



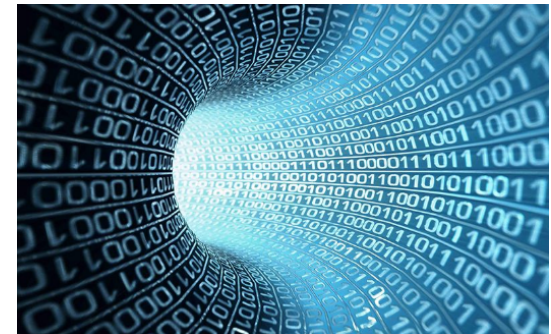
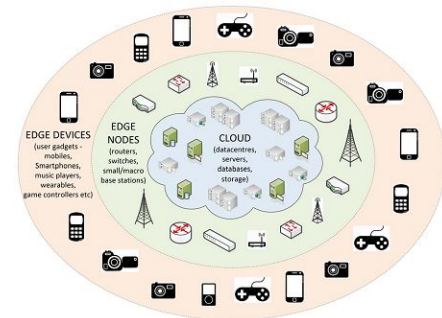
# Trends of Storage in Edge Computing

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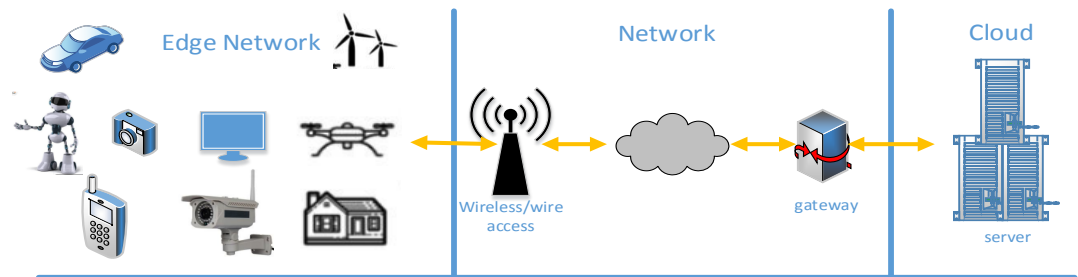
# IoT Brings challenges that Require Flash-Based storage

- Research data of IDC, by 2020
  - 50 Billion Smart Devices
  - 50 Million PB of Data
- So far from device to Cloud
  - Data Transmission Delay
  - Data transmission congestion
- Need timely data processing



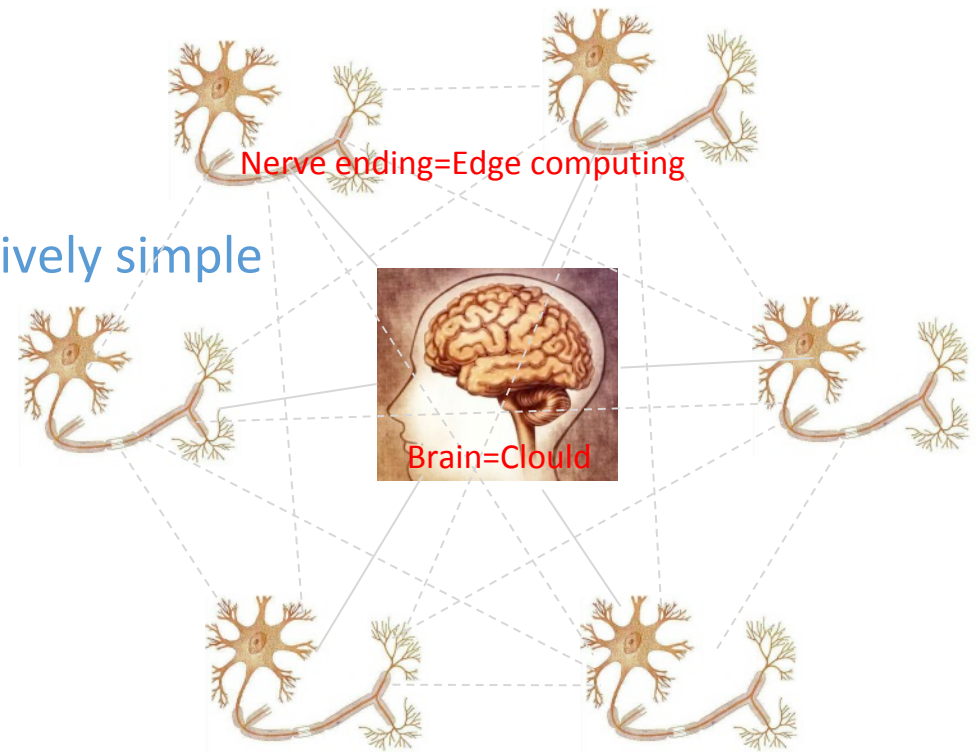
# Edge computing in IOT

- Augmented reality , Virtual reality
- Drones
- Healthcare
- Automated vehicles
- Remote monitoring



## Data features in edge computing

- Data features
  - Mass sensor ,Big Data
  - Data attributes are relatively simple
  - Data repeatability
- Data can be classified
  - Sensor type
  - Application





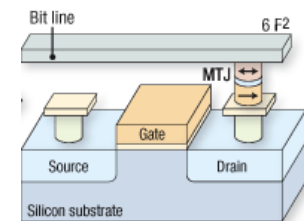
# Storage requirements for edge computing

- High Bandwidth, Low Latency
- Low Power
- Data security
  - Hardware encryption module
  - Attack defense against encryption

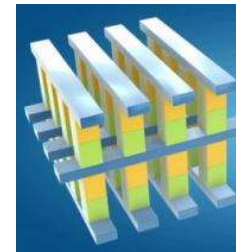


# Storage requirements for edge computing

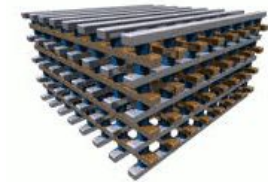
- High Capacity
- Non-volatile storage media diversification
- Small Form Factors
- Power Loss Protection
- High Endurance&Reliability
- Self health management



MRAM



3D XPiont



RRAM



# Interface and protocols

## ■ OS

- Linux: Android Things, Raspbian, Debian

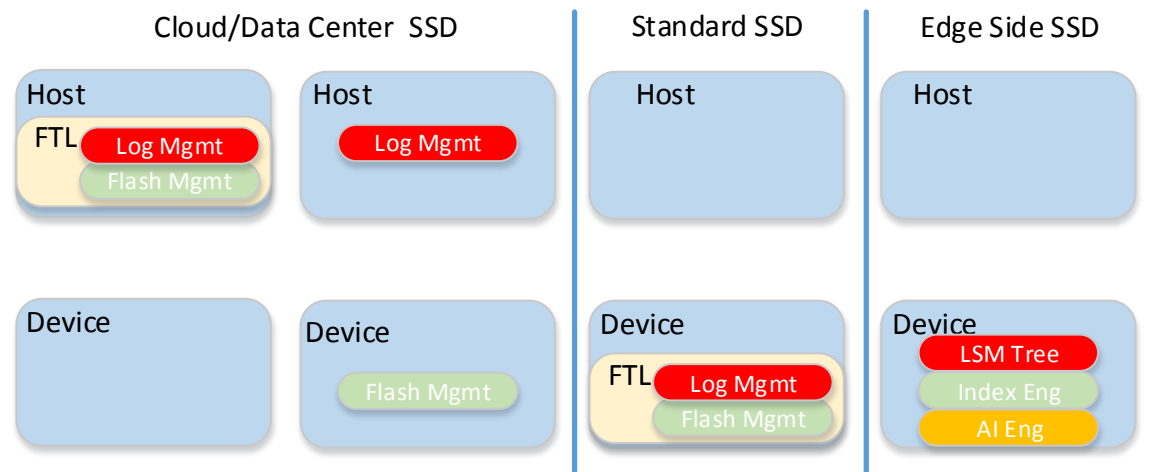
## ■ Interface

- SD,SATA,USB
- Tpye-C, PCIe

## ■ Protocols

- NVMe,NVMe+TCP/IP, NVMe+RDMA

# Trends of SSD in Edge Computing



- ※ Cloud
- ※ Data Center

- ※ Consumer
- ※ Office

- ※ Edge side
- ※ IOT
- ※ AI





# SSD for edge computing

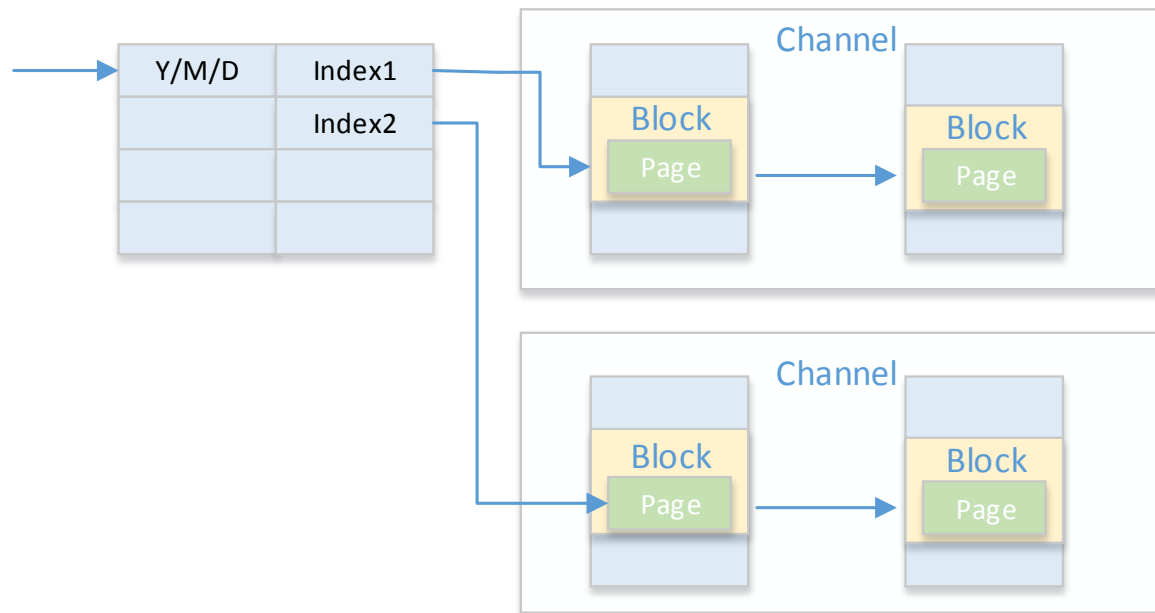
- Computing & accelerator
  - Max/Min searching
  - Mean value calculation
  - Key value searching
  - Fixed data format conversion
  - Some AI algorithms calculations sink into the SSD controller



# SSD for edge computing

- File perception
  - File attribute perception
  - Date based file management
- Machine learning
  - IO optimize
  - Cache optimize
  - Hot/Cold data queue optimization

# Date based file management





## Conclusion

- SSD Performance requirement
  - High Bandwidth
  - Low delay
- Data based file management
- AI feature
  - Key value Searching
  - Calculate
  - Machine learning



# Thanks You



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