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Enterprise**



Greenit
amsterdam region

Data Centers evolving into the future

Including the new ODC in Rijswijk by the Dutch Government

Ir. Pieter Duijves, Director EMEA, HPE

Amsterdam, 29 September 2016



A new breed of apps power the New Style of Business

 **7.6 Billion**
world population

 **100 Billion**
connected devices



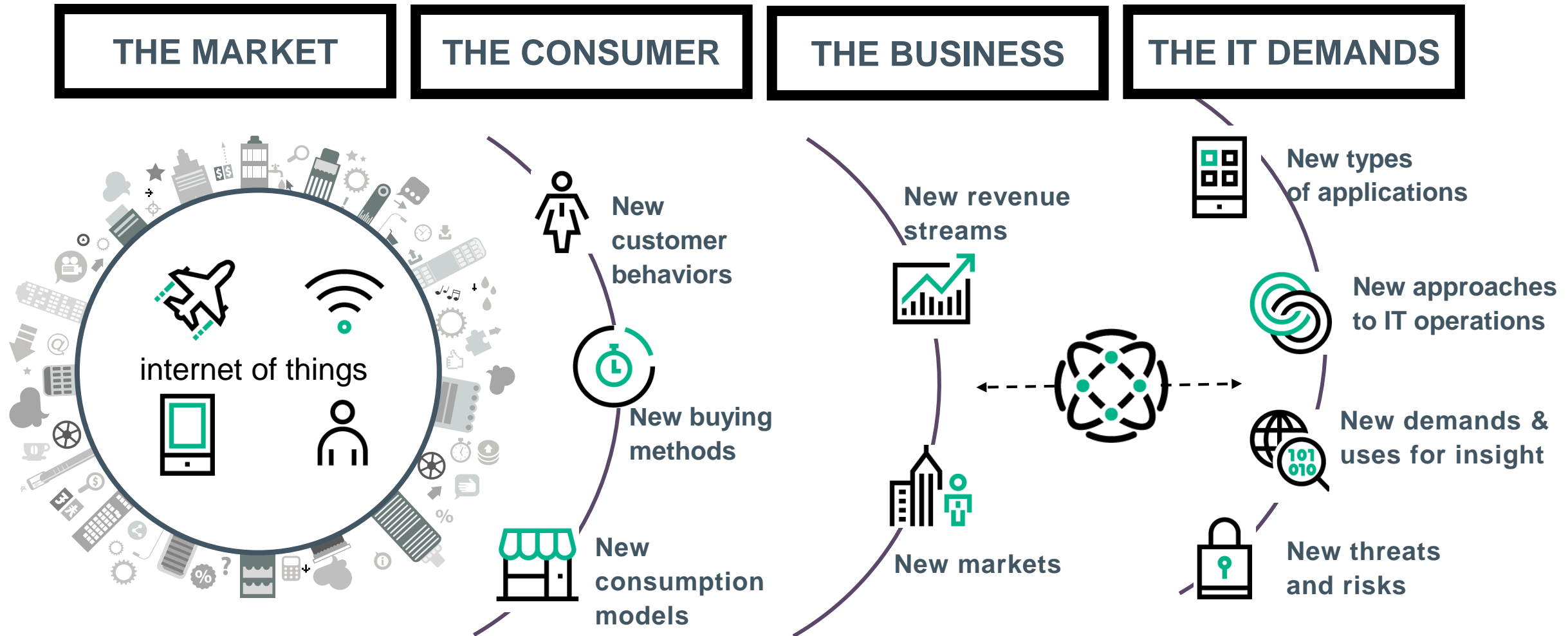
1 Trillion
applications



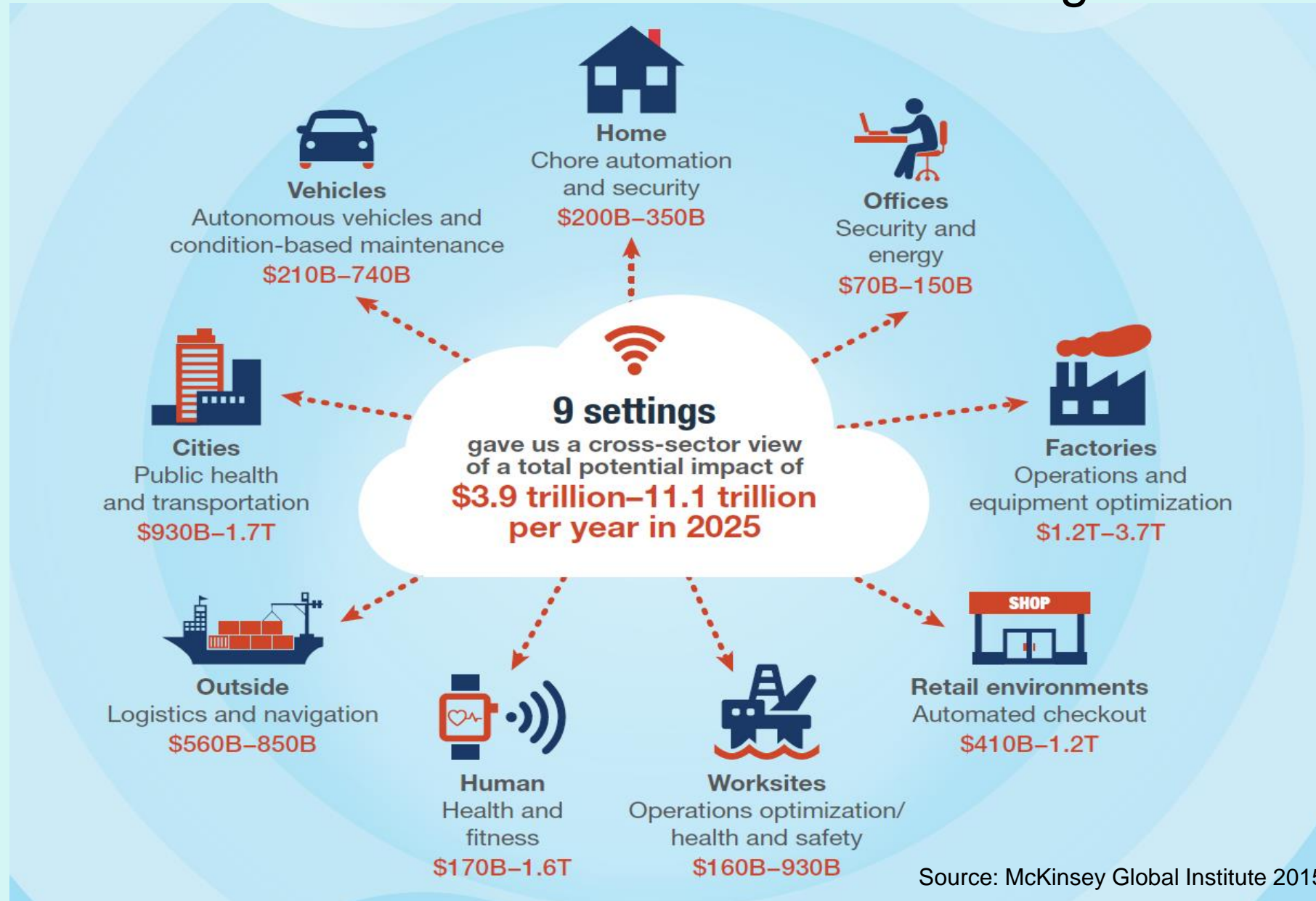
5.8 Trillion
bytes of data
*For each of those
7.6 Billion People*

By the year 2020....

New ideas require a New Style of Business and a new style of IT



Estimated Economical Value of the Internet of Things in 2025



Disruptive companies

What do they OWN?



Taxi Services

Not a single taxi



Hotel Services

Not a single hotel room



Movie broadcasting

Not a single network, nor end device



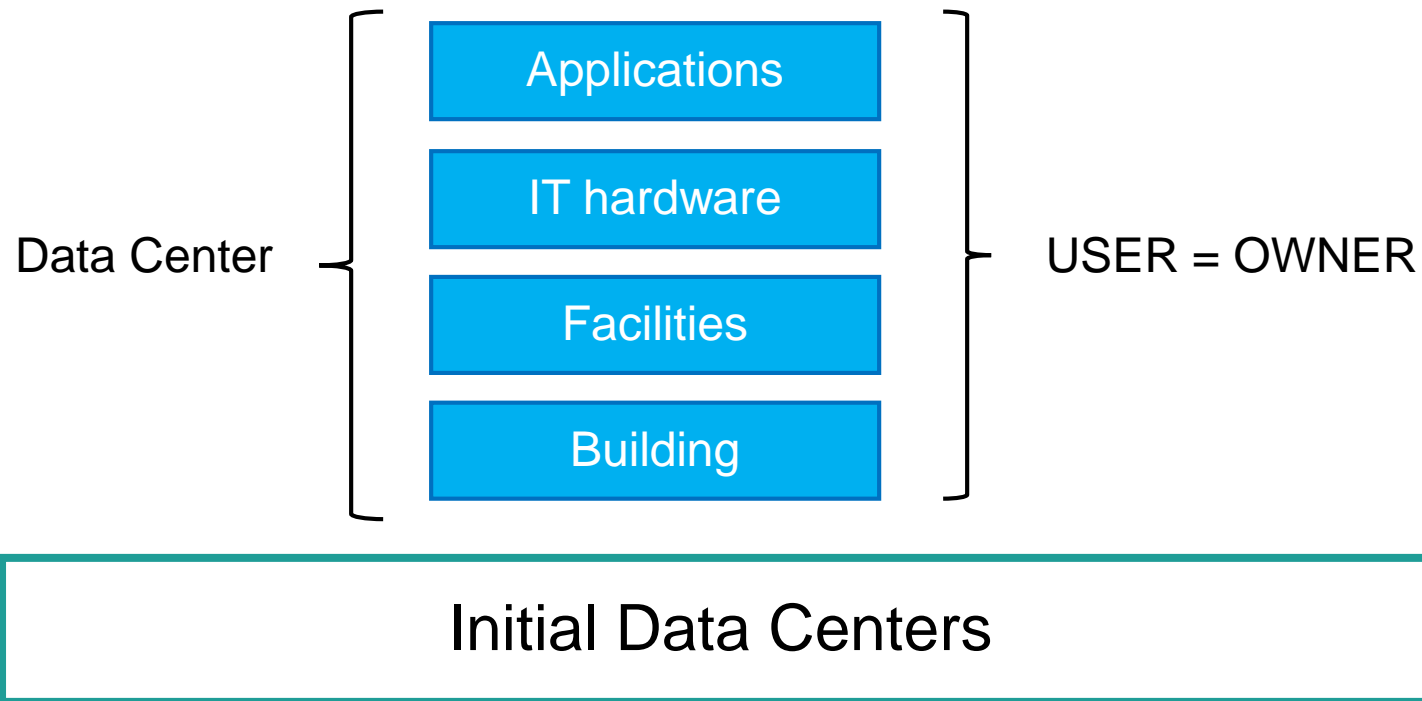
Communication Services

Not a single network, nor end device

Taxi's, hotel rooms, networks, smartphones, tv's have become underlying commodities in these business models

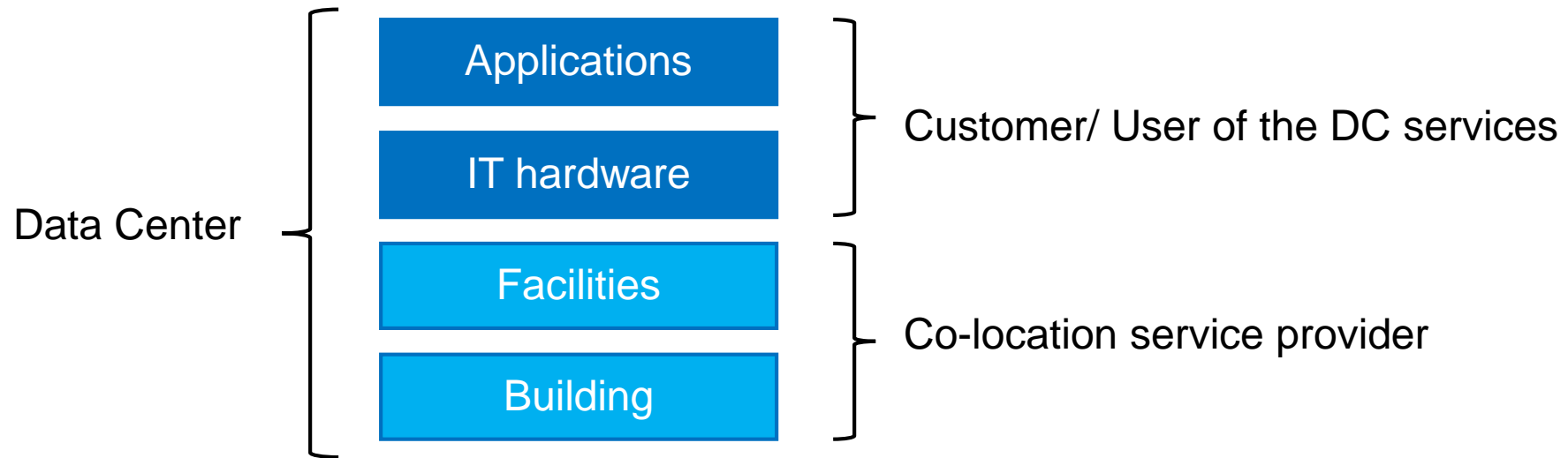
Ownership in Data Centers

Who owns what?



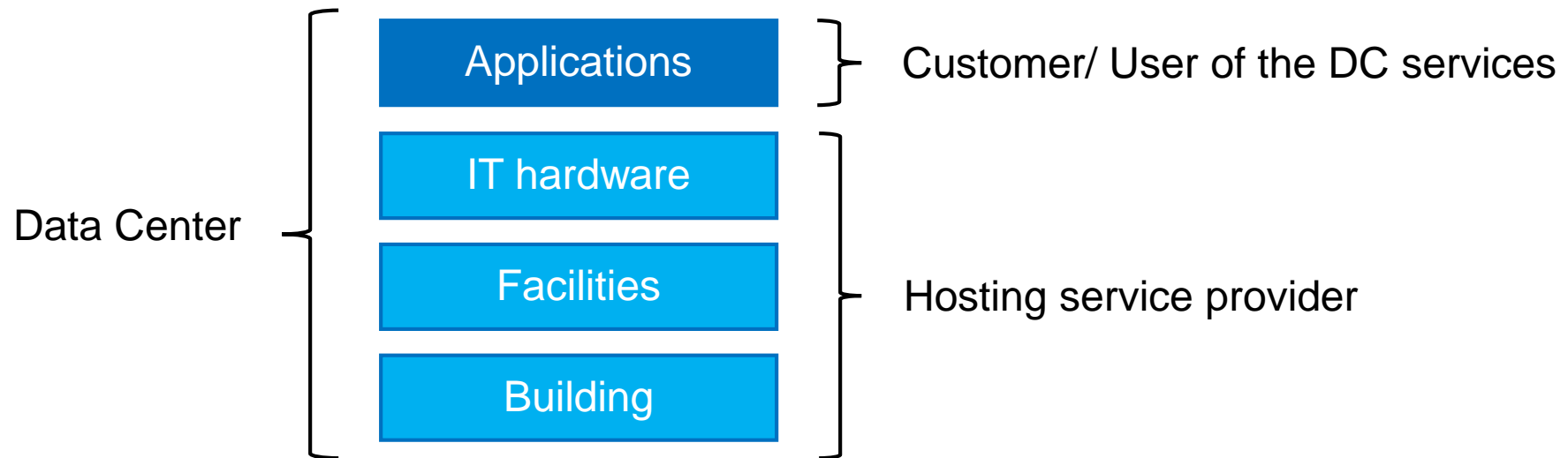
Ownership in Data Centers

Who owns what?



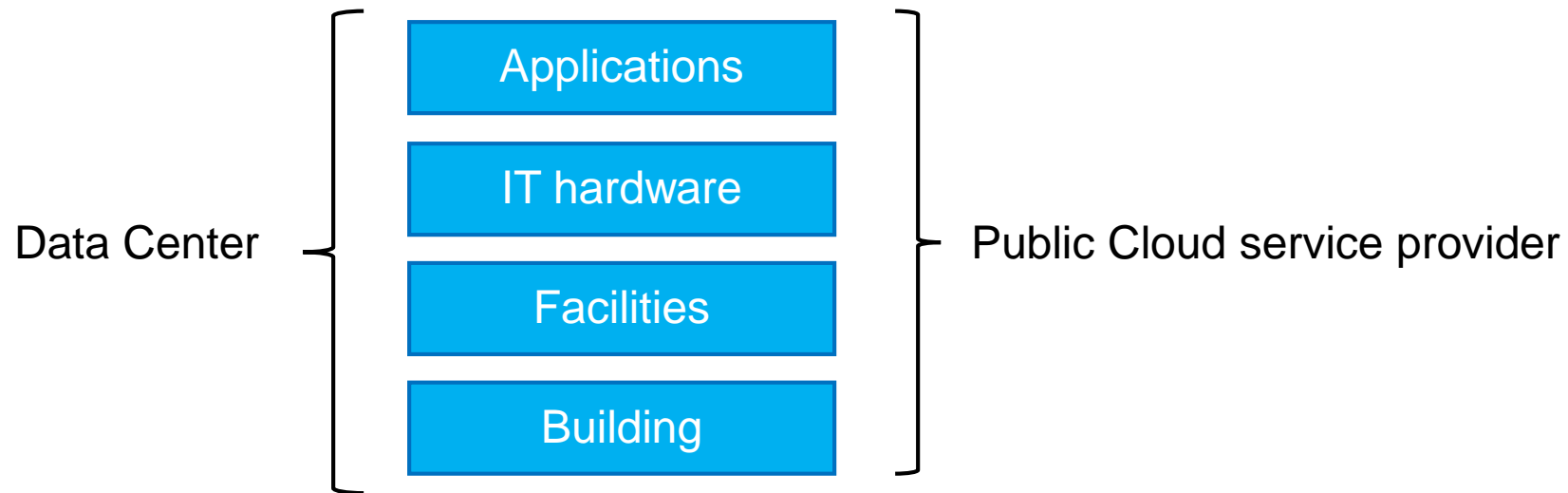
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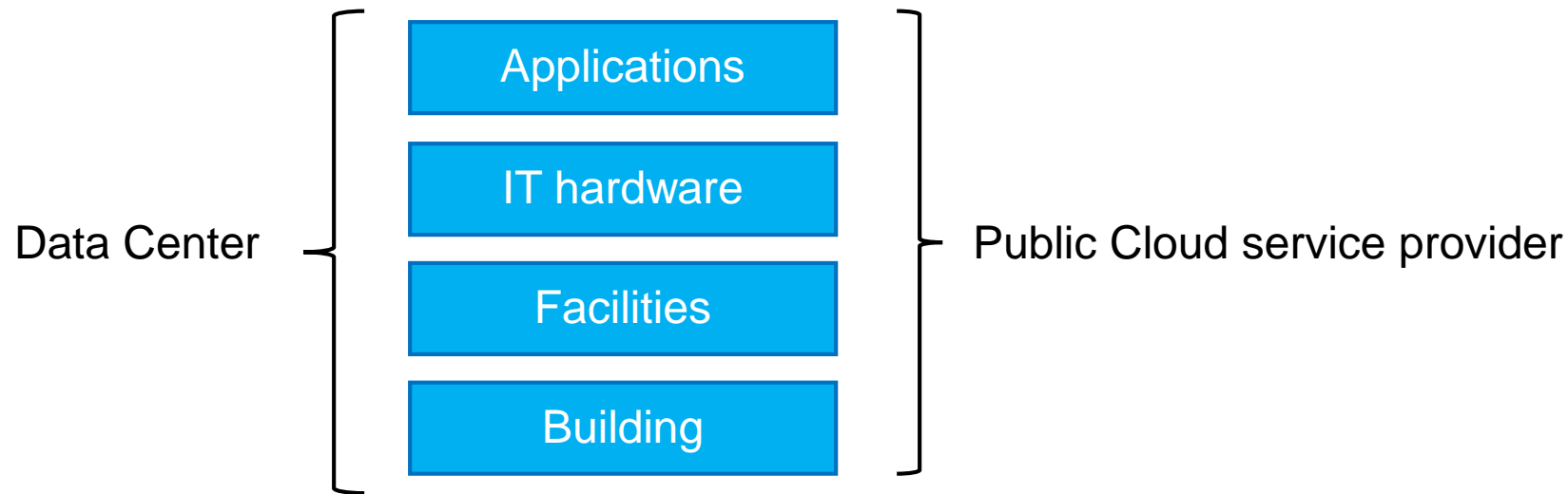
Ownership in Data Centers

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Ownership in Data Centers

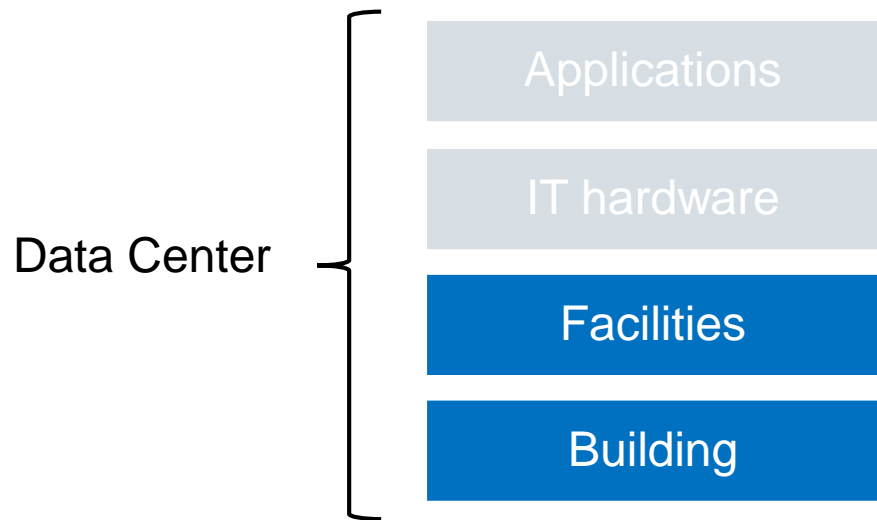
Who owns what?



Customer/user does not own infrastructure nor pays for SW licenses. He just pays for the services he consumes.

Ownership in Data Centers




So who owns the Data Centers of the Future?



- Financial Institutions
- Telecom Service providers
- Government organizations
- Large corporates
- Colo service providers
- Hosting Service providers
- Cloud Service providers

Governance Regulations Compliance Legislation Security Control

What does that mean for data center strategy?

OPTIONS ARE	Level of control	Capital cost	Opex
Owned data center			
Hosted/co-located			
Outsourced/managed			
Public Cloud			

Drijfveren Rijksoverheid - basis voor o.a. het nieuwe ODC

- Regeerakkoord: Rijksuitgaven voor mens en materieel terugbrengen van 17 Miljard € naar 13 Miljard € (2018)
- Slimmere en efficiëntere samenwerking tussen Ministeries, o.a. op ICT gebied
- Ondersteunende activiteiten worden ondergebracht in Shared Services, zoals ook het SSC-ICT voor de ICT dienstverlening
- Compacte Rijksdienst “Project 4” - PCDC Programma Consolidatie Data Centers
- Consolidatie van 64 bestaande Data Centers in 4 nieuwe landelijke Data Centers
- I-Strategie zoals vastgelegd door de Rijks CIO, nu vervolgprogramma Rijkscloud

Programma Consolidatie Data Centers PCDC



Programma Consolidatie Data Centers PCDC



Programma Consolidatie Data Centers PCDC



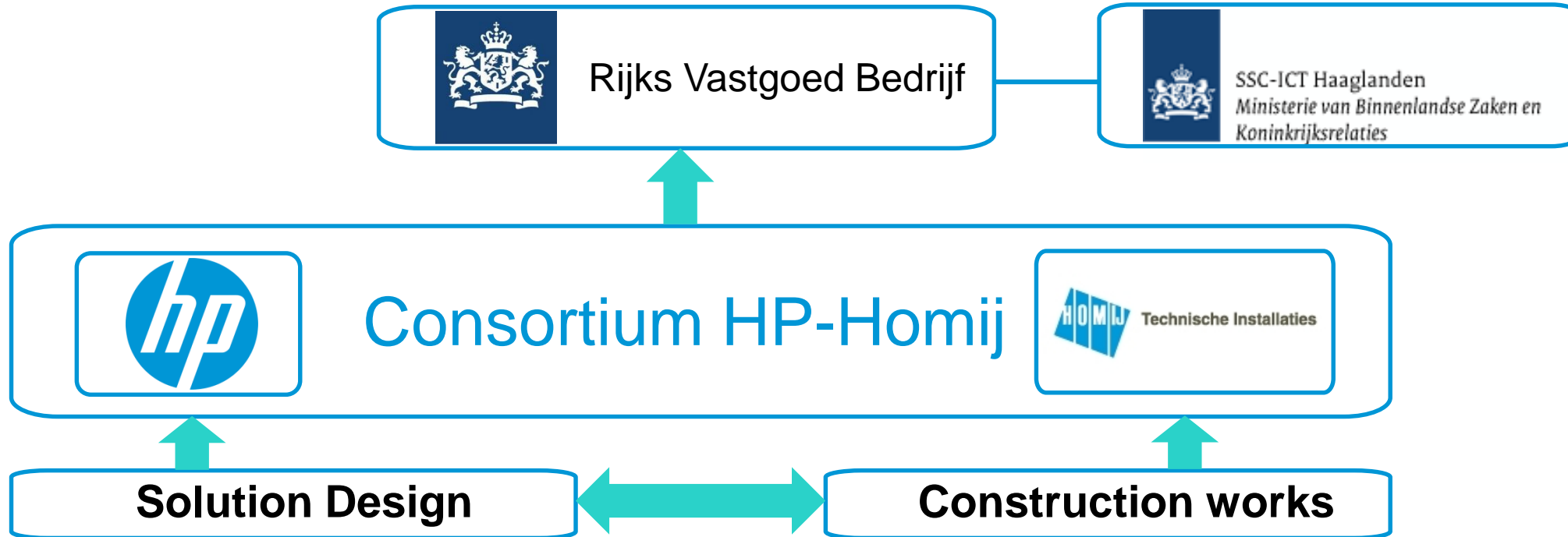
Government Data Center - ODC – Haagse km2

Available Sustainable Scalable Secure Flexible Economic

- Datacenter serving >5 ministries and other government departments
- Design Build and Maintain a new data center (brownfield)
- 2700 m2, 8 MW in 6 data halls, over 5 stages
- Tier III availability, no SPOF's
- Highest level of physical security
- Consortium set up with installation company HOMIJ, lead by HP
- HP HOMIJ selected out of >10 competitors
- Equal to or better than the competition for all criteria
- Energy efficiency: “Free Cooling”, adiabatic assistance, PUE <1.12



Client engagement model



Building facade

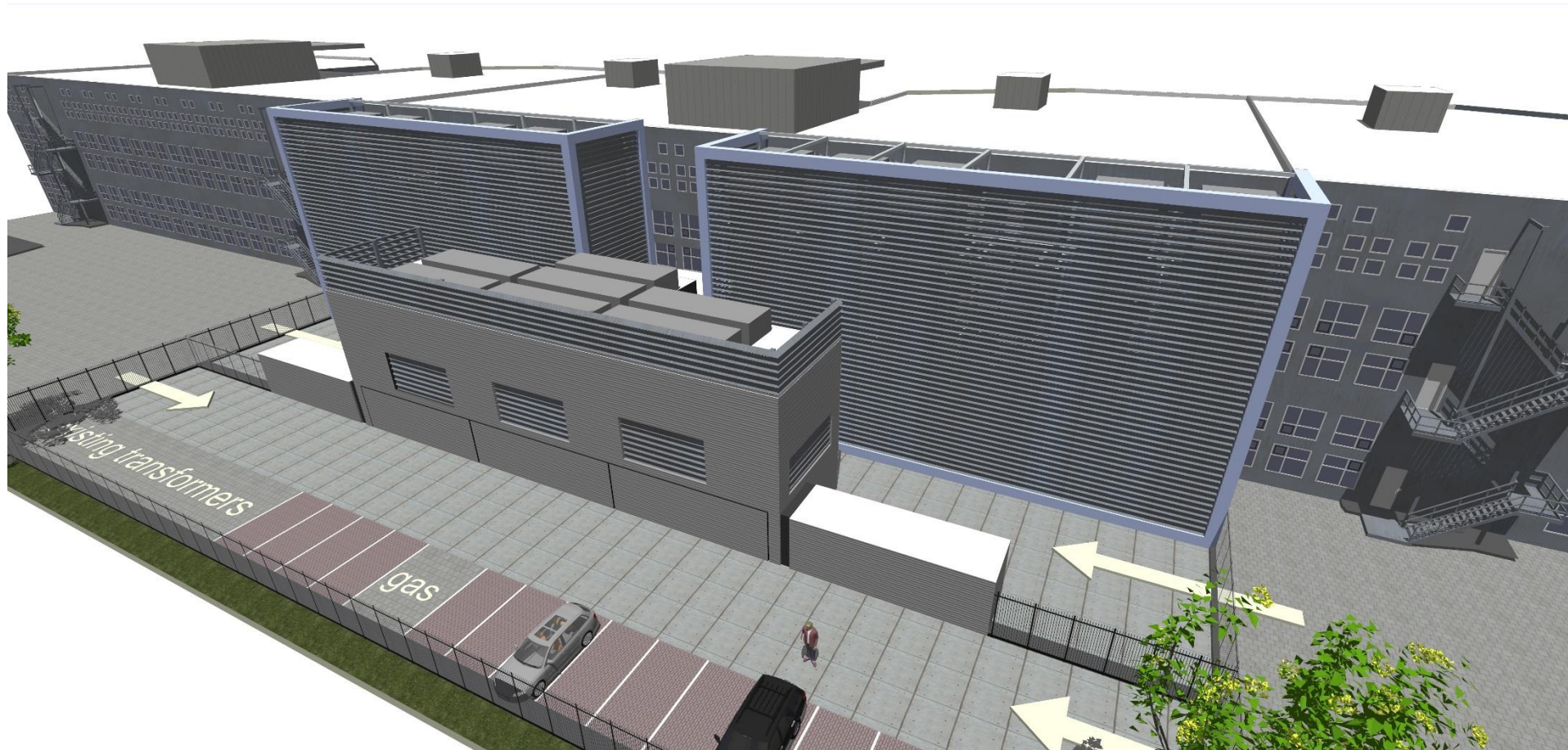
Sober and efficient solution in harmony with the existing building, inside and outside



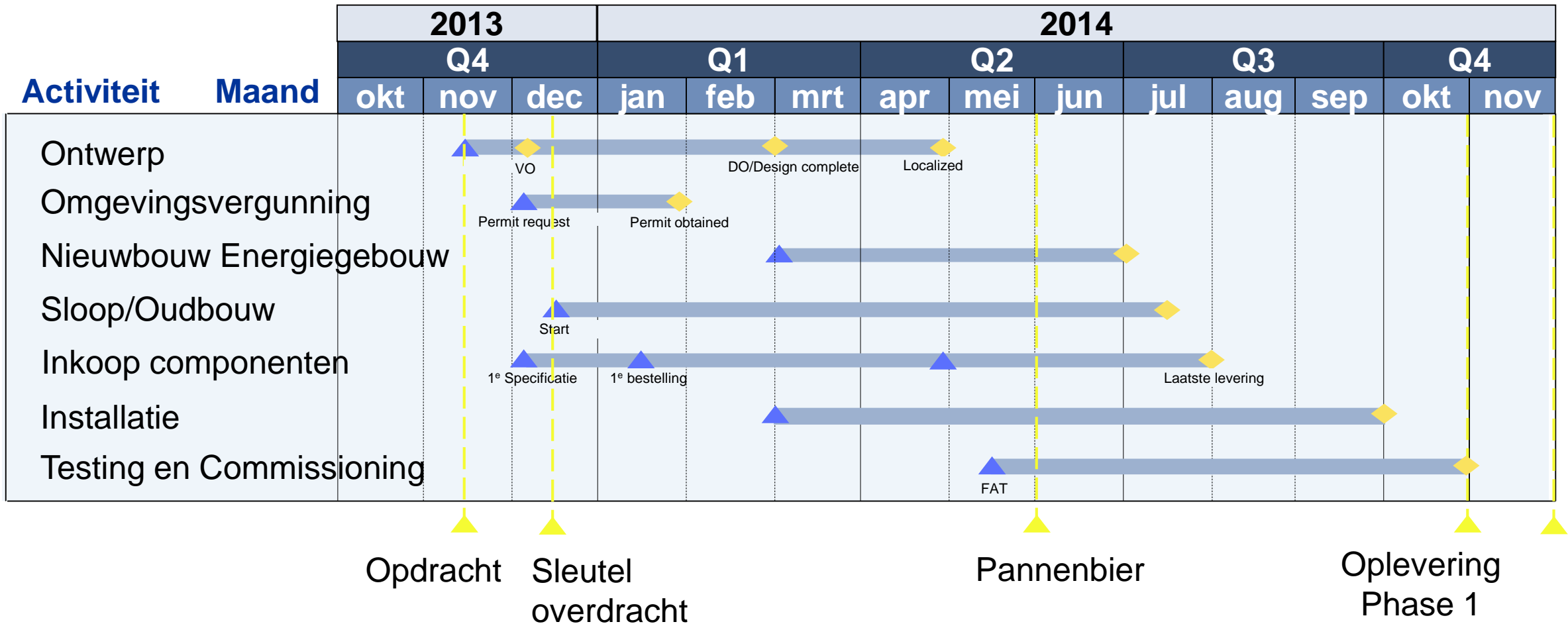
Rear side 2013



Building rear side conversion

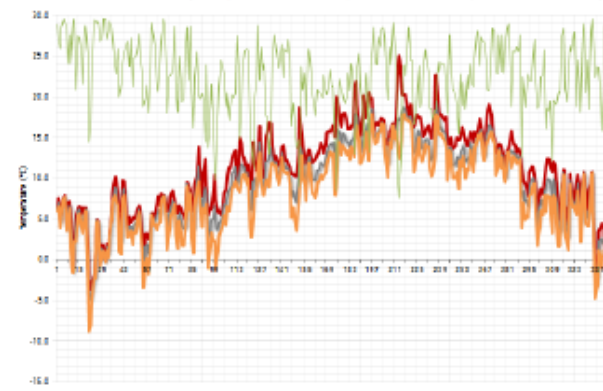


Planning ODC Haagse km2

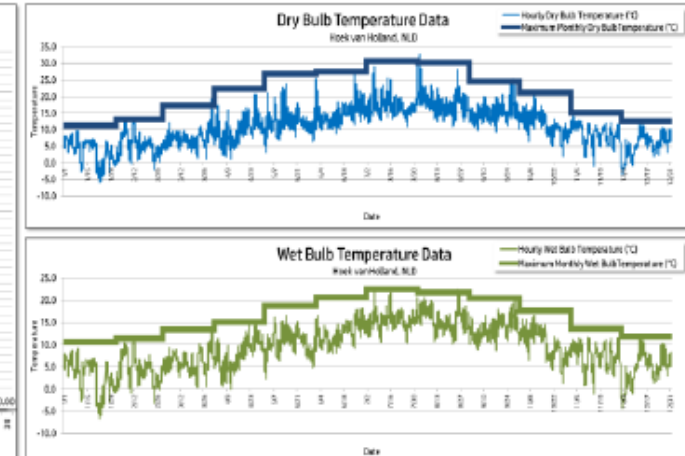
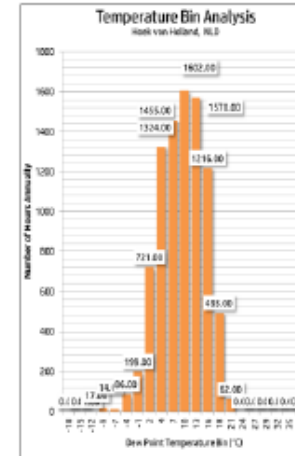
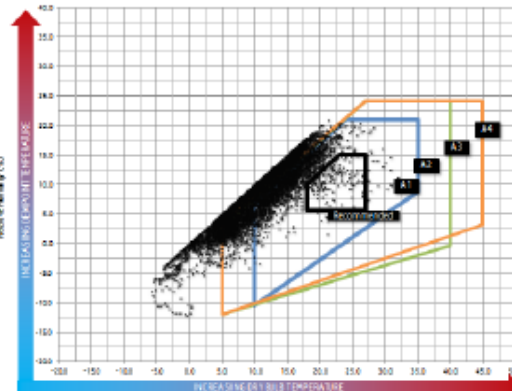


Energie Simulaties

Hoek van Holland Daily Average Climate



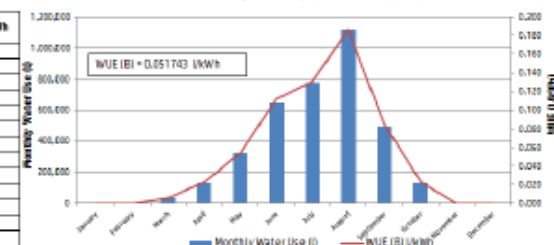
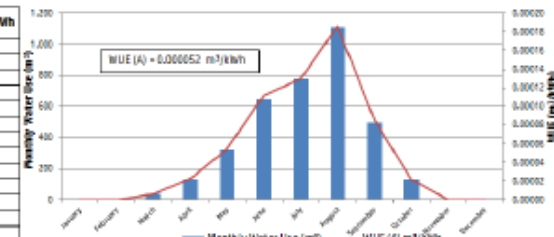
Temperature Frequencies - Hoek van Holland
Dry-bulb and dew-point temperatures



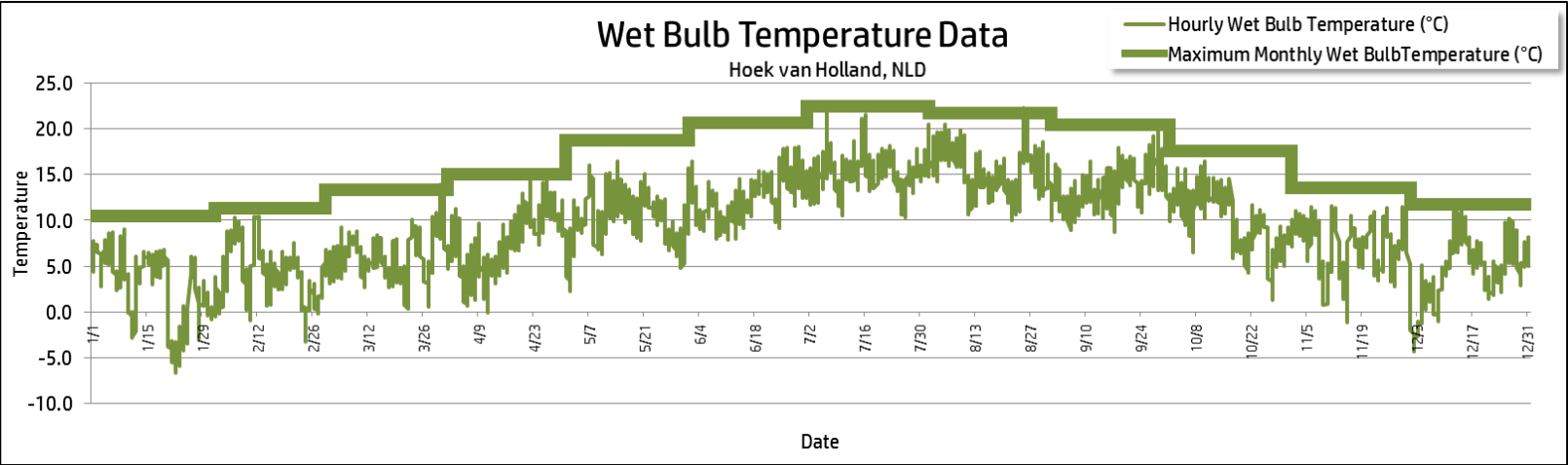
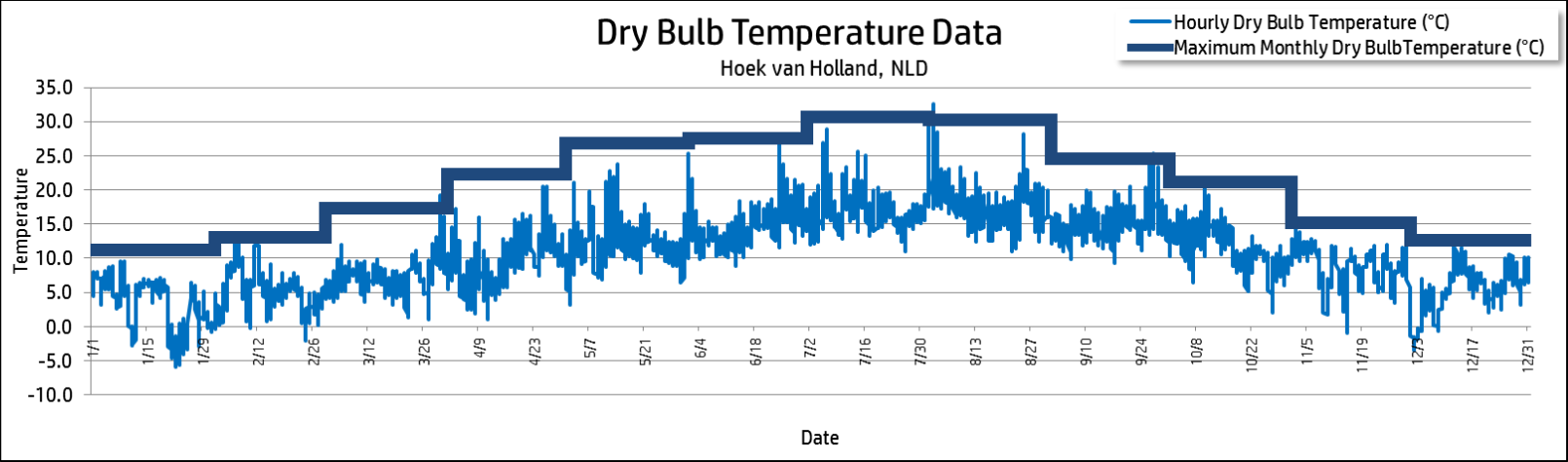
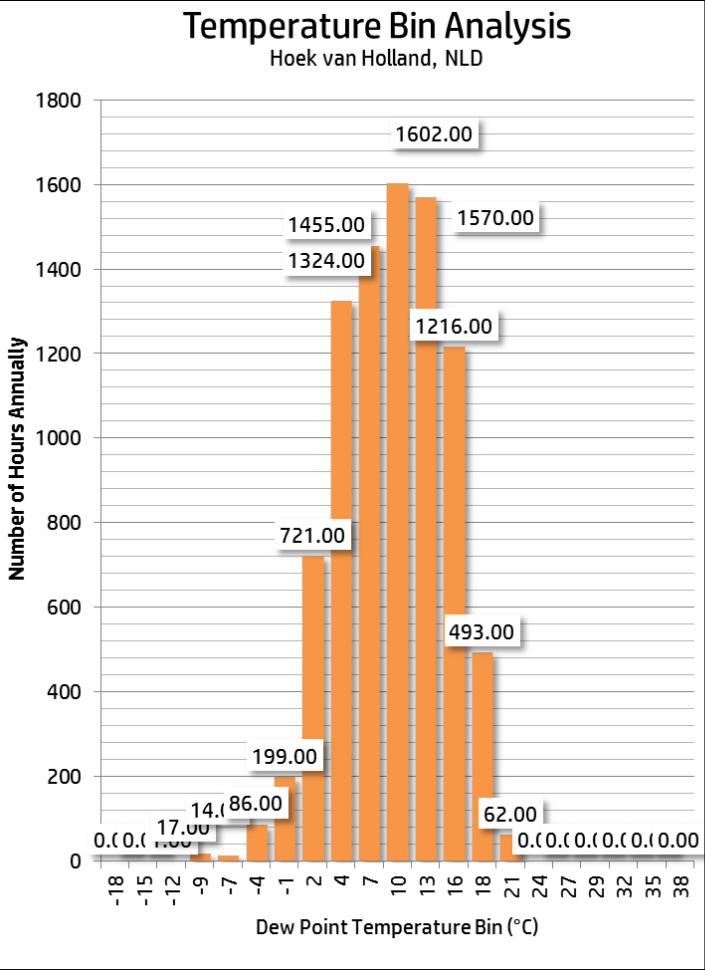
System	Energy Use (kWh)	Average Power (kW)	Percent of IT	Percent of Total
IT	61,663,360	7,039	100.0%	88.30%
UPS Losses	2,774,851	317	4.50%	3.97%
Electrical Losses in Data Center	616,634	70	1.00%	0.88%
Electrical Losses in UPS Rooms	154,158	18	0.25%	0.22%
Indirect Evaporative Fans (indoor)	1,993,940	228	3.23%	2.86%
Indirect Evaporative Fans (outdoor)	826,072	94	1.34%	1.18%
RO Water Treatment Pump	14,056	2	0.02%	0.02%
Data Center Lighting	102,480	12	0.17%	0.15%
Data Center Misc Power	78,621	9	0.13%	0.11%
Compressor Power for Data Center	82,474	9	0.13%	0.12%
Fan Power for Data Center	13,006	1	0.02%	0.02%
UPS Rooms Lighting	81,984	9	0.13%	0.12%
UPS Rooms Misc Power	157,242	18	0.25%	0.23%
Fan Power for UPS Rooms	107,221	12	0.17%	0.15%
Admin Area Lighting	184,465	21	0.30%	0.26%
Admin Area Misc Power	786,208	90	1.28%	1.13%
Compressor Power for Admin Spaces	100,353	11	0.16%	0.14%
Fan Power for Admin Spaces	94,654	11	0.15%	0.14%
Total	69,831,778	7,972		100.00%

	Monthly Energy (kWh)	Monthly Water Use (m³)	WUE (A) m³/kWh
January	5,888,874	0	0.00000
February	5,322,574	0	0.00000
March	5,896,175	39	0.00001
April	5,726,133	131	0.00002
May	5,936,877	322	0.00005
June	5,786,882	648	0.00011
July	5,977,407	777	0.00013
August	5,984,744	1,113	0.00019
September	5,770,053	495	0.00009
October	5,029,587	133	0.00002
November	5,719,187	0	0.00000
December	5,885,081	0	0.00000
Total/Average	69,805,575	3,657	0.00005

	Monthly Energy (kWh)	Monthly Water Use (l)	WUE (B) l/kWh
January	5,888,874	0	0.000
February	5,322,574	0	0.000
March	5,896,175	39,096	0.007
April	5,726,133	131,252	0.023
May	5,936,877	322,539	0.054
June	5,786,882	647,236	0.112
July	5,977,407	778,428	0.130
August	5,984,744	1,114,234	0.186
September	5,770,053	495,495	0.086
October	5,029,587	132,718	0.027
November	5,719,187	0	0.000
December	5,885,081	0	0.000
Total/Average	69,805,575	3,641,797	0.05174



Climate Analysis

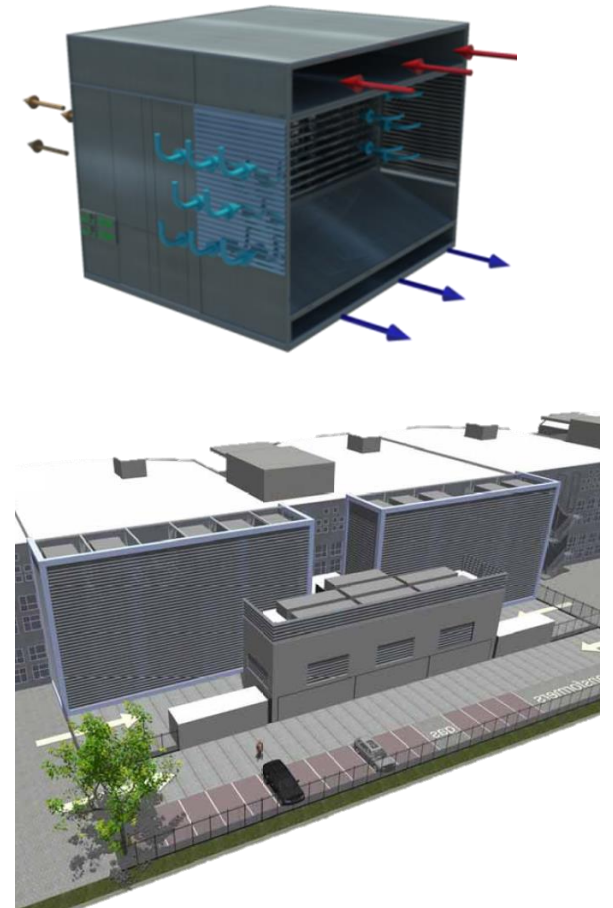


Cooling solution

Very flexible and easy to adjust climate control installation

Indirect Free Air Cooling

- No active compression cooling required
- Free air cooling, adiabatic support during hot days
- Very efficient; low PUE
- Very low water usage, WUE(A) (1,65 m³/kW)
- Proven technology
- Simple installation
- No infrastructure on the roof top
- No cooling pipeworks
- No aggressive cooling agent (no liquid in the data halls)
- No maintenance required in the data halls

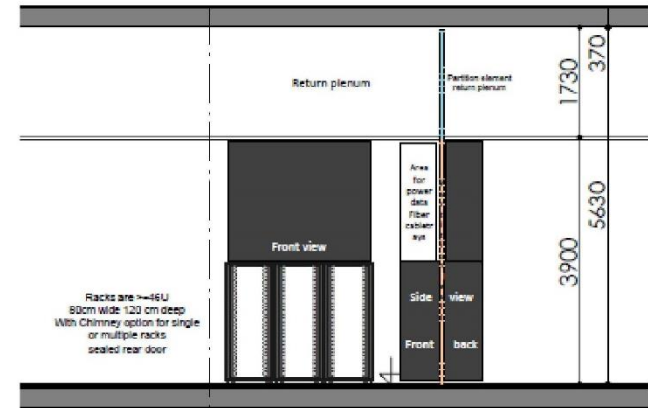


Flexibility - several solutions of data storage

Simple and fast implementation and exchangeability of new racks, private suites en cages

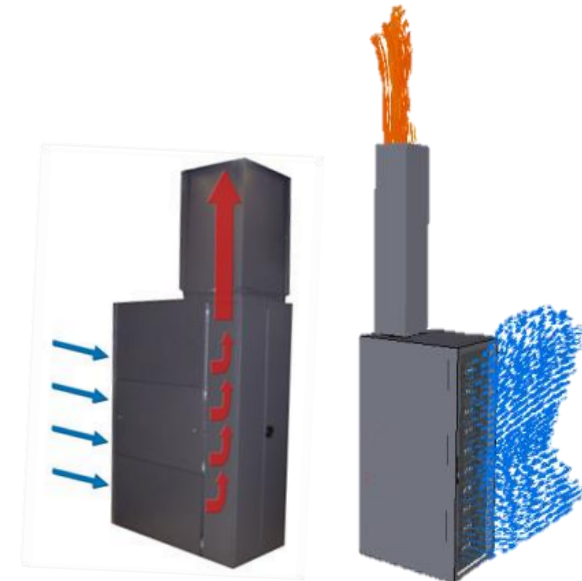
No raised floor

- No ramps so more available floor space
- Stable and solid floor load
- No sensitivity to trembling
- No cooling distribution losses
- Simple maintenance

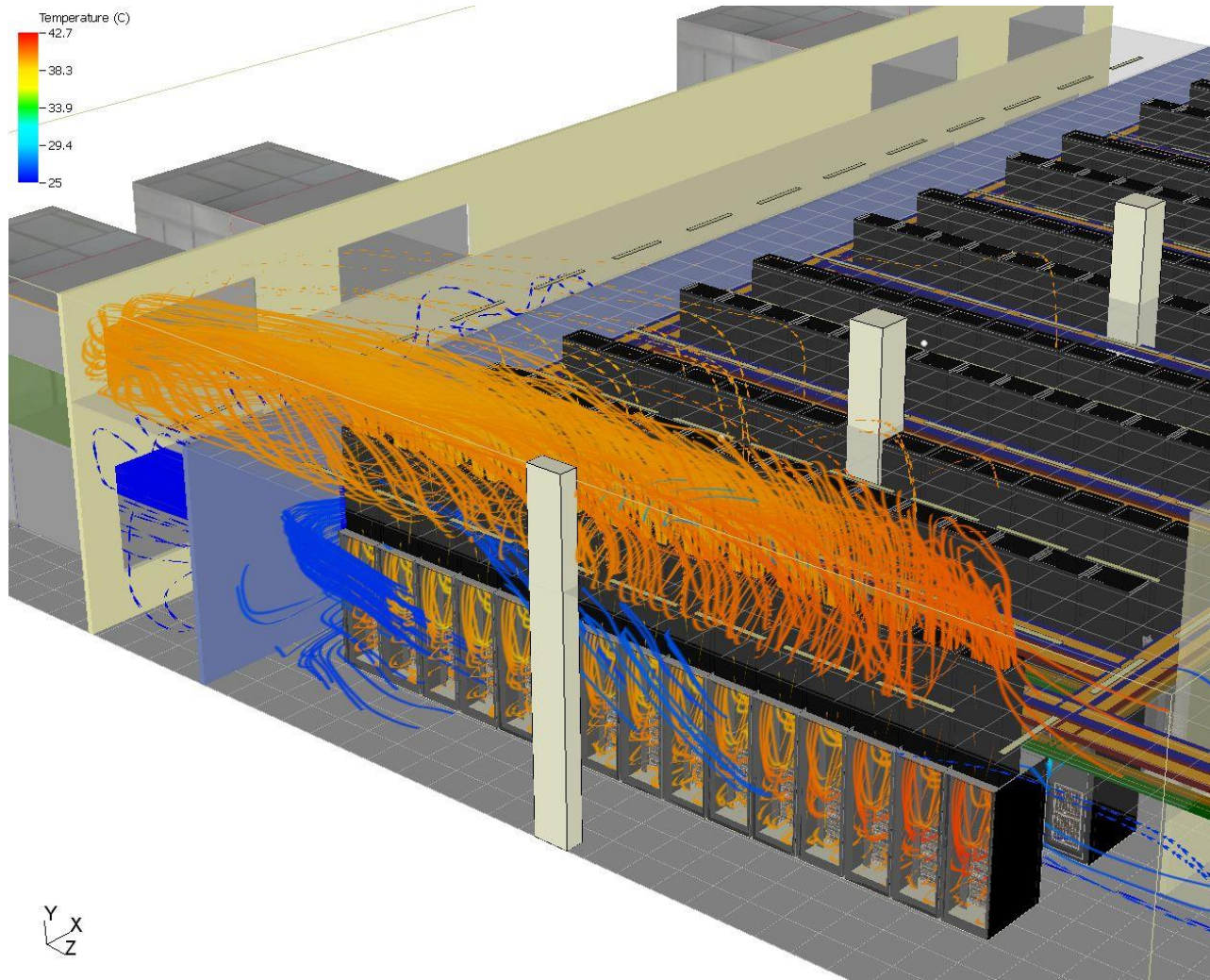


Racks with top air conduct as 'hot aisle'

- Suspended ceiling as return plenum
- Extendability per rack
- No restrictions of growing containment aisles
- Entire data halls is in fact a cold aisle
- Simple partitioning



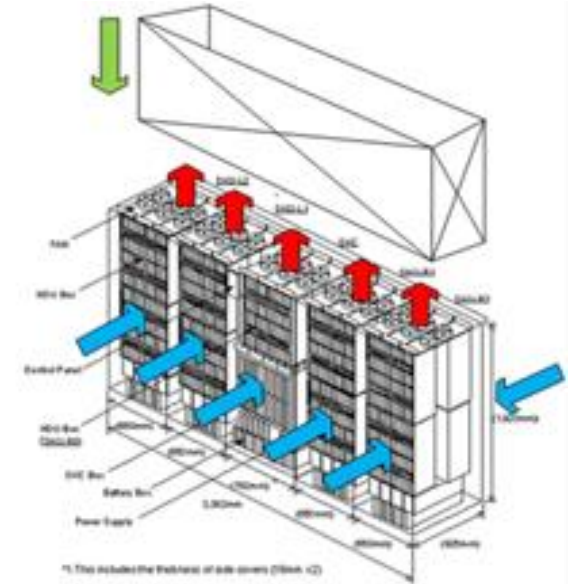
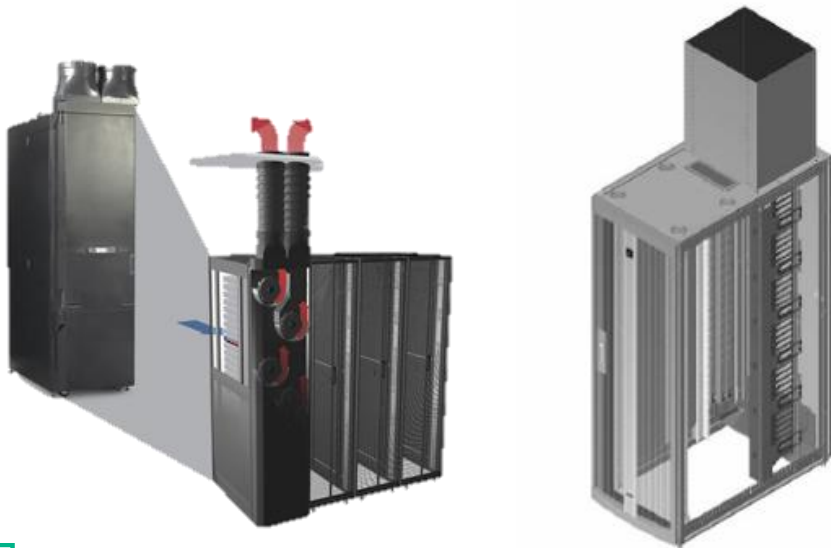
The concept in operation



Non standaard

Every IT rack known in the market can simply be installed and cooled

- Standard materials
 - Closed rear door
 - Top air conduct to suspended ceiling (chimney)

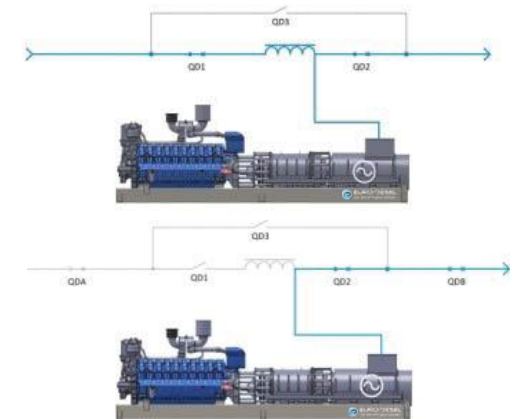
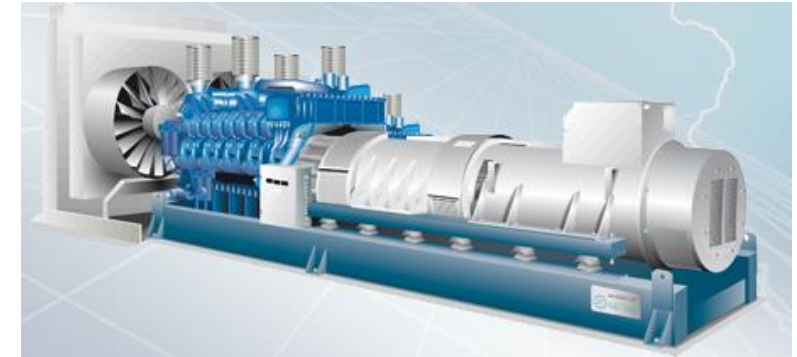


Power

UPS

Diesel Rotary UPS (DRUPS)

- Compact design compared to static UPS
- Only simple “No Break” output (no Short break)
- No batteries (environmentally friendly, no replacement maintenance cost)
- Isolated Parallel (IP) Bus system
 - Simple load sharing between the DRUPS units
 - Fault isolation between the DRUPS units
 - No need for static switches
 - Bypass of one unit is equally shared among the other DRUPS units



Classical power distribution

3 fase Bus-bar power distribution to the IT racks



DCIM Vendor selection process

HP has 5 WW DCIM partners

- Comply to Criteria, how, and what cost
- Three proposals invited
- Identify product differences
- Analyze cost structures (TCO, day 1 - END)
- Ease of deployment
- Available deployment integrations (track record)
- Training requirements
- Service contracts and delivery capabilities

The image shows a large, complex RFP table with multiple columns and rows. The table is organized into several main sections, each with a header row. The columns include criteria for evaluation, such as 'Technical requirements', 'Commercial requirements', 'Service requirements', and 'Other requirements'. The rows represent different vendors or proposals, with each row containing detailed information about the vendor's capabilities, pricing, and other relevant details. The table is very dense with text and numbers, making it difficult to read in detail. The table is tilted slightly to the right.

Product Implementation

Manage DCIM delivery HP and CANS

–Client view

- High Expectations
- Low Experience
- Scattered, inconsistent information
- Inconsistent naming conventions
- Access Security concerns IT/Facilities
- Outdated/Undocumented processes and workflows
- Underestimated involvement efforts
- Assign DCIM manager and team

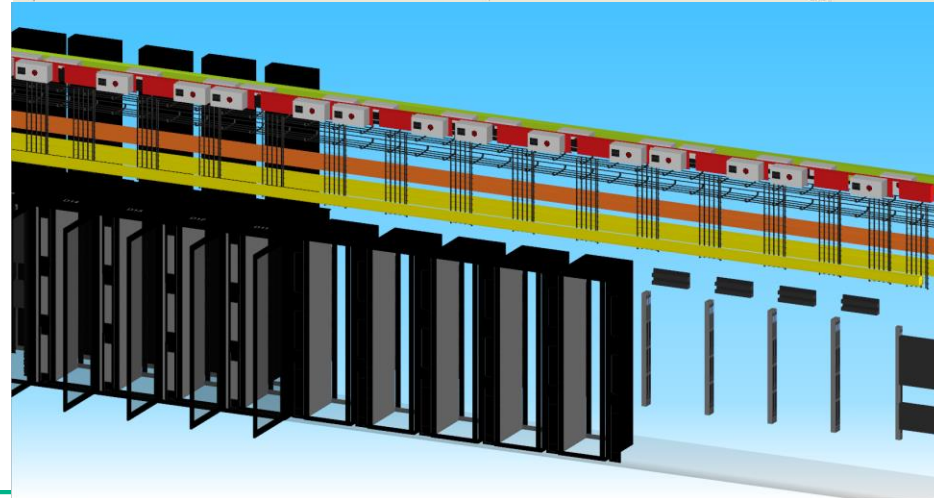
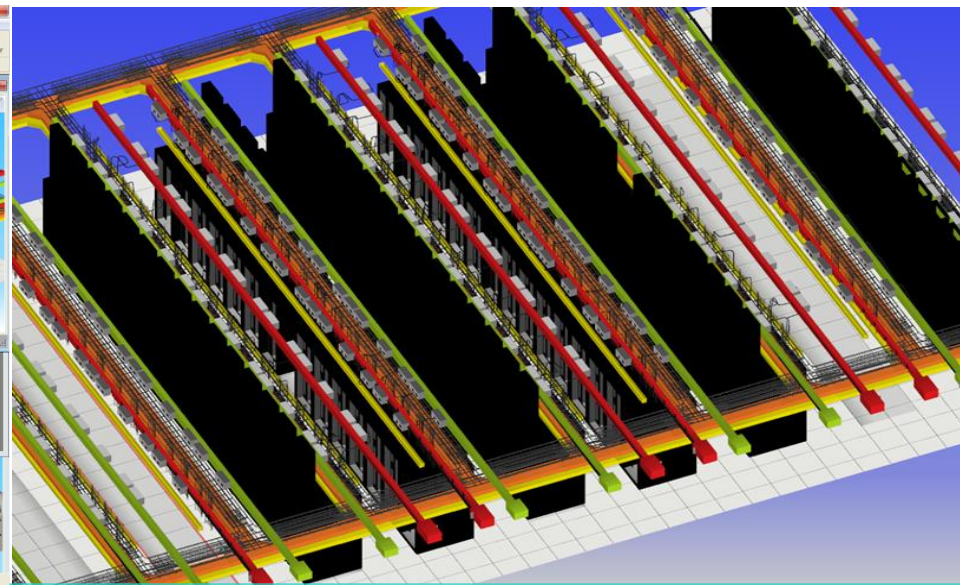
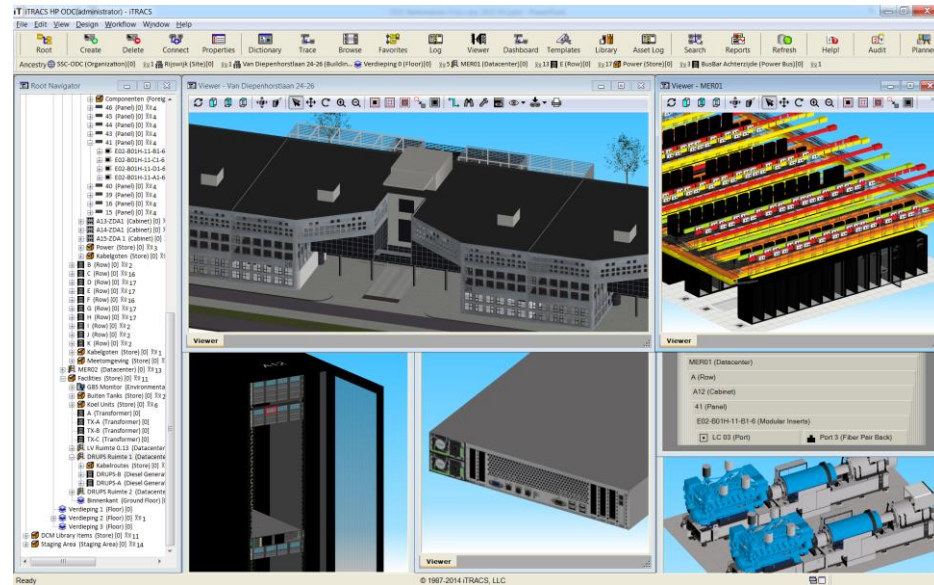
–Project Deployment

- Implement basic physical aspects
 - Building structure
 - Capacity components
 - Building Management System
 - Rack's and PDU's
 - Structured Cable plant
- Configure and integrate
- Regular onsite progress meetings
- Demonstrations to client
- OTJ Training, Onsite Admin training

Challenges Encountered during implementation

- Interpretation of the tender criteria
- Specifications Building Management System
- Client expectations changing
- Design changes tight build timeline
- Structured cabling client change requests
- Engagement model dependencies
- Rack design non standard
- Availability of importable information
- No DCIM Server or operational network on building site
- No connectivity to internet (security issue)
- Instability of iTracs SW, bug's, crashes, capabilities
- Statement of work
- Verification process DCIM as part of the commissioning process
- Acceptance criteria and process within the project

DCiM views

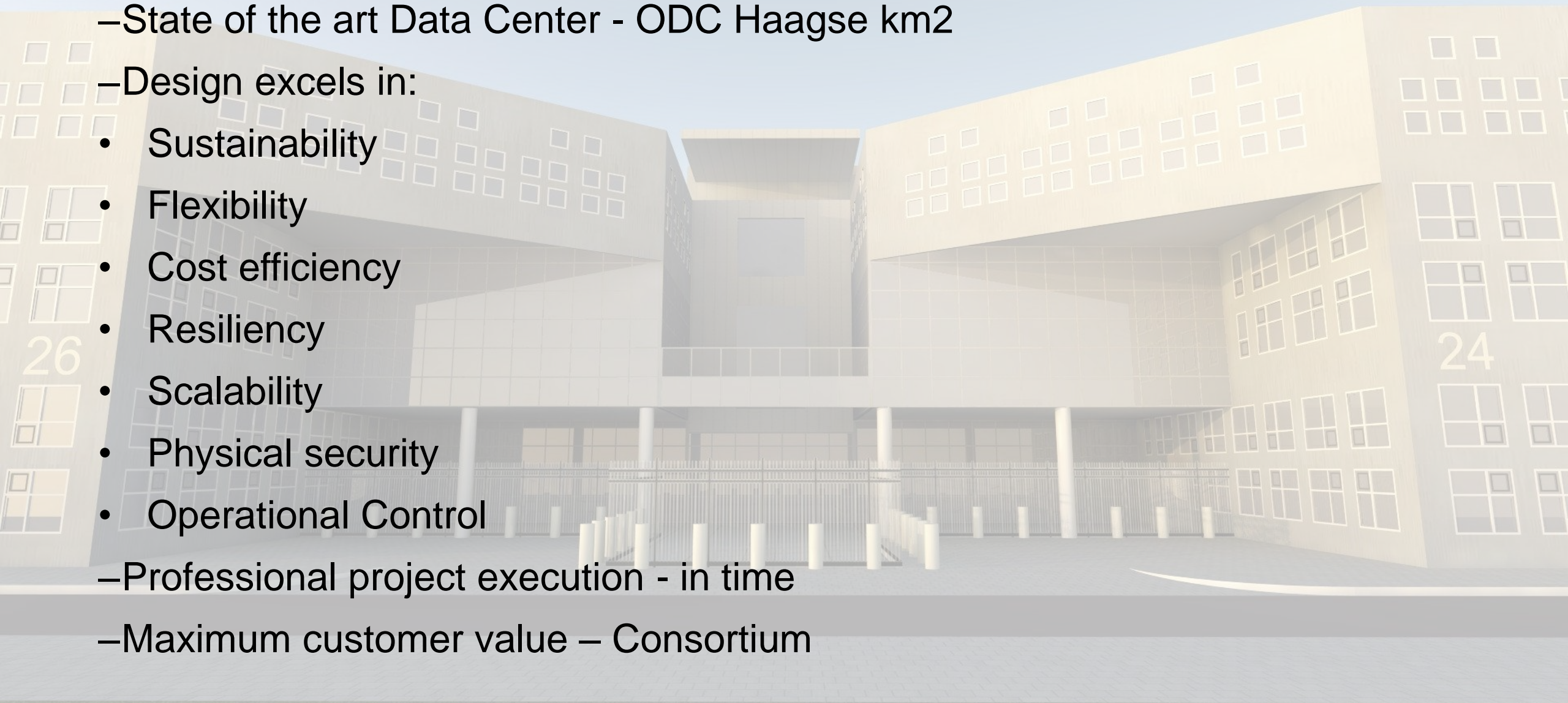


March 23, 2015 Formal opening of ODC Rijswijk by
Minister Stef Blok and SSC ICT Directeur Sylvia Bronmans



ODC Conclusions

- State of the art Data Center - ODC Haagse km2
- Design excels in:
 - Sustainability
 - Flexibility
 - Cost efficiency
 - Resiliency
 - Scalability
 - Physical security
 - Operational Control
- Professional project execution - in time
- Maximum customer value – Consortium





Data Center Facilities Consulting

HPE Data Center Facilities Services



Consulting and design for converged facility and IT infrastructures, implementation, and lifecycle occupancy



- Flexible
- Software-defined
- Modular
- Right-sized
- Right business fit
- Energy-efficient
- Financially efficient

Data Center
Facilities
Strategy

- Strategic technology planning for business growth and change

Data Center
Facilities
Design

- Define solutions with built-in mission-critical resilience, performance, and efficiency

Data Center
Facilities
Implementation

- “Turnkey services” where HP is the prime integrator and manages the entire solution

Data Center
Facilities
Assurance

- Verify and increase your ability to meet immediate and long-term operational goals

Data Center
Facilities
Energy
Services

- Better usage and management of energy, capacity, and costs



Thank you

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