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# JULY 2017

# DATACENTRE TRANSFORMATION MANCHESTER

- Yearly educational event
- Launch of “The datacentre of the future”
  - Potential of liquid technologies
  - Focused on energy reuse
  - Energy producing datacentre


https://asperitas.com/whitepapers/



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# ENERGY TRACTION

- Electrification of heat
- Smart energy
- Heat grids

City of Amsterdam

amsterdam economic board

HAARLEM

VATTENFALL

alliander sustainable area development

DUTCH DATACENTER ASSOCIATION

NUON

Eneco

TNO innovation for life

Netherlands Enterprise Agency

- Horizon 2020
- Netherlands: DEI, EIA, Smart Energy

# ENERGY PRODUCING DATACENTRES

- Multiple datacentre projects
  - 2-100 MW facilities
  - Heating city blocks
- Primary cooling by heat reuse
- No cooling energy

- Reusable heat
  - Challenge for 70°C
  - Current experimental 65°C
  - Current Implementations 50°C



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# IMMERSED COMPUTING® DATACENTRE EINDHOVEN (NL)




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# 750 KW AIR COOLED

# +/- 1400 M2

Built as PoP/Local DC in 1999

Refurbished to Colo DC in 2013

Classic DX cooling

Expanded with Direct FreeAIR cooling



EcoRacks

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# ADDED 300 KW IMMERSED COMPUTING®  +/- 35M2

- Customer 1
  - Hosting
  - High availability requirements
  - +/- 16 kW/module
- Customer 2
  - GPU based cloud cluster
  - Low availability requirements
  - +/- 32 kW/module



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# SIMPLIFICATION OF DATACENTRE INFRASTRUCTURE

- POWER
  - A/B power for hosting behind UPS
  - Single power for GPU cluster with UPS bypass
- WATER
  - +/- 30 min repair time for hosting
  - Single feed for GPU cluster
- Cooling
  - Drycool only
  - Local area heat reuse



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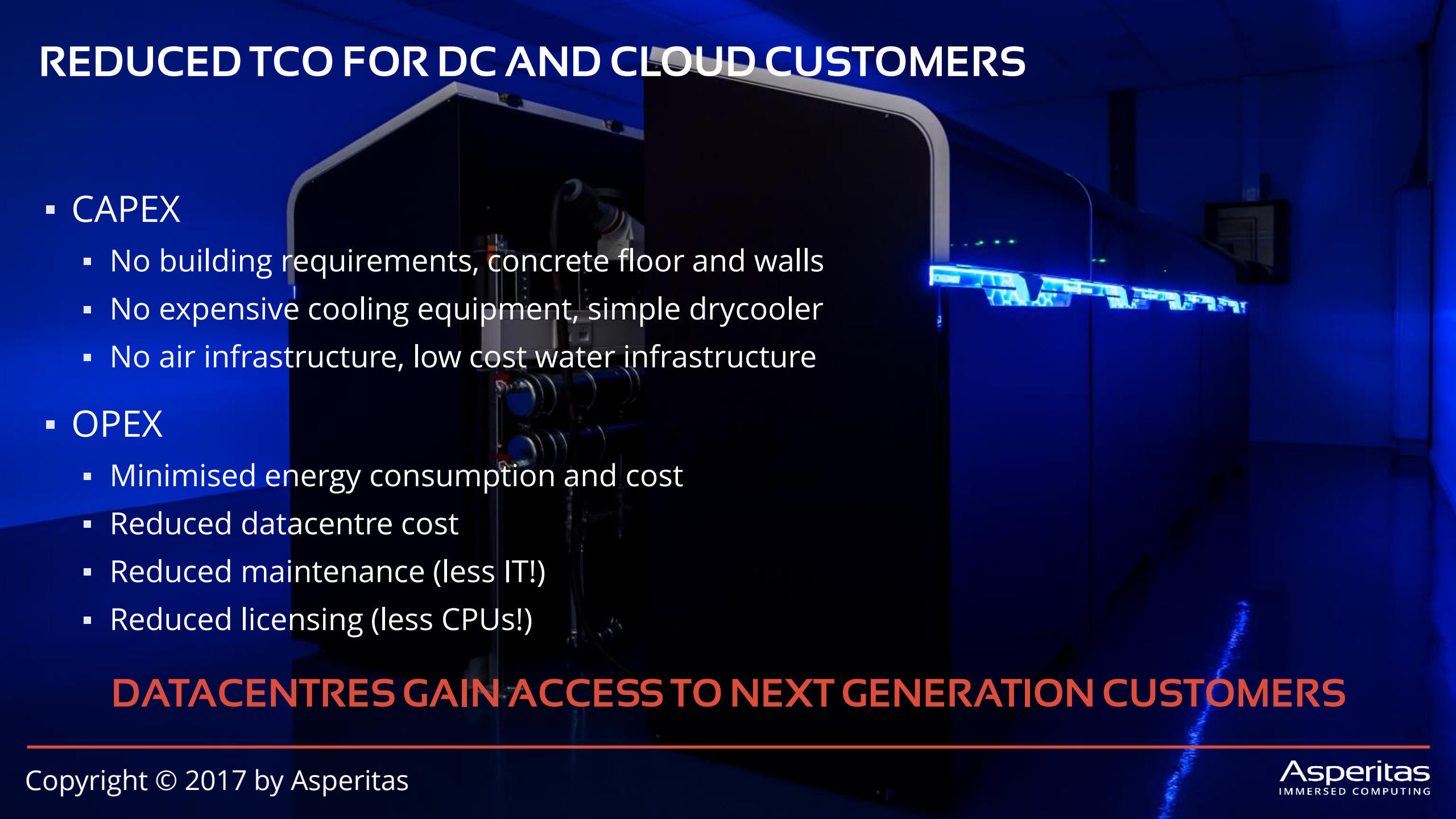
# REDUCED TCO FOR DC AND CLOUD CUSTOMERS



- CAPEX
  - No building requirements, concrete floor and walls
  - No expensive cooling equipment, simple drycooler
  - No air infrastructure, low cost water infrastructure
- OPEX
  - Minimised energy consumption and cost
  - Reduced datacentre cost
  - Reduced maintenance (less IT!)
  - Reduced licensing (less CPUs!)

## DATACENTRES GAIN ACCESS TO NEXT GENERATION CUSTOMERS



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# beehive

## Asperitas VAR

More professional mining infrastructure

Future proof mining model

Sustainable mining

Cost effective (low cost!)

Distribution of integrated mining solution



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# WORLD RECORD GPU DENSITY

- 288 mining GPUs
  - 600x1200 footprint (half rack!)
  - No air
  - No sound
  - No chillers
- Producing warm water

- Low site requirements
  - Floor, wall, lock and internet connection.
  - Power and water



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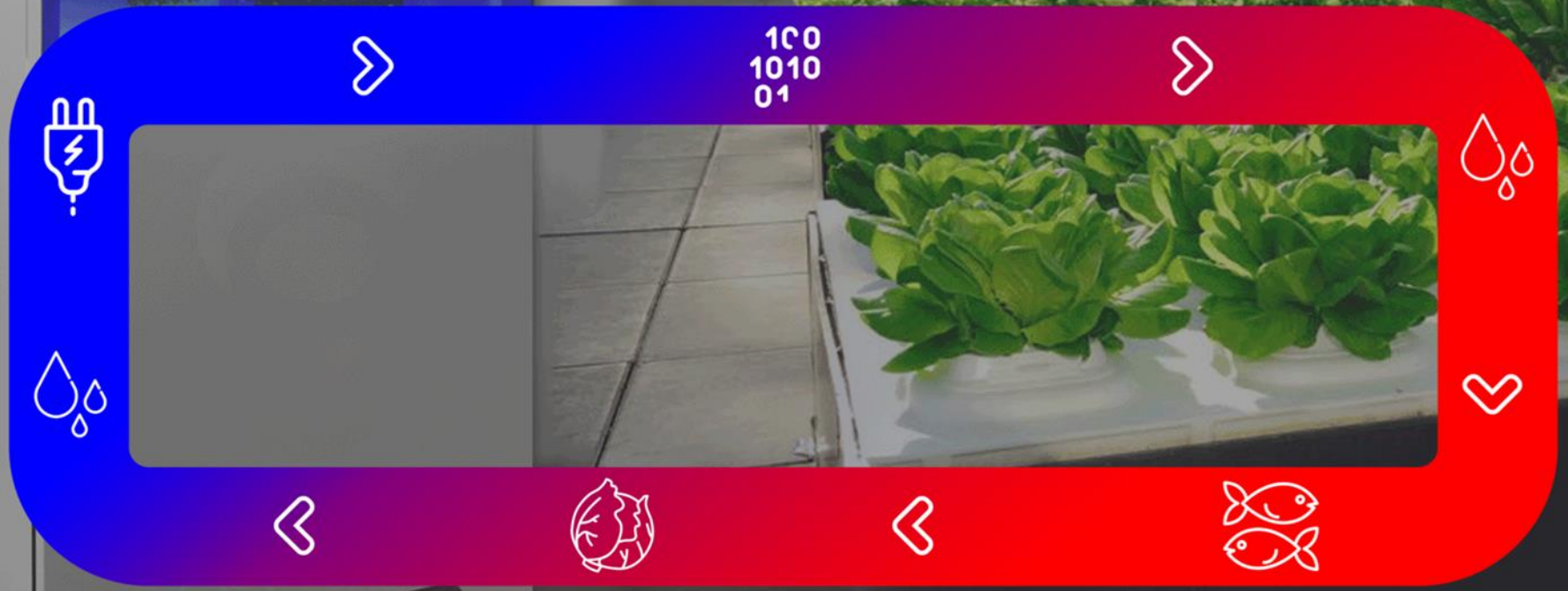
# DEPLOYMENT STRATEGY

- Positioning at heat demand
  - Swimming pools (wellness centers, community pools etc.)
  - Hospitals
  - Aquifers for heat storage
  - Building heating
- Free facilities
  - Part of external heating system

# DATACENTER & URBANFARM

## THE ULTIMATE SUSTAINABLE SMART CITY SOLUTION

## GREEN COMPUTING + URBANFARMING = CIRCULAR



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# FUTURE PROOF DISTRIBUTED DATACENTRES

## PENETRATION BEYOND DATACENTRES

30-600 kW
Edge of network, within urban/industrial areas
Free facilities
No/minimised cooling

Compute as by-product of heat demand...

- Edge demand
  - IoT
  - Blockchain
  - Machine learning
  - AI
  - Etc.
- Cloud to Edge



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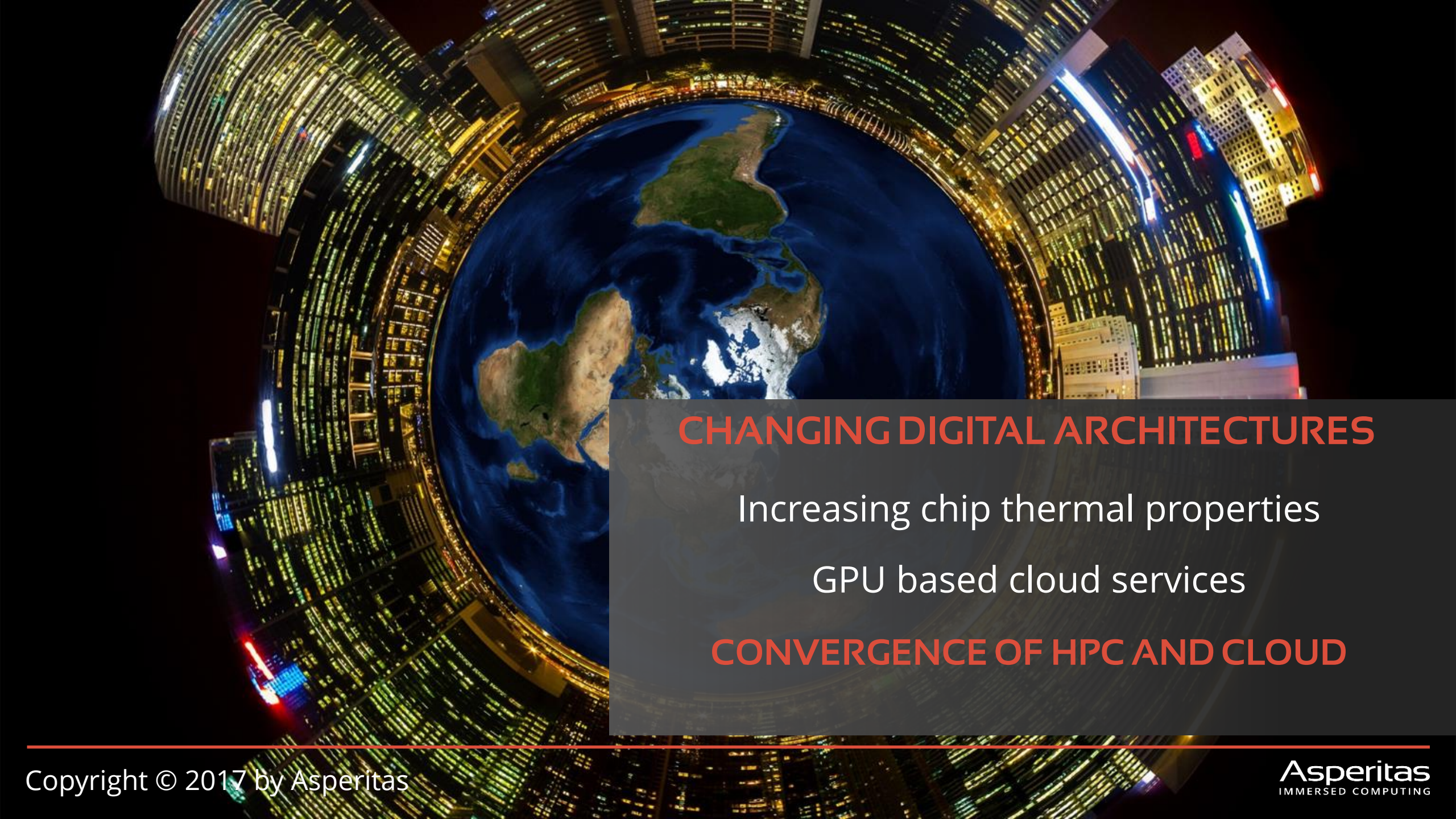

## CHANGING DIGITAL ARCHITECTURES

Increasing chip thermal properties

GPU based cloud services

## CONVERGENCE OF HPC AND CLOUD



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Servers | Storage | Solutions



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# Boston's Build Facility

## CUSTOM DESIGN

Client Branded Desktops
Fully Branded OEM Solutions
Branded Packaging and Labeling
Branded BIOS boot
Warranty labels

## CUSTOM CONFIGURATION

Exact configurations offered
Qualified by us for:
Compatibility,
Cooling and
Expandability

## BUILD AND TEST

Second to none in-house validation, build, test and QA procedures.

Remote access also available.

# BOSTON

Servers | Storage | Solutions

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