Hyper Scale Datacenter Groups

Largest DC groups of Asia Pacific
50+ DC in Global
More than 1M servers worldwide
10+ Core Cities
TB level DCI
>100TB Internet Bandwidth
10 years Tencent datacenter key words

modularize ➔ standardize ➔ productize

2008-2010: 240V HVDC
2011-2012: TMDC
2013-2014: Normandy model
2015-2016: Indirect evaporative cooling
2017: T-block
2018: T-base model
TMDC & HVDC deploy quantity

TMDC

240V HVDC

TMDC accumulative total (sets)

100,000 4KW rack

200,000 4kw rack

Source: CAICT whitepaper

500 2014
1600 2015
3500 2016
4500 2017
9500 2018
Tencent's 4 generations of data center

1st
- Traditional UPS & Chiller
- Raise floor design

2nd
- Waterside & Fan wall free cooling
- HVDC and directly grid power

3rd
- Tencent MDC
- Normandy model

4th
- T-block
- T-base model
Tencent Modular Data Center G3

Tencent Modular Data Center

Micro Module + AC+HVDC High Voltage DC + V3.5v Network cluster + Nebula Monitoring system

Industrialized/ Modularized/ Standardized/Decoupling of facility and IT/Fast/Flexible/Low Cost

Productized and standardized at data hall scale first
TMDC Design Key Points

- **Productized** - IT End facility package as a standard product, split out from building facility. R18 & R12 medium & high density.

- **Modularized** – Adopt common commercial module/parts, standardized and flexible configuration, support Online expansion

- **No UPS** - Direct City Power to Server, HVDC backup, Power efficiently over 97%

- **In-row cooling**, shorten air-flow distance, improved cooling efficiency

- **Fits most of** - factory building condition, easy assemble, dissemble, renovate and move

- **Fully operate independently**, support hot-pluggable replacement, smart control nebula
Typical 3rd Generation TMDC Datacenter Campus

- 10MW *n
- 20,000~25,000 servers *n
- 2* 10KV power feed *n
- 2 layers building

Normandy best practice datacenter model
Fast Delivery with Flexibility
Typical TMDC datacenter PUE

数据中心PUE

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Tencent 4th Generation Datacenter Requirement

Mega scale, Fast deliver, Better TCO, High efficiency, Automated operation...

Scale: Meet Tencent cloud massive and various demand

Deliver: Shorten construction time as soon as possible

TCO: Lower the Capex and Opex, get more IT output

Capability: high reliability, more efficient operation, lower pue

Traditional datacenter model is not sustainable, we need to move on
**Tencent T-base Campus Model**

T-block: *A solution for next generation IDC*

方仓级 → 模块级 → 建筑级
Box → Block → Building

T-base: *base on T-block technology IDC campus*

机房级 → 园区级
Base → Building
High efficiency technology

- Indirect Evaporative Cooling
- No chiller and standardized/Productized
- N+1 power/cooling & easy maintenance
- No air contamination by exchanger
- More free cooling and better PUE
- Pay as you grow and good TCO
- AC+240V HVDC get good efficiency
- Granularity/Precise control/Fast deliver
- PUE less than 1.2 at most places
Building blocks for T-block data hall module
### Prefabricate and parallel assembling

#### TIME LINE

| Tasks                        | Months | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
|------------------------------|--------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| **Legacy Data Center**       |        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Planning                     | 6      |   |   |   |   |   |   |   |   |   | Planning |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Team Selection               | 3      |   |   |   |   |   |   |   |   |   | Team Selection |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Design                       | 6      |   |   |   |   |   |   |   |   |   | Design |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Misc Permit                  | 3      |   |   |   |   |   |   |   |   |   | Misc Permit |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Environmental Permit         | 6      |   |   |   |   |   |   |   |   |   | Environmental Permit |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Contractor Selection         | 3      |   |   |   |   |   |   |   |   |   | Contractor Selection |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Electrical Long Lead Items   | 5      |   |   |   |   |   |   |   |   |   | Electrical Long Lead Items |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Other Long Lead Items        | 5      |   |   |   |   |   |   |   |   |   | Other Long Lead Items |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Construction                 | 9 to 10|   |   |   |   |   |   |   |   |   | Construction |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

#### modular Data Center

| Tasks                        | Months | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
|------------------------------|--------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Planning                     | 2      |   |   |   |   |   |   |   |   |   | Planning |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Team Selection               | 2      |   |   |   |   |   |   |   |   |   | Team Selection |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Design                       | 3      |   |   |   |   |   |   |   |   |   | Design |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
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| Contractor Selection         | 1      |   |   |   |   |   |   |   |   |   | Contractor Selection |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Electrical Long Lead Items   | 5      |   |   |   |   |   |   |   |   |   | Electrical Long Lead Items |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Building Shell Lead Times    | 2      |   |   |   |   |   |   |   |   |   | Building Shell Lead Times |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Cooling Unit Lead Time       | 3      |   |   |   |   |   |   |   |   |   | Cooling Unit Lead Time |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Construction                 | 6      |   |   |   |   |   |   |   |   |   | Construction |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
Besides hardware, data can talk
Open and standardize the south and north interface

With OCP, We build the hardware and software ecosystem.
Thank You

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