High Cost of ESL Design

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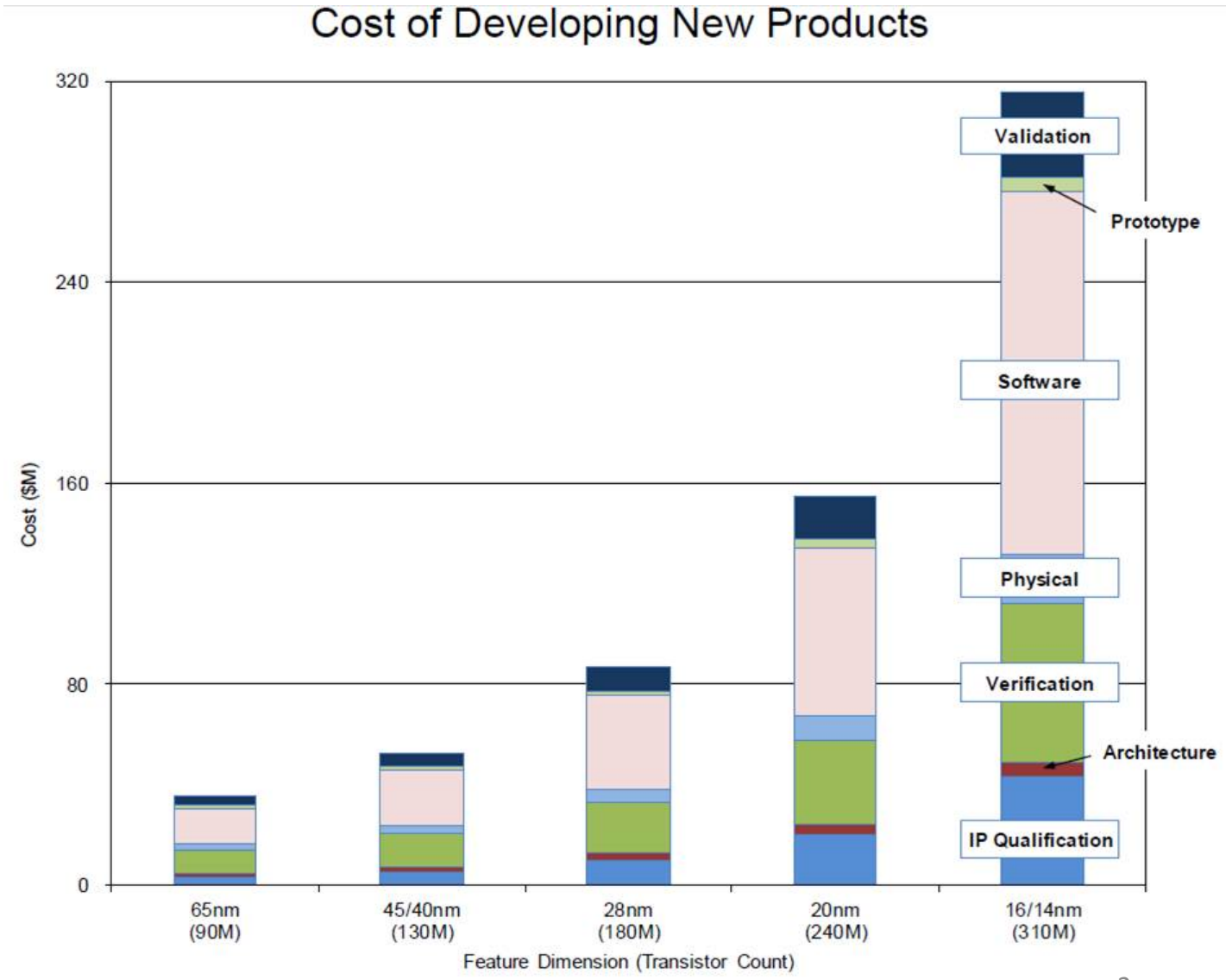
How much will that Chip Co$t?

- New SoCs will cost ~$300M
  - Lower for derivatives
  - Reusable IPs
  - Think Pre-Si Platforms
- Shift left does
  - Reduce costs and TTM
- Can we move Pre-Si platforms to Cloud?



Source: http://semiengineering.com/how-much-will-that-chip-cost

NIST Definition for Cloud Computing

NIST Special Publication 800-145

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics**,** three service models, and four deployment models.

- **Five Essential Characteristics:**
  - *On-demand self-service*
  - *Broad network access*
  - *Resource pooling*
  - *Rapid elasticity*
  - *Measured service*

- **Three Service Models:**
  - *Software as a Service (SaaS)*
  - *Platform as a Service (Paas)*
  - *Infrastructure as a Service (IaaS)*
- **Four Deployment Models:**
  - *Private cloud*
  - *Community cloud*
  - *Hybrid cloud*

How can Cloud help here?

- Cloud Computing (CC) refers to
  - Providing IT Services, Applications and Data
  - Using dynamically scalable pool(s),
  - Remotely residing Resources
- CC provides financial benefits to users and providers
- CC amplifies Information security issues

Are we there yet?

EDA not yet ready for cloud computing

Rick Merritt

2/2/2011 9:32 PM EST

SANTA CLARA, Calif. – Big EDA companies have their eyes on cloud computing, but their feet are still on the ground, according to a panel discussion at DesignCon here.

DAC Panel: A Reality Check On Cloud Computing For EDA

By Richard Goering on June 23, 2010

Comments(2)

Filed under: Industry Insights, DAC, SaaS, Hosted Design Solutions, Xuropa, Amazon, cloud, Kuehlmann, cloud computing, Griffith

Does IC design have a future "in the clouds?" Yes, according to panelists at last week's Design Automation Conference - but selectively, over a period of time. As attractive as cloud computing is, there are still technology challenges and tradeoffs, and the EDA licensing model for cloud computing has yet to be resolved.

What do you think is the future of EDA in Clouds?

HPC in the Cloud >> Around the Web

February 03, 2011

Cloud Still Lofty Concept for EDA Execs

Nicole Hemsoth

To be or not to be in the Clouds?

EDA in Public Cloud Situation

- All EDA tools are NOT available in public clouds
- Design houses may already have
  - captive Data-centers
  - EDA licensing agreements
  - IP placement concerns
- Enough barriers to move an entire design to Cloud
  - That none exists today

EDA in Private Clouds

- Several large companies have already converted their DCs to become like internal clouds
- Design teams simply submit jobs, without knowing which server these would run on
- Most Tools and flows already running on Xeon servers, FPGA farms and Emulation clusters

Logical Next Steps

- Expand the concept of Private clouds to reach public clouds
  - To minimize job queues
  - To minimize design costs
- Expand the concept of Public Clouds to include
  - All kinds of ESL platforms

Related CC Problems

- Access Control
  - Who can rightfully access a platform in the Cloud
    - CC allows sharing of the same platforms between multiple users
      - May compromise the integrity of run-time programs
      - How to ensure a timely completion of jobs?
      - Who is using the EDA license installed in the Cloud?

- Secure Communications
  - Data transfer via open channels
    - Large amounts of files transferred over public nodes
    - Large Transfer time will increase customer cost

- Data Protection in Public Cloud
  - Design IP theft
    - Fake login or indirect access
    - Unauthorized access in a 3rd party data-center
  - Erasing footprints after the job is done, e.g., tax data on old disk drives
  - Overdoing the security so it comes in the way of cost & performance

References

1) A cross section of the issues and research activities related to both information security and cloud computing by Naresh K. Sehgal; Sohum Sohoni; Ying Xiong; David Fritz; Wira Mulia; John M. Acken; IETE Technical Review (Institution of Electronics and Telecommunication Engineers, India). 2011;28(4):279-291.

2) Cloud Workload Characterization, IETE Technical Review, 2013, Volume 30, Issue: 5, pages 382-397,, by Wira D Mulia[1], Naresh Sehgal[2], Sohum Sohoni[3], John M Acken[1], C Lucas Stanberry[1], David J Fritz[1]

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Backups

Information Security and Cloud Computing

EDPS 2011 Presentation

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Optimizing a Cloud with SLAs and QoS

EDPS 2012 Presentation

April 5, 2012

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HPC in Cloud

EDPS 2013 Presentation

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