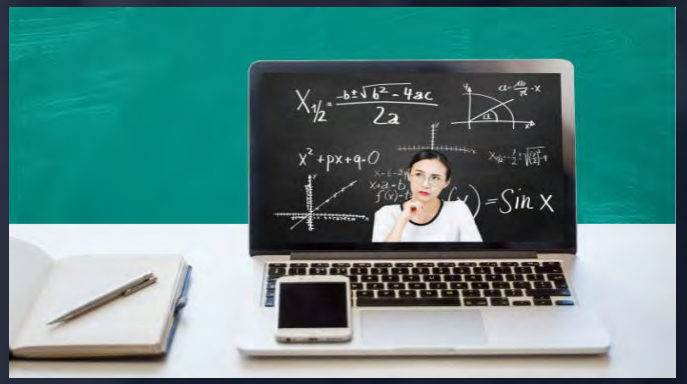
Top 10 Trends of Data Center Facilities

In 2020, the epidemic continues and the whole industry works together to cope with the epidemic.

- **Cloud computing and Internet applications accelerate development, and new life which include online healthcare, education, and office becomes norm**

remote office work



online education

telemedicine

- **The value of prefabricated buildings is fully leveraged, and the construction like Thunder God Mountain hospital and Fire God Mountain hospital were completed within 10 days, in order to cope with the epidemic.**

Thunder God Mountain hospital and Fire God Mountain hospital construction site

Thunder God Mountain hospital and Fire God Mountain hospital complete

China's "New Infrastructure" Drives the Industry, Bringing a Peak of Data Center Construction

Beginning of March, the government officially included "big data center" into the core field of "new infrastructure".

National Development and Reform Commission 14th Five-Year Plan: Accelerating the Construction of the National Integrated Big Data Center System

Fourth Plenary Session of the 19th Central Committee: Build a One Network for National Digital Economy Infrastructure, Strengthen Top-level Data Resource Coordination and Element Aggregation, Fully Give Full Play to the Function of Basic Strategic Data Resources, Promote the Construction of National Integrated Big Data Centers, and Provide Subsidies 3 Years After the Construction Is Passed

“Carbon Neutralization” Accelerates the Development of the Data Center Industry to “Zero Carbon”

Europe: Green New Deal, Clearly Requires Zero Carbon Emission in DC

A European Green Deal

Striving to be the first climate-neutral continent

- “The European Green New Deal” requires 100% carbon neutrality by 2050 and a target of reducing emissions from 40% to 50% (55%) by 2030.
- “Data Center Energy Efficiency Code” requires data center carbon neutrality (net zero emissions) to be achieved by 2030

China 2060 Carbon Neutral Target

CO_2 emissions peaked by 2030 and striving to be carbon neutral by 2060

Develop action plans during the 14th Five-Year Plan

Organize the preparation of the 14th Five-Year Plan to Combat Climate Change and develop the action plan for reduce carbon dioxide emissions.

The State Council issues guidelines.

国务院关于加快建立健全
绿色低碳循环发展经济体系的指导意见
国发〔2021〕4号

Accelerate the green transformation of the information service industry, build and reconstruct large- and medium-sized data centers and network equipment rooms, and establish a green O&M system."

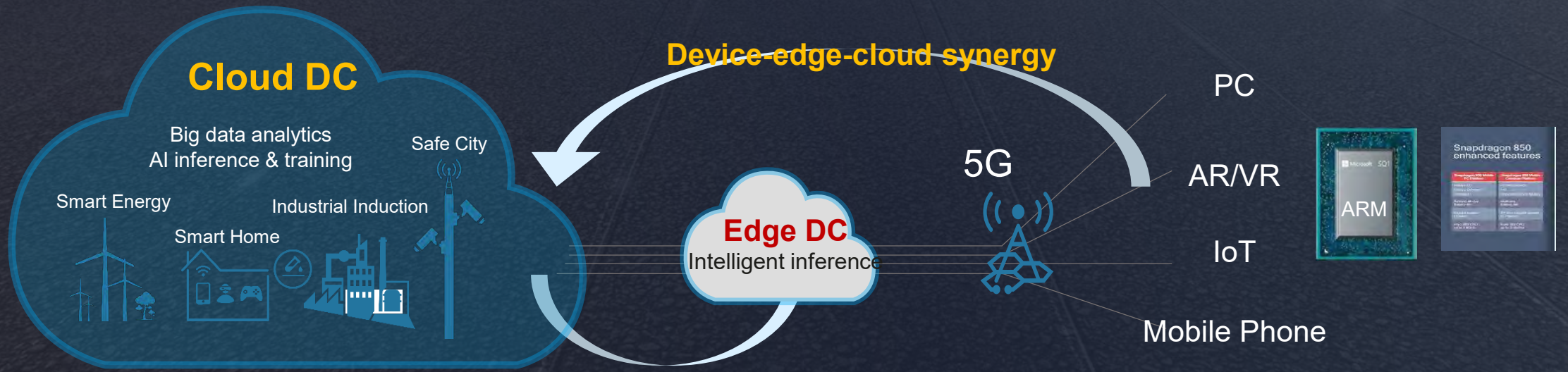
Cloud Computing and Edge Computing Continue to Develop Rapidly, and Cloud DCs and Edge DCs Become Mainstream

Cloud computing continues to grow rapidly, and IDC and EDC will become cloud DCs.

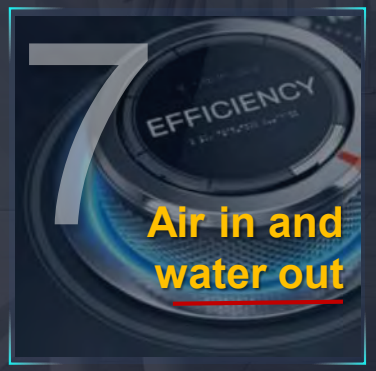
- Continuous increase in the proportion of cloud migration: It is estimated that by 2025, traditional non-cloud DCs account for only 20%, and cloud DCs account for 80% (40% for hybrid cloud and public cloud).
- The growth rate of traditional DCs is 6%, Internet public cloud is 25%, and government-enterprise hybrid cloud is 40%.

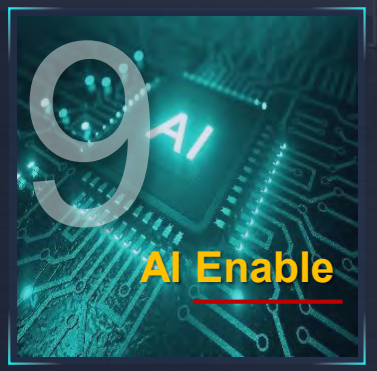
The edge computing power is about to grow. The total computing power will exceed that of the cloud DC.

- 5G enters the commercial phase ahead of schedule, promoting the increase of terminal services and edge DC requirements.
- The compound annual growth rate (CAGR) of the edge computing market is 35%+.
- More than 50% data will be analyzed, processed, and stored at the network edge in the future.



Top 10 trends of data center energy in 2025





Trend 1

Zero carbon DC

Carbon neutrality triggers a green revolution, Data Center PUE Enters the 1.0x Era and "Zero Carbon" DCs Will Realize

green power

- Green power, such as wind energy and solar energy, will be more widely used in data centers.

Power saving water saving

- The PUE requirement is more strict, 1.4 -> 1.3 -> 1.2.
- With the continuous evolution of cooling technologies, CLF enters the 0.1 era.
- WUE Becomes a Green Data Center Evaluation Indicator

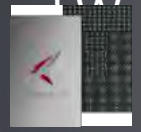
thermal energy recovery

- In large-scale data center campuses, heat recycling, as a new energy-saving solution, has started to be implemented in large-scale data center campuses.

Trend 2

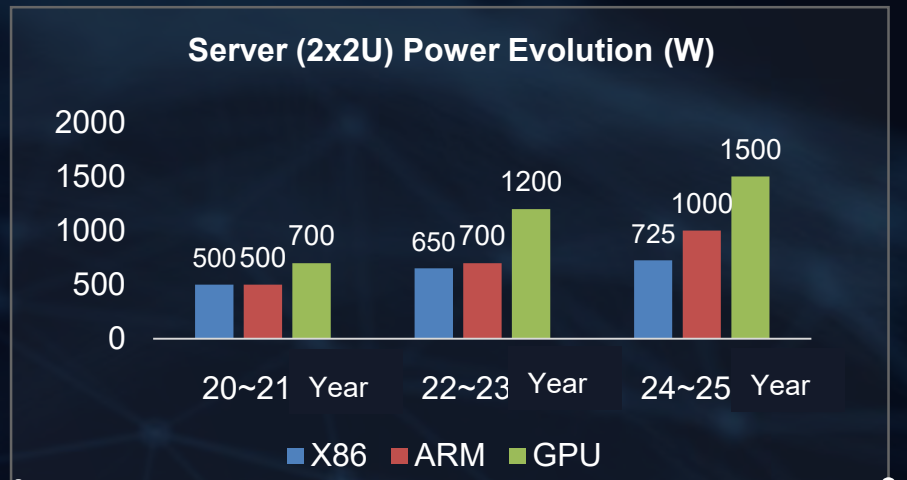
High density

In 2025, mainstream cloud DCs will form hybrid deployment of 15 kW to 30 kW



Continuous improvement of computing power and density, collaboration of diverse computing power, 15–30 kW hybrid density becoming the mainstream

- Chips are generated in two years and will evolve to high computing power and power density in the next five years.
- Power consumption difference of different types of computing power increases.
- Diversified Computing Collaboration Will Become Mainstream, x86, ARM, and GPU Chips will Dominate the World



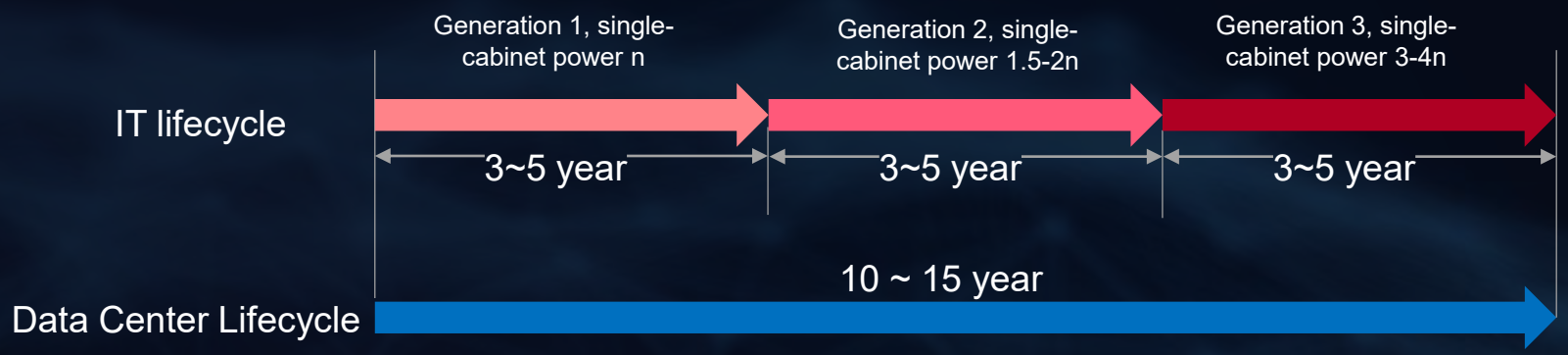
The mainstream power distribution of the IDC in the future is 15–30 kW/R.

Trend 3

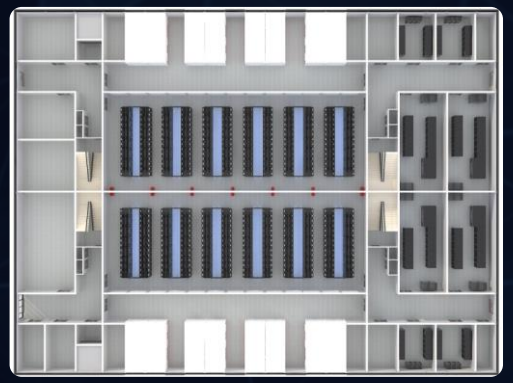
Scalable

The infrastructure will be elastic. The first-generation infrastructure matches the second-generation and third-generation IT power evolution.

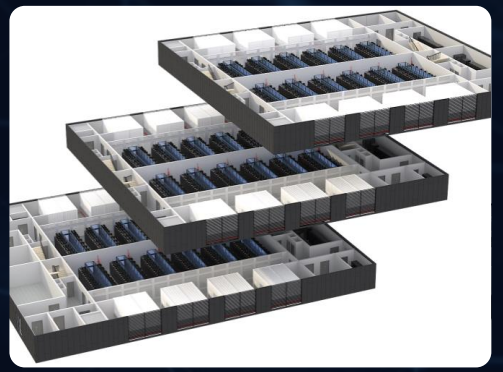
1 generation infrastructure matches 3 generations of IT



Flexible deployment with different density



One DC at one layer, on-demand expansion



Trend 4

Fast

Rapid deployment becomes a rigid demand due to service bursts in a short period of time.

Data centers are shifted from support systems to production systems to meet the application requirements of clouds and need to be rolled out as quickly as clouds.

Services such as remote office and online live broadcast burst in a short period of time due to the epidemic.

WeLink

Expanding X 10,000 ECSs in X days in the face of a sharp increase in the number of users

Service requirements require faster construction.

service provisioning	Week -> day -> hour
Tenant requirements	rent on demand supply it in time.
capital input	On-demand elastic capacity expansion, reducing capital cost
ROI	Faster returns and ease capital pressure

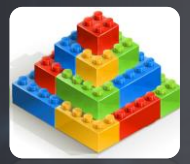
Traditional data centers face uncertainties such as rain and snow and frozen soil, prolonging the deployment period.

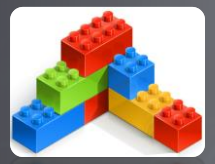
*The typical TTM of the current data center is 9 to 12 months, and the TTM will enter 6 months or even 3 months in the future.

Trend 5

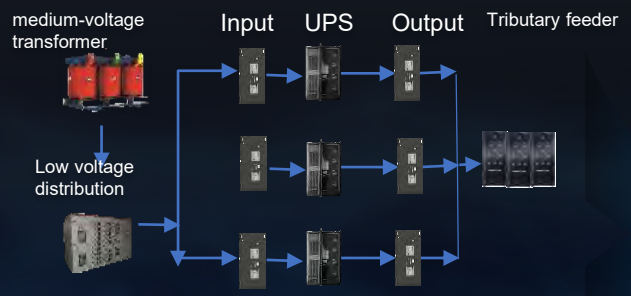
Simple Architecture

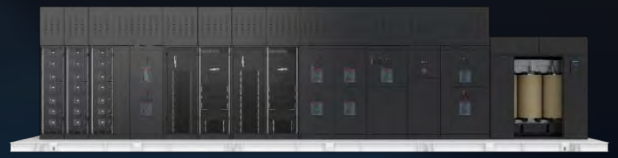
Converged, prefabricated, system-level, and DC-level simplified architectures will become mainstream applications.





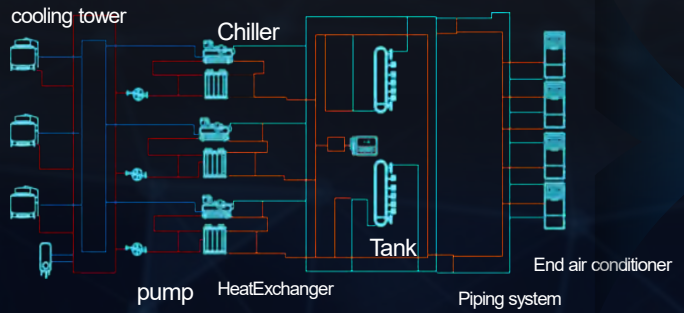
Convergence and simplified Power Supply System





Power module

Convergence and simplified cooling system



Indirect evaporative cooling

Simplified DC prefabrication

Prefabricated data center

- Prefabrication delivery: TTM from 20 months to 9 months for 1000 cabinets
- Full modular design: on-demand deployment, phased investment, and low initial investment
- Elastic architecture: supporting IT evolution

Trend 6

Lithium for All

Lithium-based in and lead-based out, data centers will be fully lithium-based, achieving high-density and modular power supply systems.

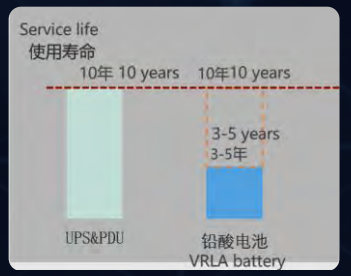
From lead-acid batteries to lithium batteries

Lead-Acid Battery Application Bottlenecks Are Increasingly Severe

Large footprint

Frequent fires

Difficult maintenance



Short service life

Life cycle > 2x lead-acid, saving 70% footprint

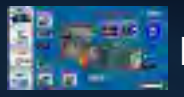
VS

10 years no replacement	Life cycle <5 Year
Short-term backup power with high current	Poor short-term discharge capability
70% less footprint	large footprint
Low load-bearing requirements	High load-bearing requirements, independent battery room

Trend 7

Air in and water out

Driven by O&M and carbon neutrality, traditional chilled water systems will be replaced, and cooling systems with less water will become the mainstream.



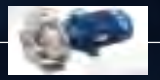
BMS

Chilled water system

Water system

Temperature control terminal

Chiller



Pump

Valve

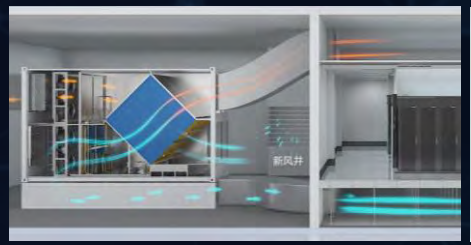
Tower

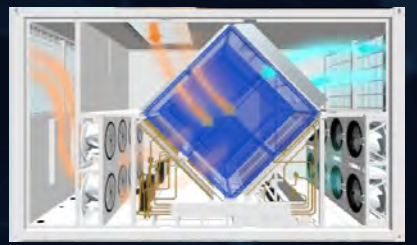
Tank

7 devices and 4 heat exchanger, high engineering requirement , high water consumption, and complex O&M

Wind system

indirect evaporative cooling system



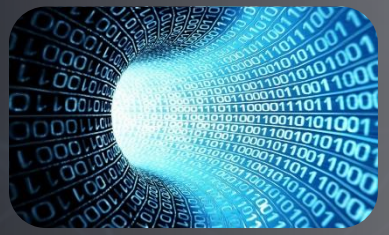


Integrated product design, less engineering, natural cooling + spray, and less water consumption

Trend 8

Fully digitalized

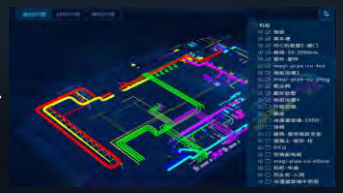
Digital technologies are more and more widely used in data centers,All-DC visualization, manageable, and controllable



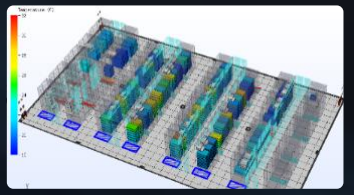
Digitalization of data centers throughout the lifecycle from planning → constructionv → maintenance → optimization

- Digital survey
- Tool-based design

- BIM application and digital construction



- BIM+DCIM, digital O&M



- BIM+ simulation, digital optimization

Digitalization of devices and terminals and instant messaging technologies support digital foundations.

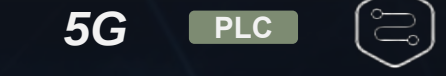
Digital equipment

Intelligent Power supply | Intelliget Cooling | Intelligent Module

Sensor and intelligent terminal

Sensor | machine vision | Robot

communication technology



5G | PLC | IOT

Trend 9

AI Enabled

AI will gradually replace duplication of effort, expert experience, and business decision-making,Autonomous Driving Data Centers Coming

AI energy efficiency

AI energy efficiency diagnosis

AI energy efficiency optimization

Manual: 3-5 parameters, monthly adjustment

AI: 700+ parameters, real-time adjustment

AI operation

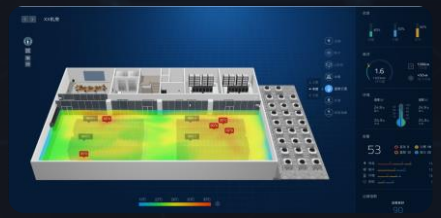
AI unattended inspection

AI Predictive Maintenance

Manual: daily preventive maintenance and monthly/quarterly preventive maintenance

AI: 24/7 non-stop inspection and predictive maintenance

AI Management



AI simulation

AI service prediction

Manual: judgment based on experience and business decision-making

AI: online simulation and automatic service design

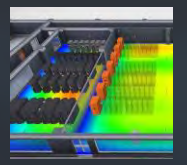
Trend 10

Secure and reliable

Hardware reliability, software security, system resilience, security, privacy, reliability, and availability become necessary requirements.

Three-layer predictive maintenance, consolidating reliable foundations

System level



Full-link AI predictive maintenance

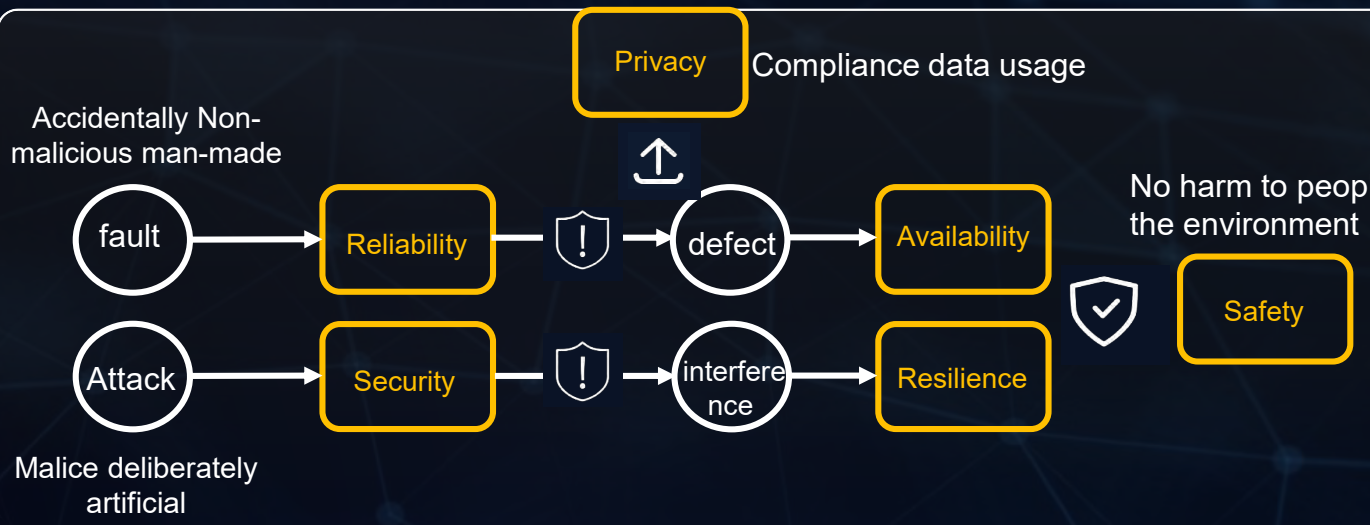
Component level

Capacitor AI Life Prediction Patented Algorithm

Devicel evel

AI-based shallow discharge prediction capacity, zero power failure, and high precision

Hierarchical defense, enhancing data center security and trustworthiness



Bring digital to every person, home and
organization for a fully connected, intelligent world.
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