Responding to High Efficiency Challenges: Data Centre Energy Saving Solutions

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HUAWEI TECHNOLOGIES CO., LTD.
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2 Huawei practice of Data Center Energy Saving
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Typical Energy Consumption Inside Data center

According to the Independent, the amount of energy consumed by the world’s data centre amounts to 3 per cent of the global electricity supply and accounts for about 2 per cent of total greenhouse gas emissions. That gives it the same carbon footprint as the airline industry.
Principle: E2E Energy Saving Design for DC

- E2E energy saving design for DC:
  - IT system energy saving design: reducing energy consumption of a DC from the source
  - Power distribution energy saving design: ensuring reliability, improving power distribution system efficiency, and reducing energy consumption
  - Cooling system energy saving design: high-efficient cooling systems, and free cooling application

Energy saving measures:
- Cloud computing
- IT device innovation (server, storage, and network security)
- Electrical conversion and power transmission and distribution
- IT device load
- Cooling device load
- Unified intelligent monitoring and management

- Green energy

Electrical conversion and power transmission and distribution:
- High-efficient UPS
- HVDC
- High-voltage D.G. system
- Usage of sustainable energy

- Air flow direction optimization
- High-efficient air conditioner
- Fresh air energy saving technology
- Liquid-cooling and heat dissipation solution
- High-density cooling solution
- Ice cooling storage solution

IT device load:
- Intelligent lighting system
- Waste heat reclaim
- Modular solution
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Liquid Cooling Solution For Server

- 45 kW/cabinet Heat dissipation capability
- 80% liquid cooling: 3D high density tube embedded cold plate, inlet water temperature up to 45 °C
- 40% energy saving: PUE≈1.1

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Management of existing ICT equipment and services with cloud computing technology

- Audit existing physical equipment and services:
  Consolidation of existing services
  Decommission unused ICT equipment/services
  Decommission low business value services
  Shut down idle equipment
- Design data centre with cloud computing technology
- Virtualise and archive legacy services
- Dynamic control cooling and power supply with IT demand in cloud computing data centre
Indirect Air Side Free Cooling Technology Solution

**Indirect Evaporator Cooling Solution Principle**

**Design Criteria**
- Temperature, humidity, water resource analysis
- Air supply and return working condition design
- Building structure considering

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**Benefit**

- High Efficiency, Save 20% (PUE 1.2 VS 1.5)
- Occupy less space
- Stronger environmental adaptability

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**Diagram**

- New air intake (40°C)
- New air exhaust (53°C)
- Air supply (22°C)
- Air return (35°C)
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Case 1: Huawei Help xx To Build TOP80 Supercomputing Center with Huawei Liquid Cooling Server

TOP 80 Supercomputing Center, Cooling PUE (CLF) = 1.05
Case 2: Huawei indirect air side free cooling solution

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<th>Green cooling</th>
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<tr>
<td>➢ Take full advantage of free cooling</td>
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<td>➢ Indirect air side free cooling</td>
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<tr>
<td>➢ Divide hot and cold air stream</td>
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<td>➢ Improve supply air temperature</td>
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<td>➢ Reduce hot air stream reflux and optimize air distribution</td>
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<th>High efficiency power</th>
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<td>➢ Distributed DC power, improve efficiency</td>
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<td>➢ Direct Current model, efficiency more than 97%</td>
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Thank you

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