

Initial cost findings..

- State-of-the-art review:
 - Prices for core/hour ranges from:
 - ~ € 0.015 (Magellan report) to ~ € 0.04 (University of Washington) in the US*;
 - ~ € 0.075 in the UK (Hawtin et al. 2012 for JISC)*
 - ~ € 0.09 for a sample of EGI centres in Europe (e-IRGSP2 in 2009)
 - e-FISCAL in-line with the rest of the studies:
 - Median € 0.05 in 2010 and € 0.0337 in 2011
 - Average: € 0.10 in 2010 and € 0.08 in 2011
- ➔ Centralised large HPC center personnel costs < distributed ones

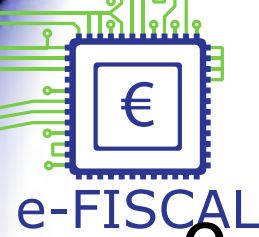
*All the exchange rates are recent i.e. beg. of June 2012

More findings

- Observation and metrics...:
 - Significant **differences between median and averages**
 - Indicate outliers in the sample (low or high numbers) – to be studied!
 - **Costs decreasing** from 2010 to 2011
 - in-line with lower h/w prices and better efficiency
 - **CAPEX/OPEX ratio**: in 2011 around 30%-70% (median) to 32%-68% (average)
 - ~50-55% of total costs is dedicated to **personnel costs**
 - Average/median **utilization rate** for 2011: 58% & 67%
 - Mixture of EGI, PRACE and other sites
 - E.g. for 2011, EGI reports a utilisation rate of 71,3%.
 - **Depreciation rates** for computing: average 5 years
 - Quite good rates of **PUE**: 1.5 median value
 - Percentage of **electricity cost**: around 15% of all costs (median value)

Other considerations

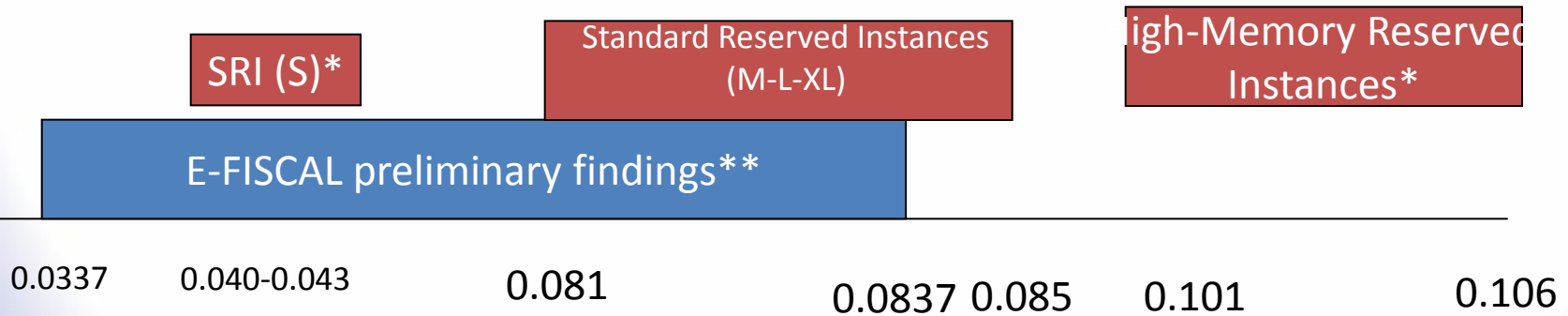
- Vague separation between HPC and HTC systems
 - limited difference between near end-of-life HPC systems compared with newer high-end HTC ones
- Physical vs. logical core issue identified
 - Hyperthreading (in most cases): logical cores=2x physical cores



A high level comparison

e-FISCAL vs Amazon reserved instances

Comparison with reserved instances as less costly solutions compared to “on – demand” instances (all amounts in €)



*Cost for 3-year reserved instances/hour transformed in €/logical CPU hour (equivalence based on instance characteristics) Based on windows/EU-Ireland/80% -100% usage of reserved instances. Amazon site accessed on 22/5/2012

**Cost per logical CPU/hour €/logical CPU hour (2011)

No performance adjustment has been performed YET