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Hipervisore:

Final

## Energy Efficiency in HPC Data Centers: Latest Advances to Build the Path to Exascale

Gabriel Andres Alzate Acuña

Universidad Distrital Francisco Jose de Caldas

April 21, 2016



## **CECAD**

HPC

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#### El camino a la Exaescala





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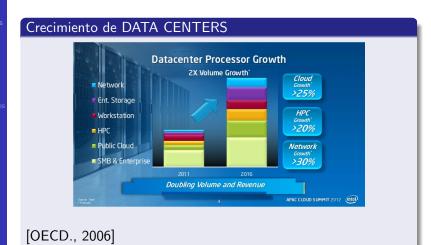
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Requerimiento

Refrigeración

Final





## Retos a EXAESCALA

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## Características de impacto en el rendimiento

- Uso de energía.
- Densidad de área.
- Kilovatios por metro cuadrado.



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Requerimientos

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#### Requerimientos de Exaescala **Exascale Requirements** Petascale Machine of 2010: TFLOP of Compute Exascale TFLOPS Compute 40x Memory 75X Comms 20x 100W Disk/Storage 33x 100W Other 900x 150W 200W Visceral Focus on System Power Efficiency Improvement [OECD., 2006]



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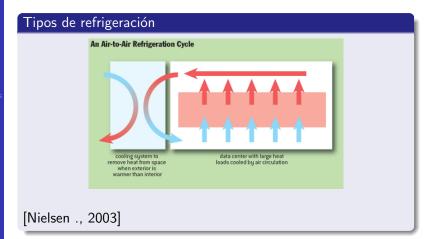
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Requerimiento

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Tipos de refrigeración server racks with hot (outflow) and cold (inflow) server server server server server server corridors rack rack rack rack rack rack between heat each row exchange with exterior cooling system below the floor [Nielsen ., 2003]



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## Tipos de hipervisores

## Tipos de hipervisores

Nativo



- VMware ESXi (gratis)
- Parallels Virtuozzo
- ·Citrix XenServer (gratis)
- •Microsoft Hyper-V Server (gratis)

Hosted



· Oracle VirtualBox (gratis)



Hipervisores

### Rendimiento de hipervisores

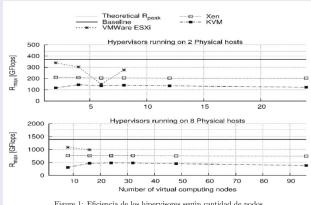


Figure 1: Eficiencia de los hipervisores según cantidad de nodos

[Samee U. Khan, 2006]



## Final

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Conclusiones

## Conclusiones

### **CONCLUSIONES**



# Bibliografía

**HPC** 

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