



ANIE
AUTOMAZIONE



Il nuovo paradigma del Data Center IoT ready
Alessio Nava
Direttore Divisione IT & Telecomunicazioni Rittal





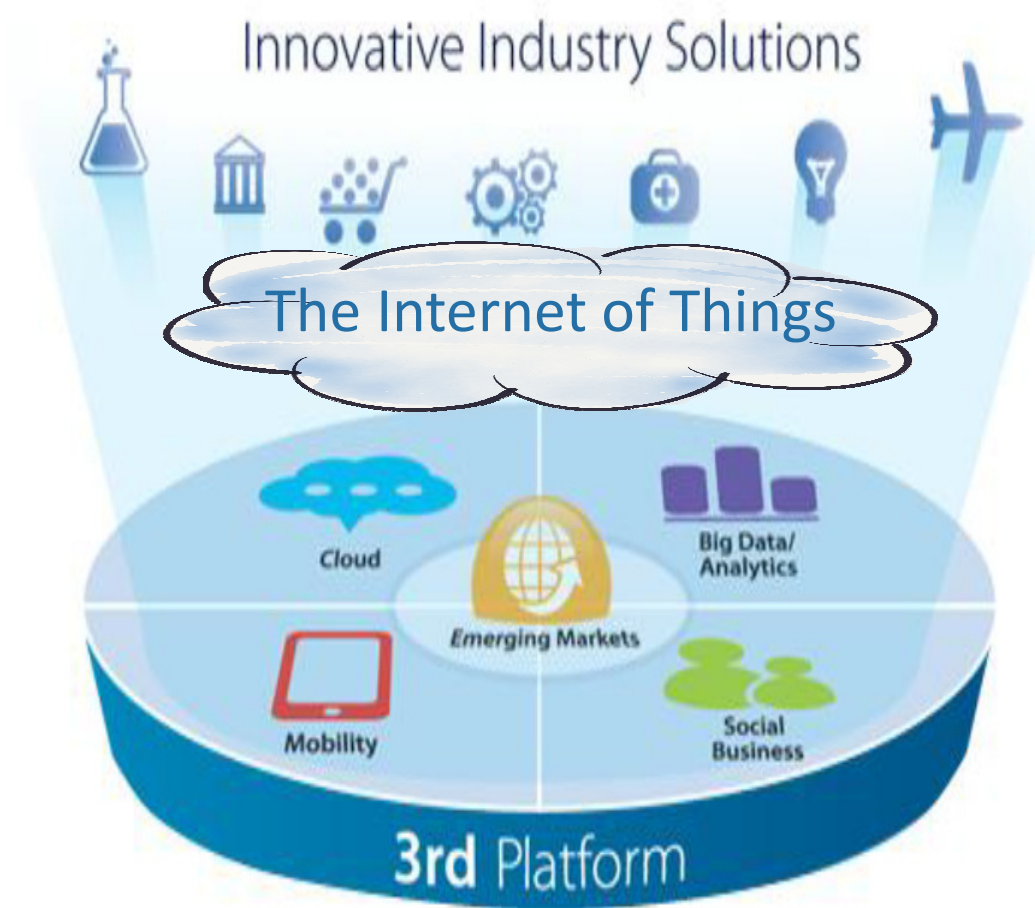
L'efficienza nell'era dell'Internet of Things

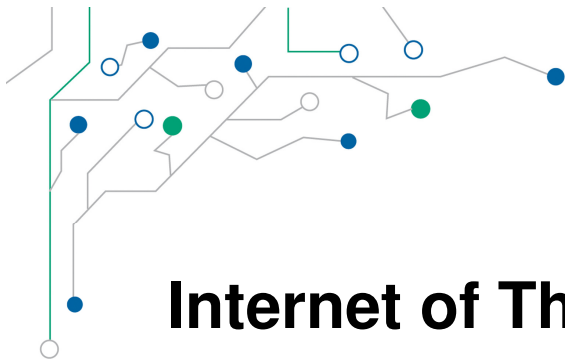
- **Scenari in evoluzione**
- **Le sfide di un moderno**
- **L'efficienza ed il risparmio energetico**
- **Il nuovo paradigma del Data-Center**



► Scenari in evoluzione

La terza piattaforma





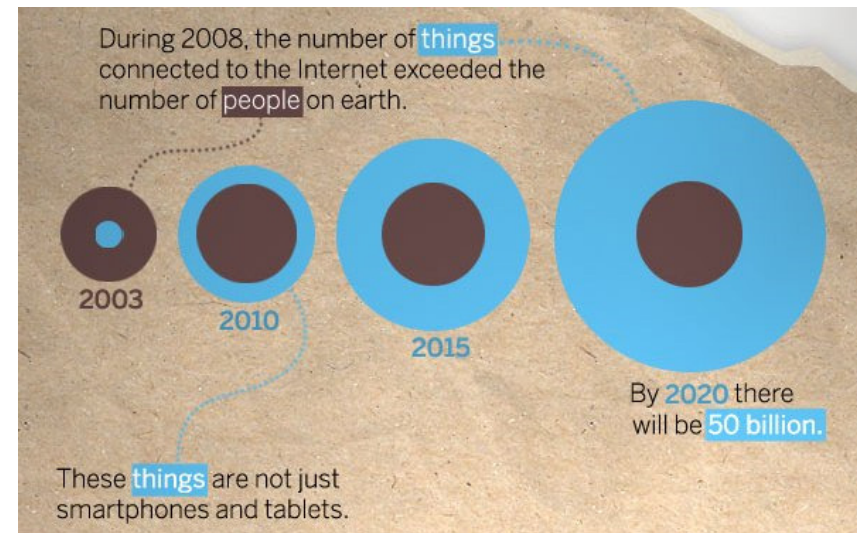
Internet of Things

- L'Internet of Things (o Internet degli Oggetti) è un neologismo riferito all'estensione di Internet al mondo degli oggetti comuni.
- Non si tratta di smartphone o tablet. L'Internet degli oggetti è una vera e propria evoluzione della Rete.
- Gli oggetti si rendono riconoscibili e acquisiscono intelligenza grazie al fatto di poter collezionare dati e accedere ad informazioni aggregate da parte di altri.



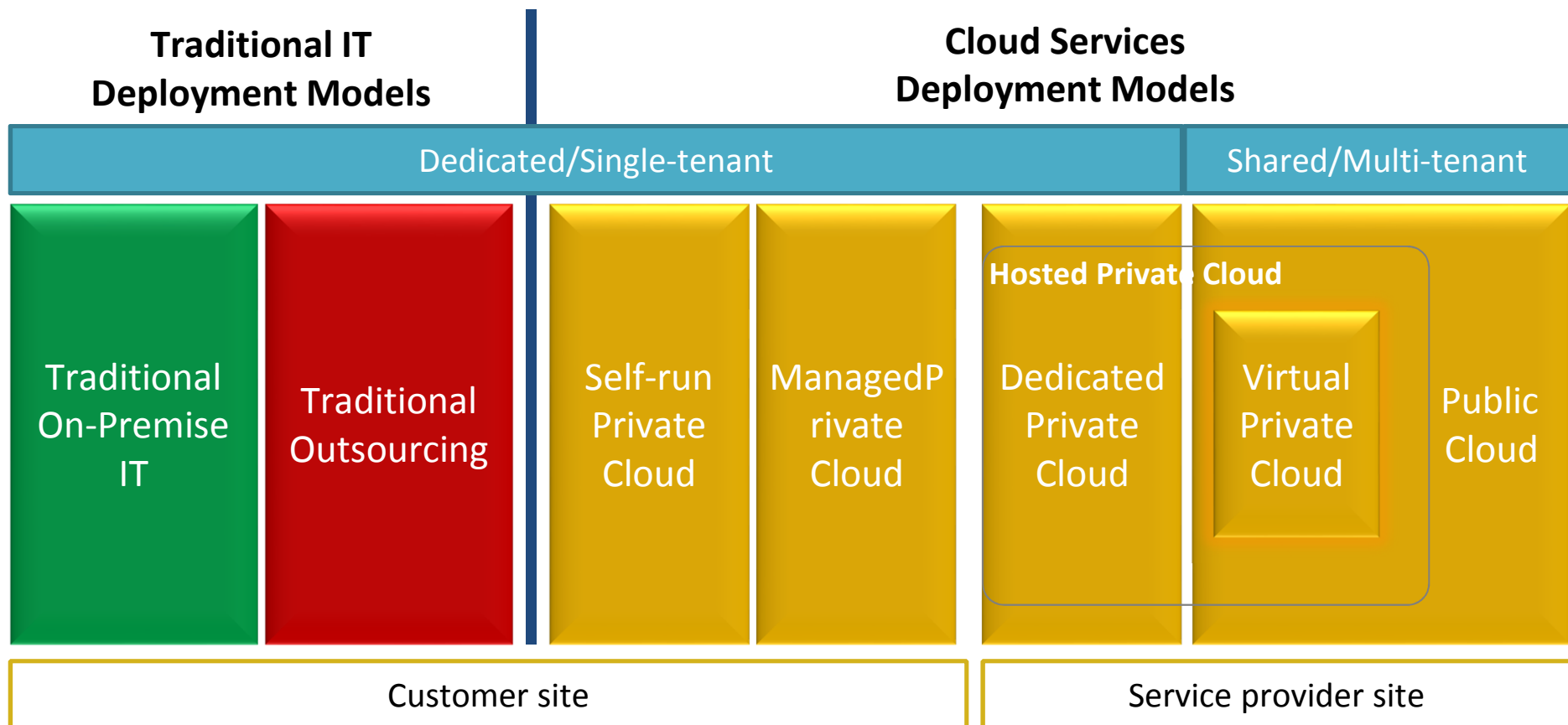
La crescita degli oggetti

- La crescita degli Oggetti Intelligenti è esponenziale: entro il 2020 saranno più di 50 Miliardi
- Le applicazioni sono infinite:
 - le sveglie suonano prima in caso di traffico;
 - le piante comunicano all'innaffiatoio quando è il momento di essere innaffiate;
 - le scarpe da ginnastica trasmettono tempi, velocità e distanza per gareggiare in tempo reale con persone dall'altra parte del globo.
- Tutti gli oggetti possono acquisire un ruolo attivo grazie alla Rete.





Cambiano logiche e modelli IT: da Traditional a Cloud Models





Big Data

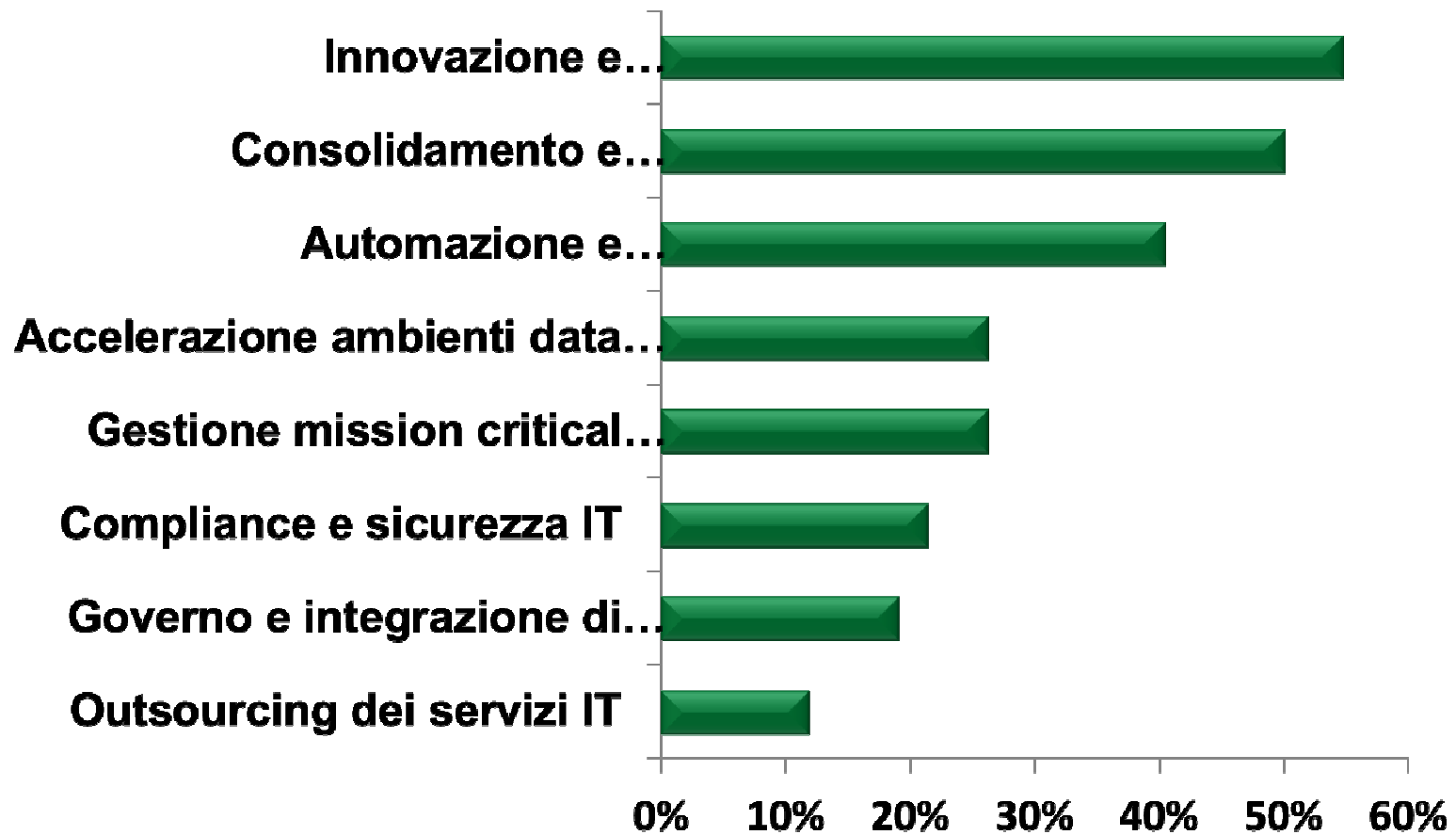
- Ogni giorno vengono creati nel mondo 2,5 exabyte di dati (equivalenti a c.a. 2,5 Miliardi di HD da 1 TB)
- Il 90% dei essi è stato creato solo negli ultimi due anni. Questi dati vengono registrati ovunque:
 - sensori di monitoraggio ambientale,
 - post sui social media,
 - video ed immagini digitali,
 - record delle transazioni di acquisto
 - segnali GPS.

Questi tipi di dati vengono definiti big data.

Fonte: IBM 2013



Principali priorità IT per le aziende italiane a 12/18 mesi





► Le sfide di un moderno Data Center

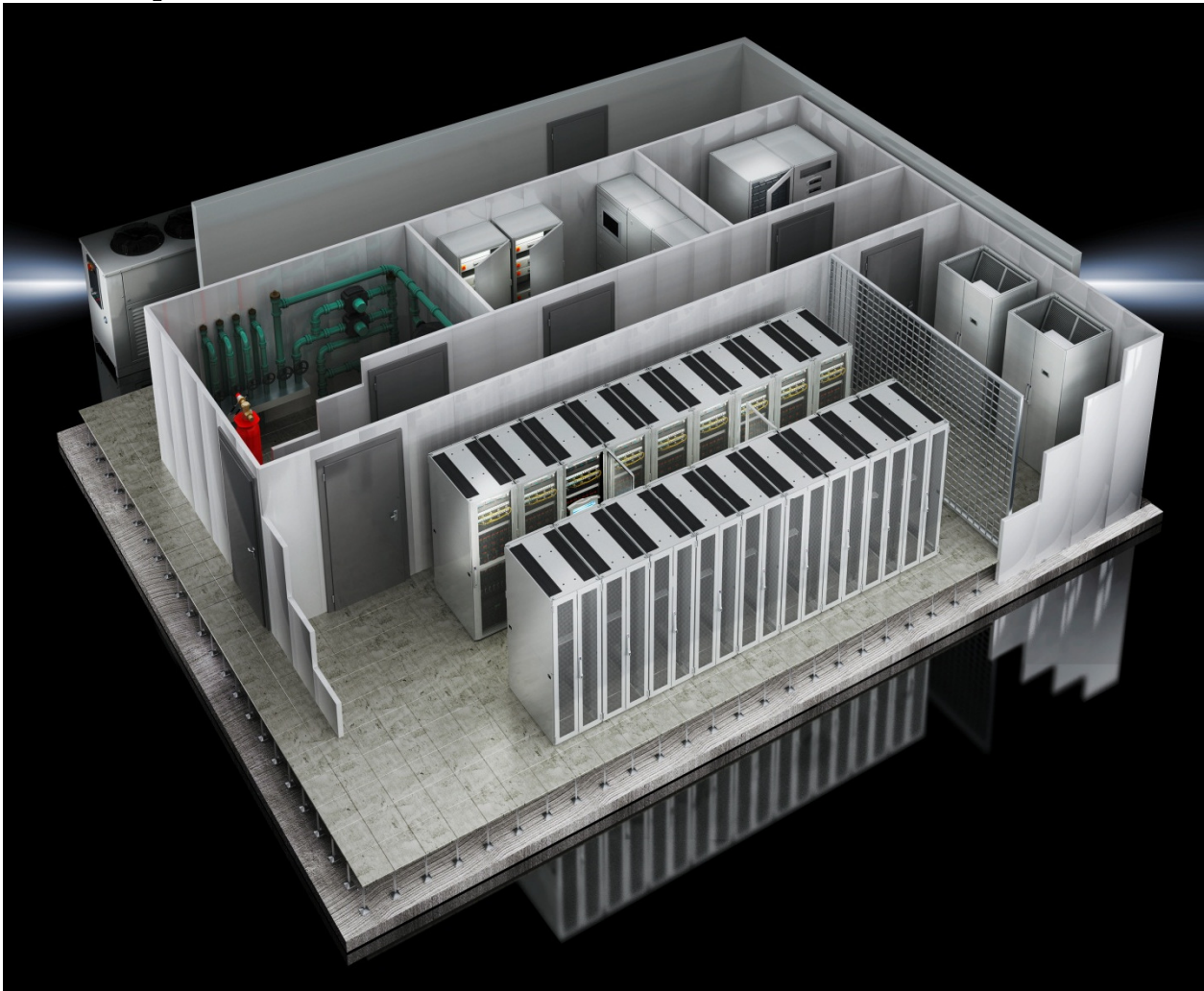
Into the future with intelligent solutions

IT infrastructure: Flexible. Standardised. A perfect fit.

- A smart modular system, from IT rack to full-fledged data centres
- Efficient solutions for rack, suite and room cooling
- High-performance management software (DCIM) with suitable interfaces
- Online tools facilitate selection



Disponibilità, scalabilità, efficienza



Disponibilità

- Component reliability
- Redundancy
- Location security
- Physical security
- System integrity
- Absence of SPoF
- Infrastructure & Staff
- Control


Scalabilità

- Scalable investments
- Capacity management
- Relocation

Efficienza

- Component efficiency
- System efficiency
- OPEX control


Disponibilità, scalabilità, efficienza




UPS systems
1-18 kVA, 1-phase
10 – 960 kW, 3-phase



Power distribution
Fully wired and
contact hazard proof



IT recooling systems
Holistic solutions for
IT cooling




Pipework
Optimum
design




Security rooms
Protection against a
large number of physical
hazards



RiZone
Manages and monitors the
entire data centre



**Room, raised floor,
rack cooling**
Individual cooling
concepts



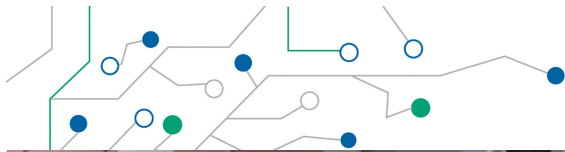
Server racks
A large range
with comprehensive
accessories



Network enclosures
Network enclosures
IT wall-mounted
enclosures



**Sensor network
monitoring**
Optimum availability
& transparency



Low-voltage main distributor

- Busbar systems up to 5,500 A for individual configurations
- Integrates measuring systems for different works

Power back-up with the UPS

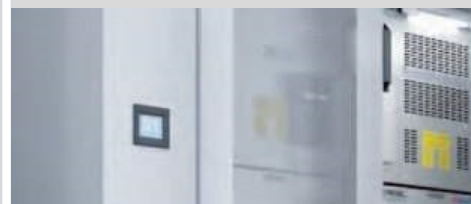
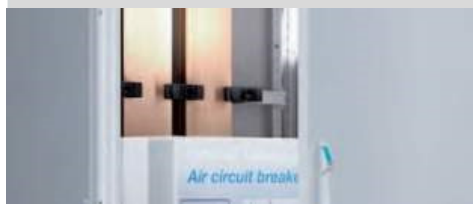
- Rack-mounted, modular design
- Scalable up to 960 kW
- Highly efficient, with 95% energy conversion efficiency in the partial load range already

Power sub-distribution

- Modular construction; can be extended with the system operational
- Phase current up to 250 A at the input; VDE-certified
- Shock-hazard protected

Power distribution inside the rack

- Plug and play power supply
- Modules with different sockets
- Manageable modules with current measuring and switching functions



POWER: Efficienza e risparmio energetico dei sistemi di alimentazione e distribuzione dell'energia



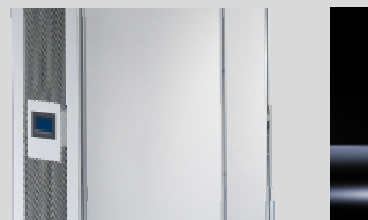
Rack-based cooling

- High-performance cooling with up to 30 kW / rack
- High energy efficiency



Suite-based cooling

- Cooling system integrated into the enclosure suite
- Efficiency can be increased with optional aisle containment systems
- Raised floor not required



Room-based cooling

- Cooling output up to 118 kW
- Efficiency can be increased with optional aisle containment systems
- Optimised energy and room efficiency



IT chiller & Piping systems

- Cooling output from 8.5 to 462 kW
- Redundant pump design
- Optimised COP value
- Inexpensive plastic pipework



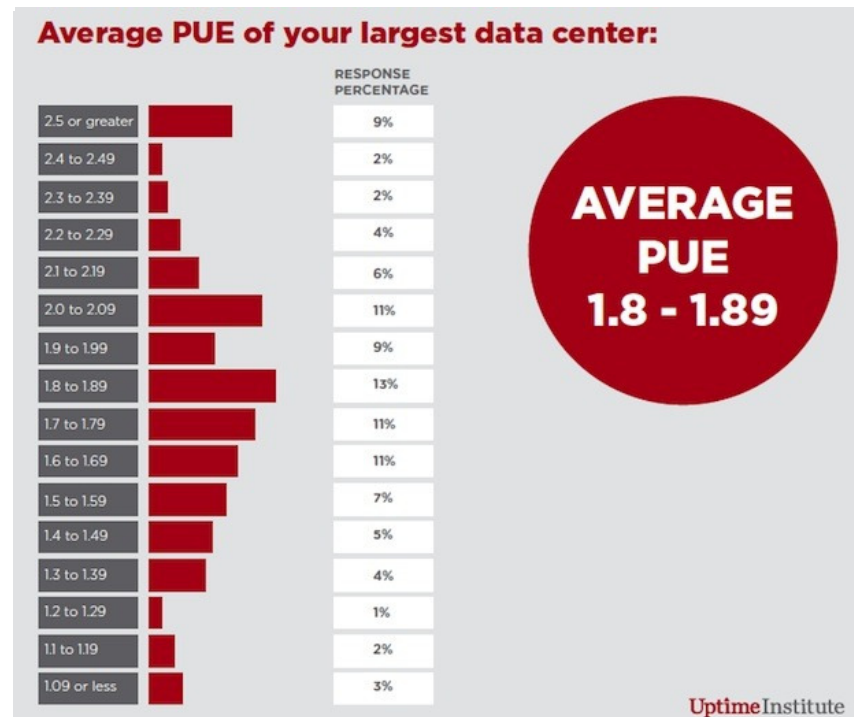
COOLING: Efficienza e risparmio energetico dei sistemi di climatizzazione



► **Efficienza e risparmio energetico**

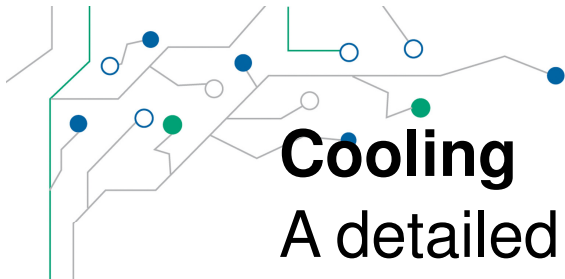
Efficienza Energetica

- **PUE** è una metrica standard per il calcolo dell'efficienza energetica.
- La media attuale (secondo Uptime Institute) è compresa tra 1,8 e 1,89



$$\text{PUE} = \frac{\text{Total Facility Power}}{\text{IT equipment power}}$$

Fonte: © Uptime Institute



Cooling

A detailed view ...



Cooling

Room Cooling

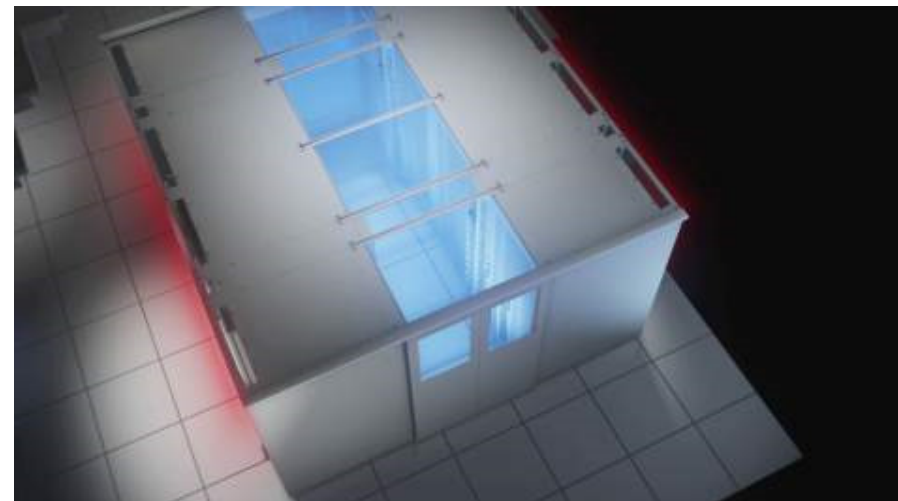
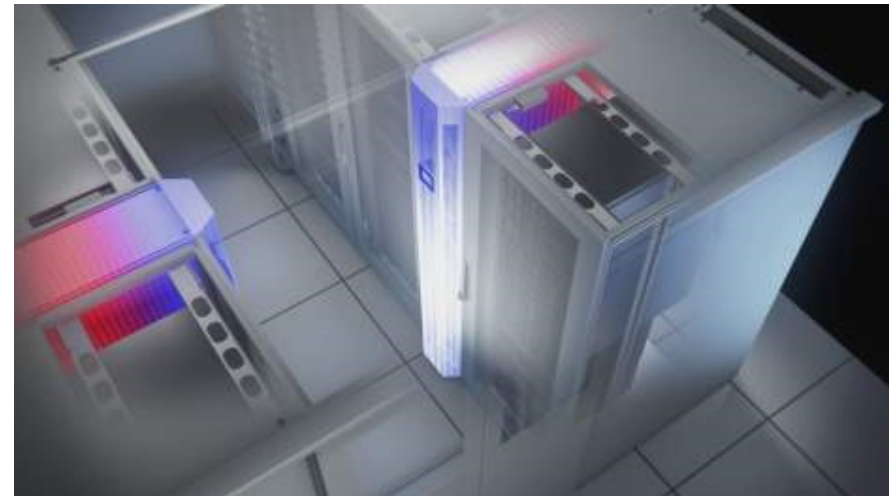
- Room Cooling:
 - CRAC
 - Chilled water supply
 - Raised floor, perforated tiles
 - Aisle containment
 - For low power consumption per rack (<4 kW)
- Principle:
 - Cold air moves under the raised floor
 - Perforated tiles and perforated server doors
 - Warm exhaust air at rear door
 - CRAC unit takes in the warm air
 - An heat exchanger cools down the air
 - Circulation starts again



Cooling

Row Cooling

- Row Cooling:
 - Heat Exchanger inside rack row
 - Chilled water
 - No raised floor
 - Aisle containment to separate warm from cold
 - Mid range power consumption (<15 kW)
- Principle:
 - Cold air blown in the cold aisle
 - Perforated server doors
 - Warm exhaust air at rear door
 - Heat exchanger takes in warm air
 - Circulation re-starts

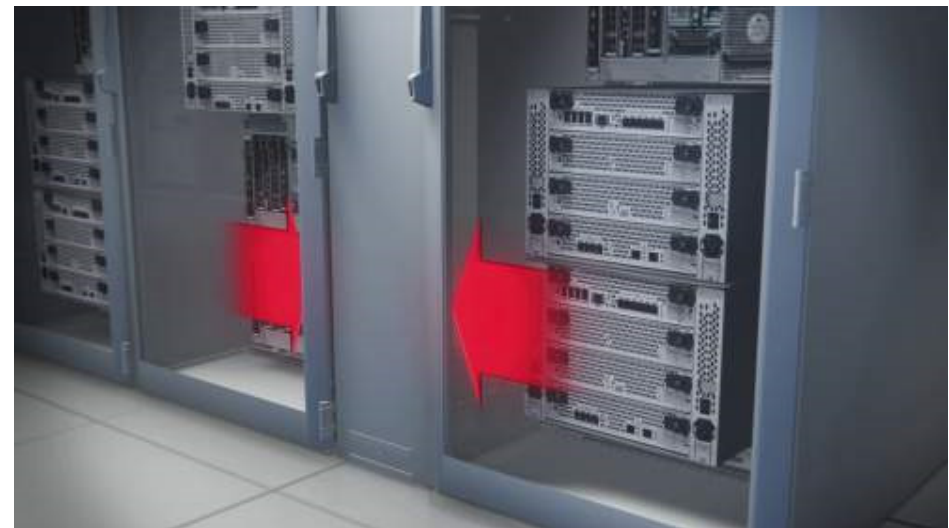




Cooling

Rack Cooling

- Rack Cooling:
 - Heat exchanger in row of racks
 - Dedicated to one or two racks
 - No raised floor
 - No aisle containment
 - Glas doors
 - High power consumption (>10 kW)
- Principle:
 - Cold air blown behind glas door in front of the servers
 - Warm exhaust air at backside of servers but inside rack
 - Exhaust air will taken in by heat exchanger
 - Circulation re-starts





Soluzioni a confronto

100kW a Milano, esp a 200kW	Tipo di soluzione	PUE (*)	Costo annuo (0,13 €/kWh)	Risparmio vs. CW 7°C	Risparmio vs DX
Soluzione DX	Raffr. ambientale	1,43	162.848,88 €		
Soluzione CW (T_w=7°C)	Raffr. Ambientale	1,41	160.456,20 €		
Soluzione CW (T_w=15°C)	Raffr. precisione	1,29	147.802,20 €	126.540,60 €	150.462,50 €
Soluzione CW (T_w=18°C)	Closed loop	1,27	144.943,00 €	155.132,00 €	179.053,90 €

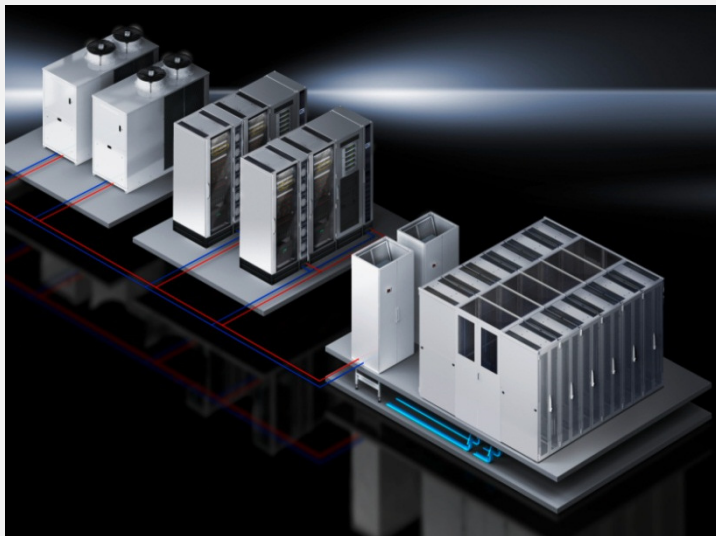


► Il nuovo paradigma del DataCenter

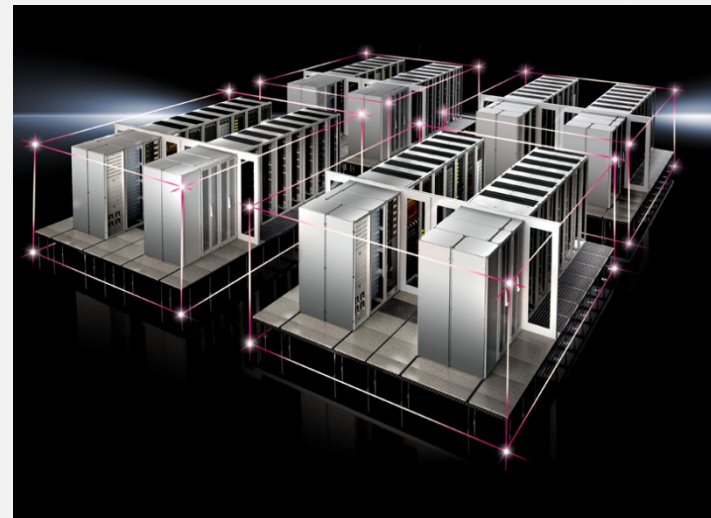
La standardizzazione rende il Data Center più efficiente, più flessibile e più competitivo

Data Center solutions (I)

Component-based Data Center



Module-based Data Center



Quattro possibili configurazioni

Single6, 60 kW, N+1

Double6, 120 kW, 2(N+1)

Single9, 90 kW, N+1

Double9, 180 kW, 2(N+1)



- **Tecnologia innovativa rispetto ai DC individuali**



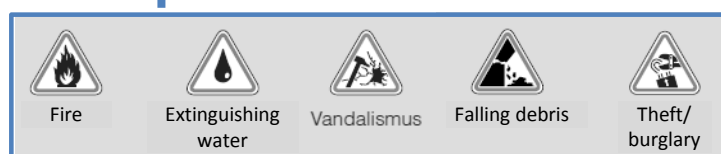
Realizzazioni con tre diversi livelli di sicurezza



Standard room Indoor



Container



Security room

Climate control – ZUCS Zero U-Space Cooling



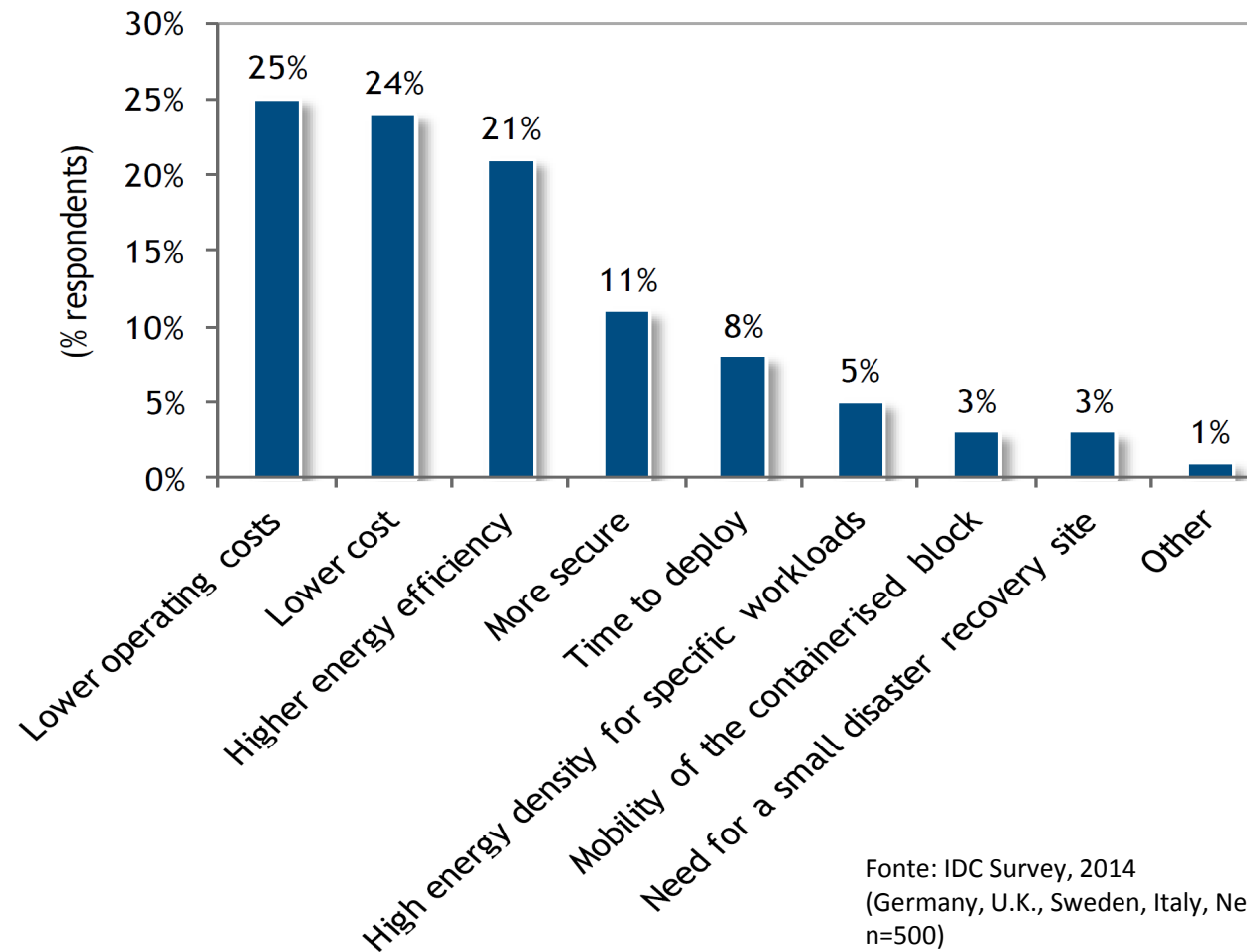
Consistent arrangement of all cooling components in Zero U-Space of the data centre – the raised floor –

no requirement for space on the server surface

Optimum ventilation with minimal redirections that might cause unnecessary pressure loss.

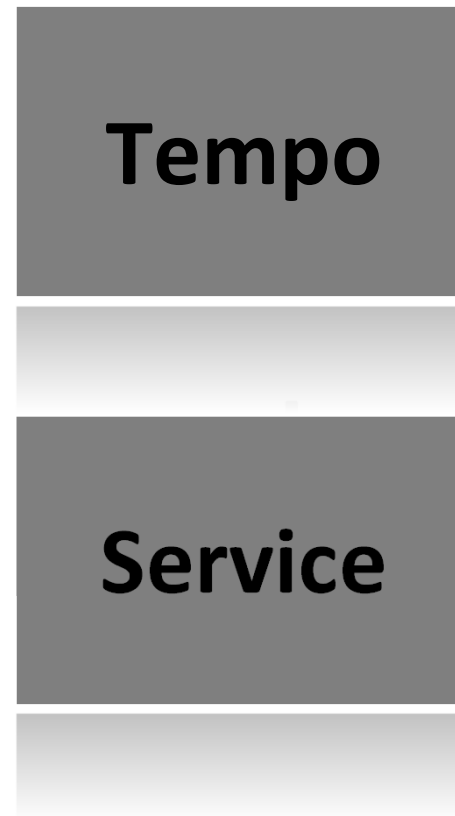
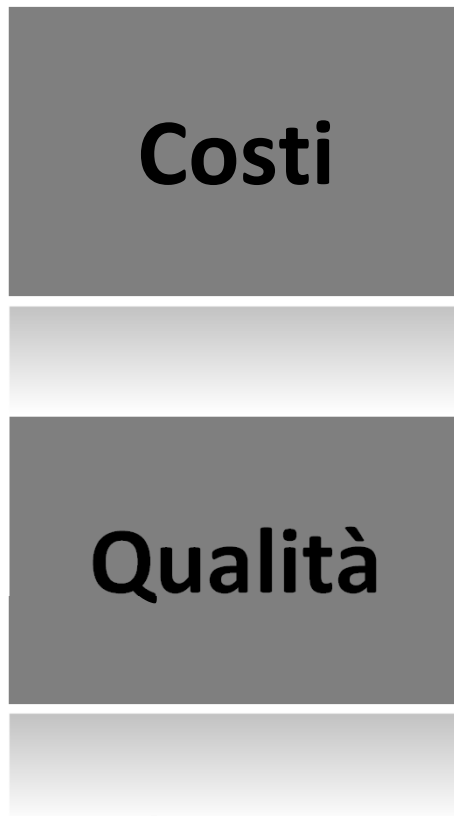
All components are consistently arranged to correspond to physical requirements. They are placed right in the optimum place of the cooling system, surrounding the servers that represent the centre of the system.

Driver per l'adozione di modular DC



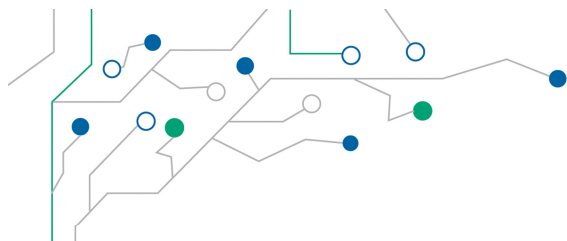


Benefici





PUE = 1,15



100kW a Milano, esp a 200kW	Tipo di soluzione	PUE (*)	Costo annuo (0,13 €/kWh)	Risparmio vs. CW 7°C	Risparmio vs DX
Soluzione DX	Raffr. ambientale	1,43	162.848,88 €		
Soluzione CW (T_w=7°C)	Raffr. Ambientale	1,41	160.456,20 €		
Soluzione CW (T_w=15°C)	Raffr. precisione	1,29	147.802,20 €	126.540,60 €	150.462,50 €
Soluzione CW (T_w=18°C)	Closed loop	1,27	144.943,00 €	155.132,00 €	179.053,90 €
Soluzione modulare standardizzata		1,15	130.961,68 €	294.950,00 €	318.870,00 €



A strong family

The Friedhelm Loh Group – a successful business

11,500
employees worldwide

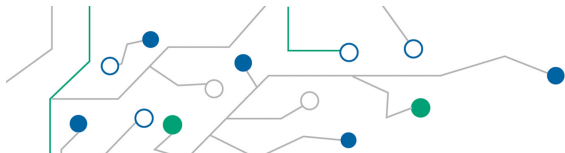
18
production sites



More than
78
int. subsidiaries

2.2 bn
euros turnover

Figures based on 2013



Rittal – The System.

Faster – better – worldwide.

We set standards – RiMatrix S.

Rittal opens up brand new perspectives for the IT world.

- Standardised, mass-produced data centre modules
- Only one item number
- Fully functional including server and network racks, climate control, power distribution and back-up, monitoring and DCIM (Data Center Infrastructure Management)
- Available for immediate delivery

The revolutionary alternative to individual data centre construction:
RiMatrix S





Grazie