requiring better visibility and additional control measures.

<https://www.gminsights.com/industry-analysis/edge-computing-market>

<https://newsroom.accenture.com/news/2023/edge-computing-to-enable-new-business-models-in-the-next-three-years-according-to-new-accenture-report>

Google's Quantum Networking Research

- Google has been making strides in quantum networking, aiming to create ultra-secure communication channels.
- Quantum networks promise to revolutionize data security by making it virtually impossible for hackers to intercept communications.
- Potential to set new standards in secure data transmission.

Cisco's AI-Driven Network Management

- Cisco has integrated advanced AI algorithms into their network management solutions.
- AI-driven management allows for predictive maintenance, automated troubleshooting, and optimized network performance.
- Increased efficiency and reliability of network operations, reducing downtime and operational costs.

Key Trends Shaping Your Future Career

1. **Managing a Hybrid Workforce**
 - Embracing hybrid work models will attract employees, while resistance will lead to setbacks.
2. **Multicloud Adoption**
 - Strategic use of multicloud architectures will balance costs and agility.
3. **Disaggregation of Network Functions**
 - Transitioning to software-defined networks requires new skills and support.
4. **AI-driven Operations**
 - AIOps will become essential for mitigating skill shortages and integrating into systems.
5. **Sustainability in IT**
 - IT's role in achieving sustainability goals will be crucial for leadership metrics.

Source: The Future of Networking in 2025 and Beyond (NTT)

Assignments

- Individual Labs
- Group Labs/Presentations
- In-class Discussions

Contacts

- WhatsApp Group: “B5 - ATN”
- Email: hi@nimal.info

- Course Demonstrator: Dinusha Malshan

- Any non-attendance excuses must be submitted in writing via email, with the course demonstrator copied.
- Unexcused absences will be counted as absent, and no excuses will be accepted after the lecture.

Questions?

Ask early, ask often!

Feel free to ask during the lecture (or via email later)!