NG DataCenters

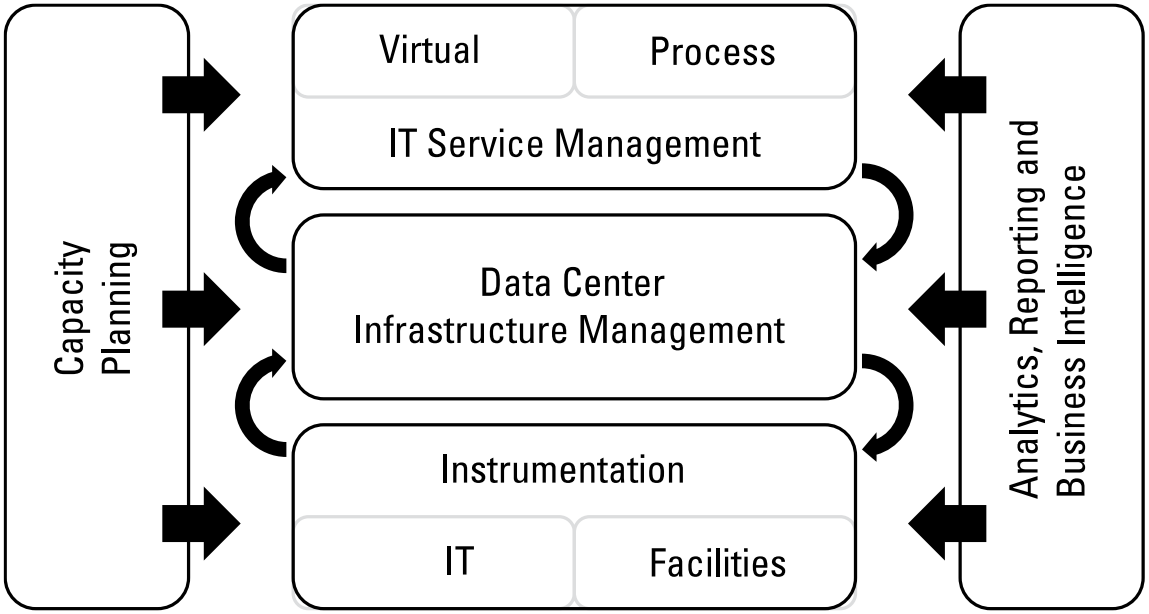
Paolo Caturegli

Maurizio Davini

5 architectural principles for NG DC

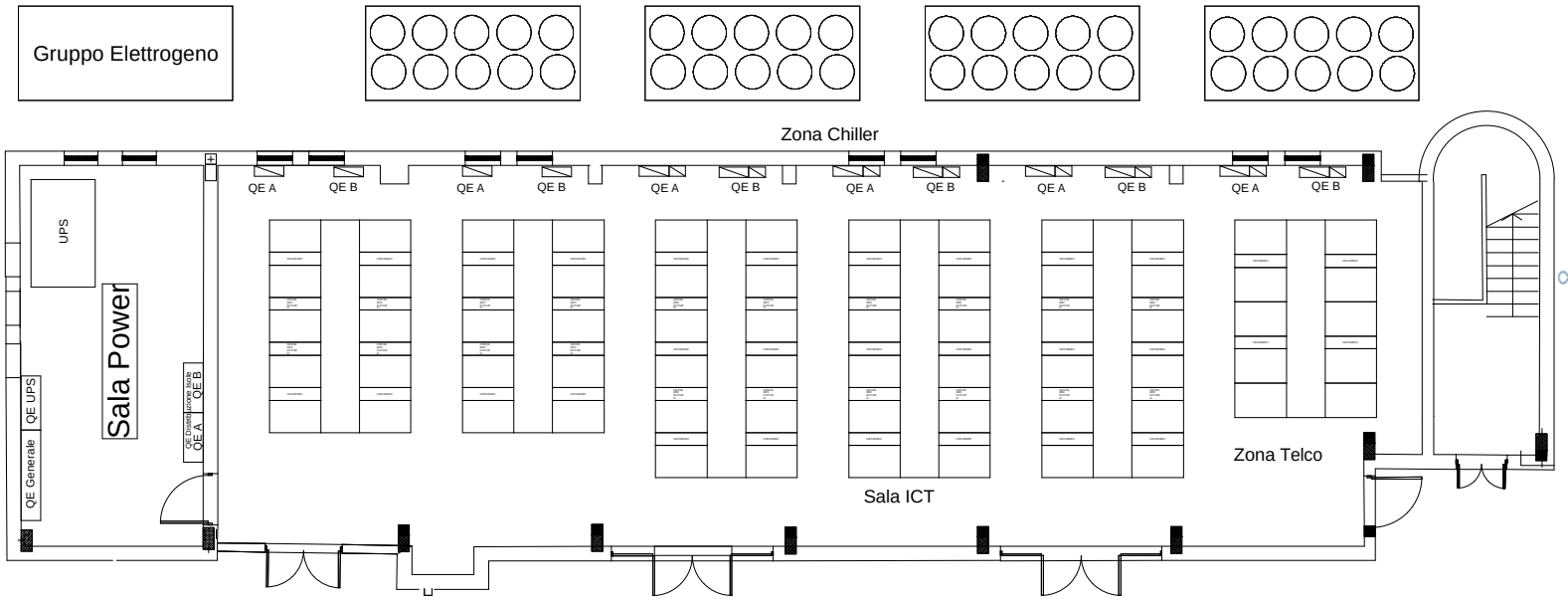
- Scale Out
- Guaranteed Performance
- Automated Management
- Data Assurance
- Global Efficiencies

DCIM : the core



DC SPG IN PISA

DC SPG (floor plan)



Some Numbers

- 250 sm
- 56 Racks
- 5 PODs (mixed use)
- Spine&Leaf network (10,25,100 Gb/s)
- 400 Servers (mixed workload)
- 2 PB storage

Power

- Actual power supply installed:
- 630KVa MV transformer (500KW) max power
- 2 UPS 200KW each A and B independent supply lines Vertiv EXL
- 11 to 15KW per rack power supply
- 500 KW GE as power backup
- All power switches and panels are monitored and mounted on brackets for easy maintenance and replacement

Cooling

- Actual chilling power installed:
- 3 by 170KW Adiabatic Chillers Vertiv FGA017
- 24 In-Rows by 30KW Vertiv CRV060
- Eco fans (magnetic not bearing) chillers and In-Rows
- Space to double number of in rows in any pod
- All controlled by integrated software with pro-active features (Trellis)

Telco Facts

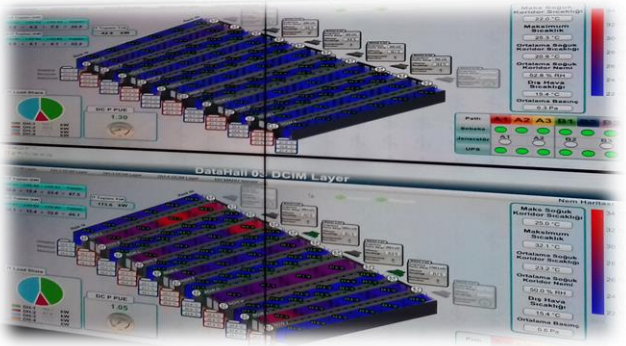
- 250 smf connect the DC in a ring (N-S) to the rest of the UniPI MAN
- A dedicated ring interconnects 3 DCs via 40 and 100Gb links
- MUX interconnect 10 and 100Gb link on a single SMF link
- Any rack connected by 12E and 12W OM4 MM fibers for redundancy and resiliency in high capacity PP (144 by 1U)

GREEN DC

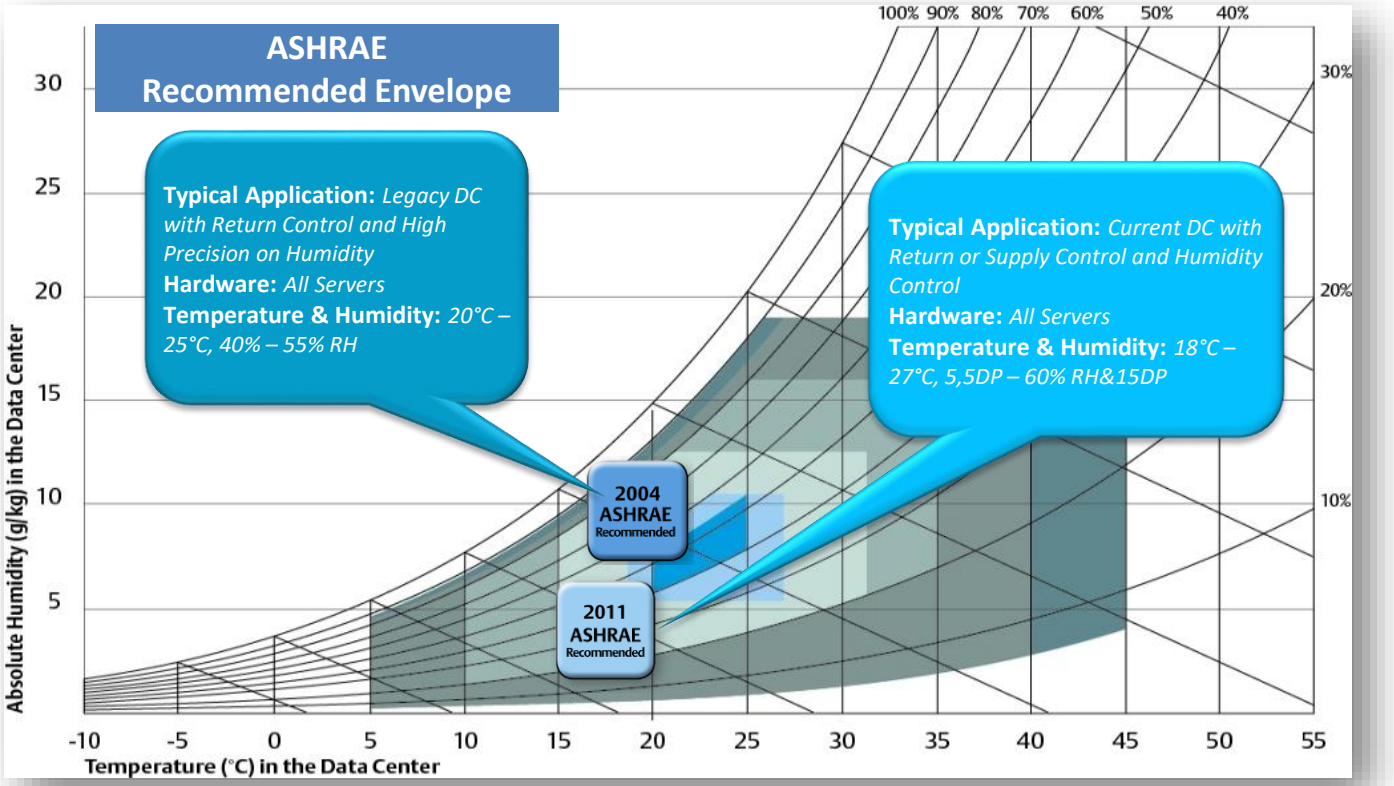
Additional Notes

TWO STEPS FOR EFFICIENCY IMPROVEMENT

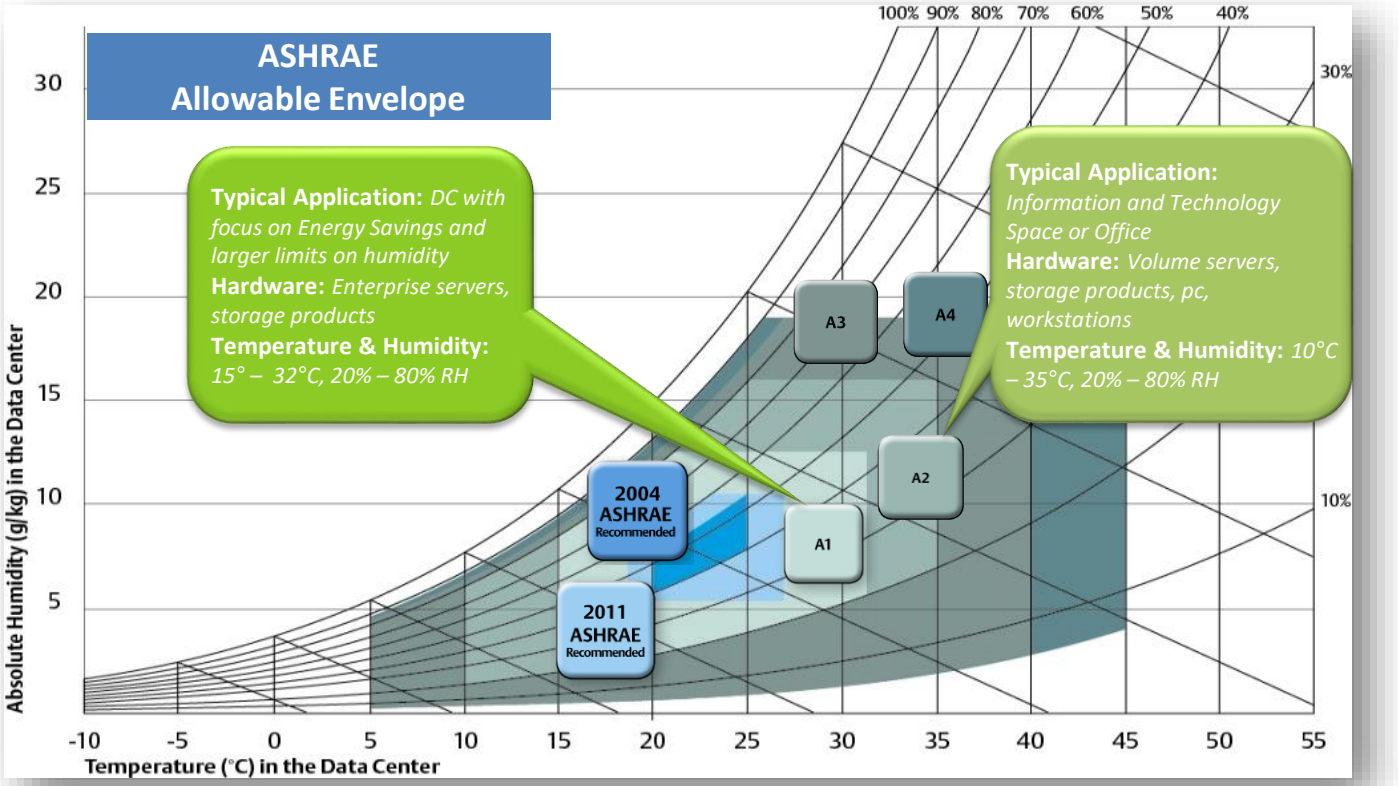
- **Increase data center temperatures** with supply air temperature (temperature in front of the racks) more close to the limit of the Recommended ASHRAE Envelope and eventually in the Allowable range for few hours in a year.



- **Improve racks containment and the startegy to move just the right quantity of air,** so to increse the return air temperature


ASHRAE
Recommended Envelope
Typical Application: Legacy DC with Return Control and High Precision on Humidity
Hardware: All Servers
Temperature & Humidity: 20°C – 25°C, 40% – 55% RH
Typical Application: Current DC with Return or Supply Control and Humidity Control
Hardware: All Servers
Temperature & Humidity: 18°C – 27°C, 5,5DP – 60% RH&15DP
2004 ASHRAE Recommended
2011 ASHRAE Recommended
100% 90% 80% 70% 60% 50% 40%
30%
20%
10%
Absolute Humidity (g/kg) in the Data Center
30
25
20
15
10
5
-10 -5 0 5 10 15 20 25 30 35 40 45 50 55
Temperature (°C) in the Data Center

DATA CENTER OPERATING THRESHOLDS – NEW APPROACH



Vertiv HPC-S

HIGH EFFICIENCY

The freecooling and adiabatic freecooling operation allows to reduce the annual use of compressors, thus achieving top ef iciency levels.

FREECOOLING

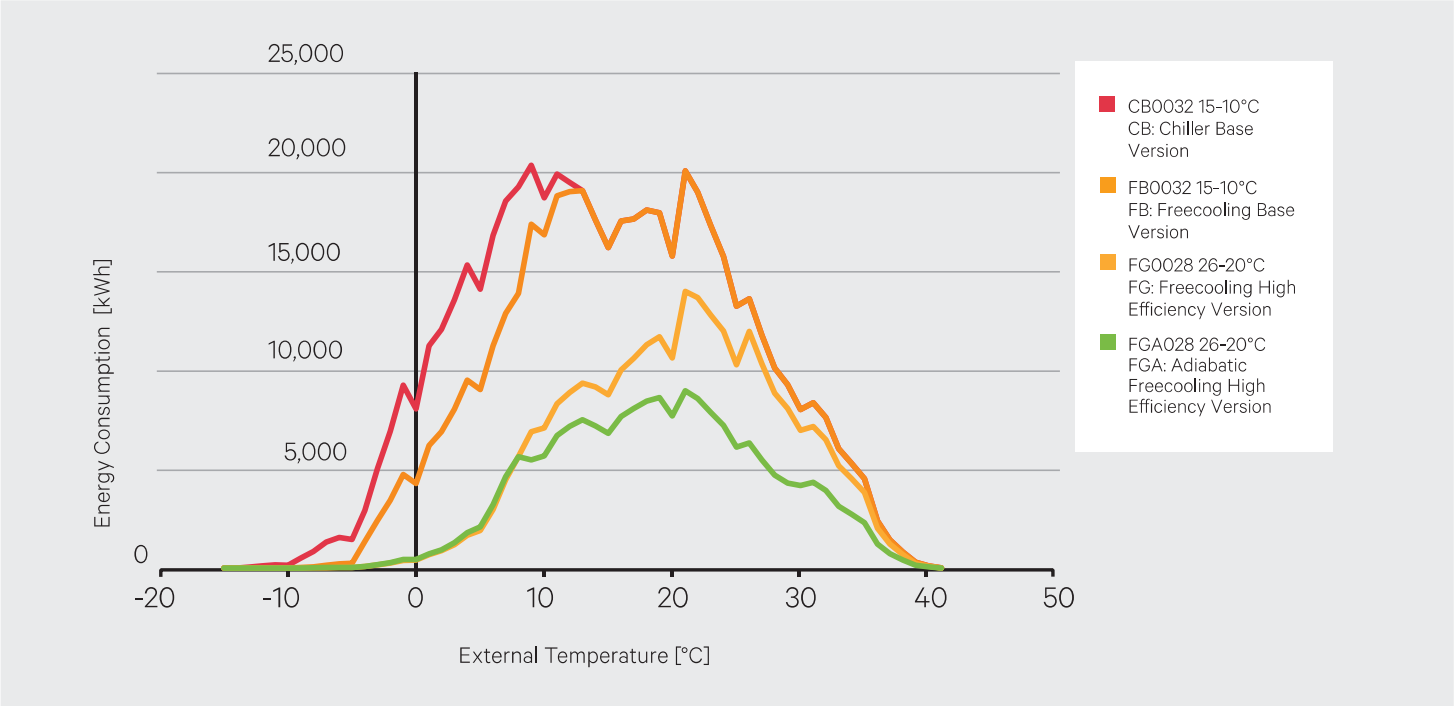
Integrated freecooling section, delivers additional energy savings and greater reliability.

ADIABATIC COOLING

In the adiabatic models, the highly ef icient adiabatic wet pads humidify air entering the freecooling and condensing coils, increase freecooling operation and mechanical ef iciency.

ENERGY CONSUMPTION

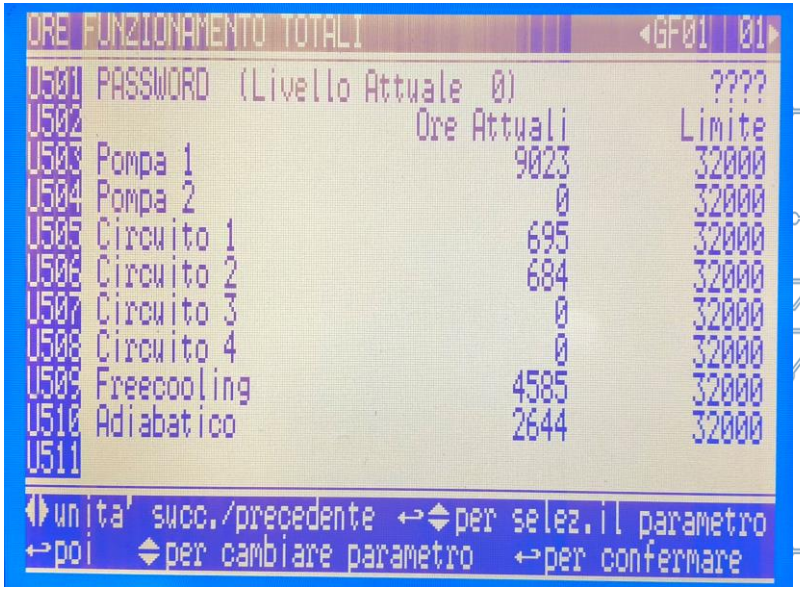
Liebert HPC-S Annual Energy Consumption: A Wide Range of Energy Efficient Solutions



Madrid Climatic Profile with 350 kW Heat Load

DC SPG Results 2017

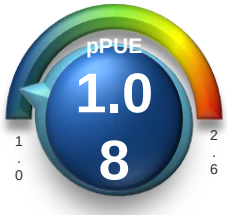
- 53 % Freecooling
- 30 % Adiabatic
- 17 % Compressors



NEXT STEPS ?

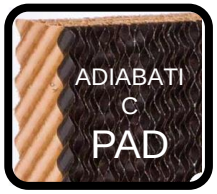
Additional Notes

LIEBERT® AFC – THREE COOLING TECHNOLOGIES IN 1 UNIT

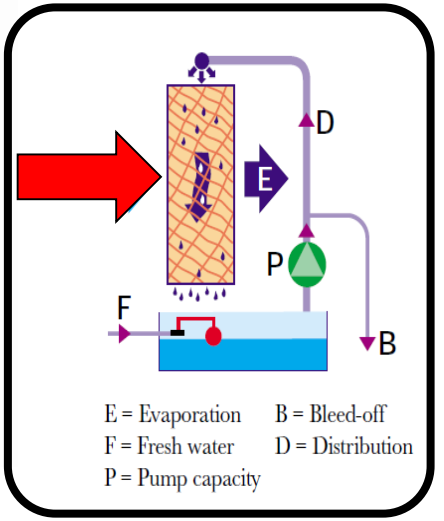


Freecooling

Patent Pending



Adiabatic Cooling



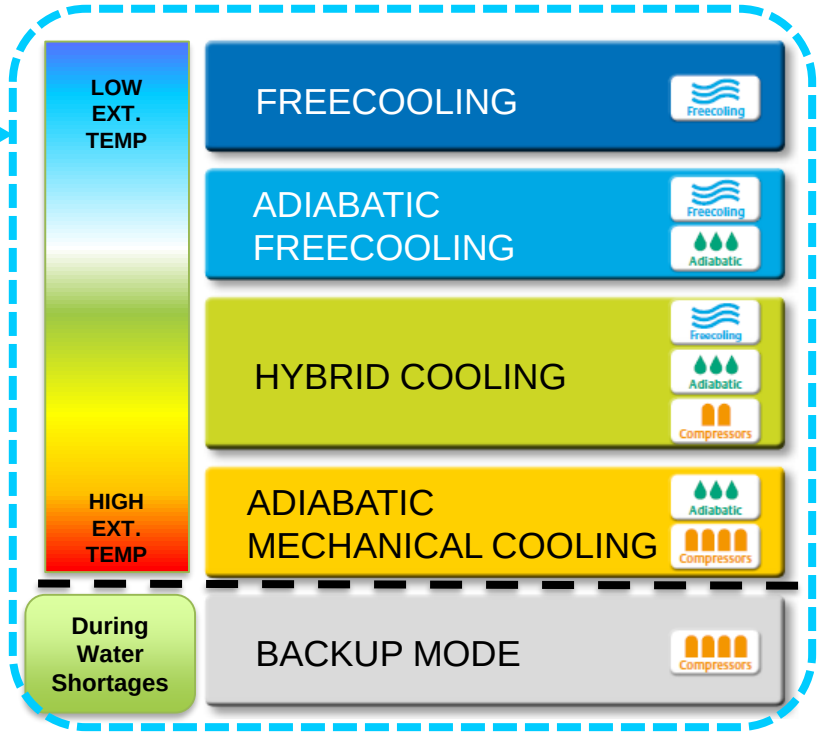
100% Compressor Back-up

Additional Notes

LIEBERT® AFC – MODALITÀ DI FUNZIONAMENTO

- In these high efficiencies units the control function is fundamental. Networking capabilities and algorithms that works in a virtualized environment.

Range
From 200 kW to 1600 kW
50 Hz and 60 Hz



ONE MORE THING….

All success stories in Pisa start here…..