# IA Virtualization for EDA

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## Agenda

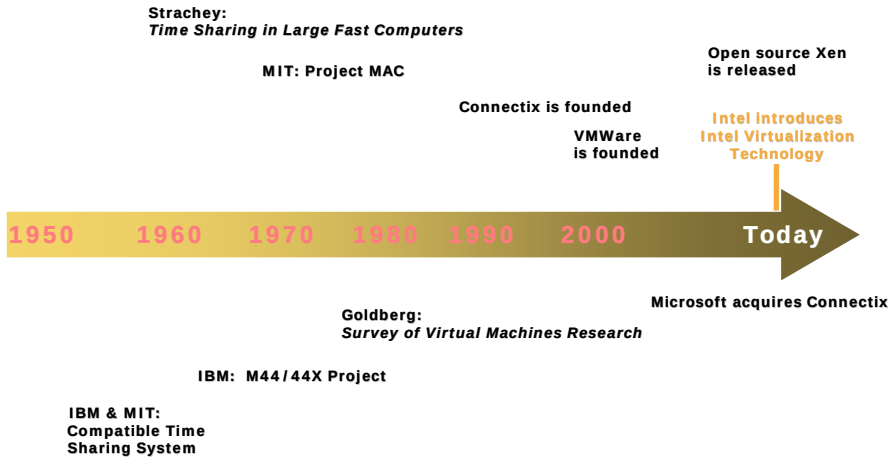
- Virtualization Background
- Client and Server usage models
- Applications of Virtualization in EDA
- Intel's Virtualization Technology
- Summary

## How long has virtualization been around?

1. Recent development: ~5 years
2. A while: 10 years
3. Older than Microsoft: 30 years
4. A lot longer…..>40 years

Would you believe ~45 - 50 years?

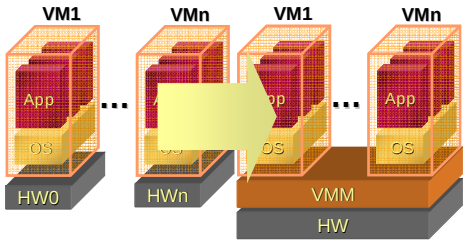
## Virtualization



# Today's Uses

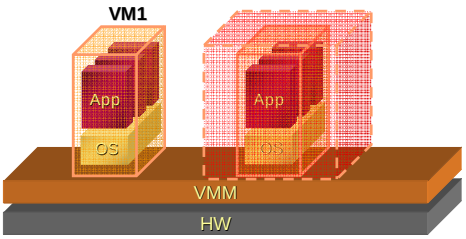
## Virtualization addresses today's IT concerns

### Server Consolidation




10:1 in many cases

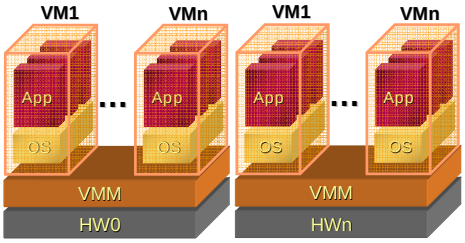
### Test and Development



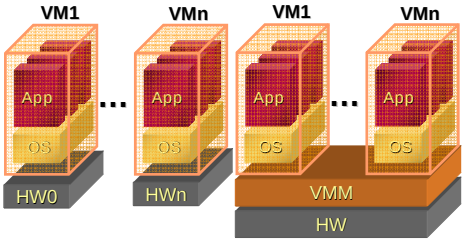

Enables rapid deployment

# Emerging Usage Models

### Dynamic Load Balancing




### Disaster Recovery




**Goal: True "Lights Out" Datacenter**

**Instantaneous failover**

**Dynamic load balancing**

**Autonomics**

**Self healing**

## Applications for EDA Industry

- Porting CAD tools across different OSes
  - While running on the same machine
  - And comparing GUIs on the same monitor
- Consolidating different applications on one machine
  - Protected from each other in different Virtual Machines
  - Give legacy tools their own OS, no need to port
- Provide failover reliability for critical tasks

*EDA can consume multi-core processing power*

## Virtualization Challenges

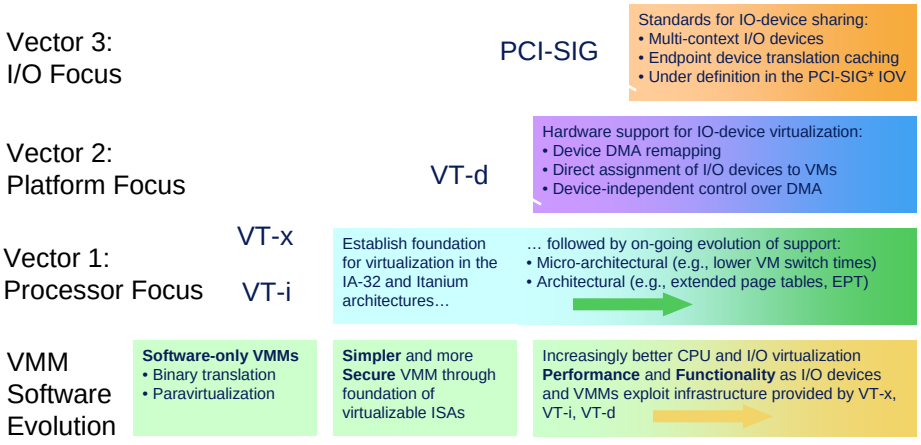
- Complexity
  - CPU virtualization requires binary translation or paravirtualization
  - Must emulate I/O devices in software
- Functionality
  - Paravirtualization may limit supported guest OSes
  - Guest OSes “see” only simulated platform and I/O devices
- Reliability and Protection
  - I/O device drivers run as part of host OS or hypervisor
  - No protection from errant DMA that corrupts memory
- Performance
  - Overheads of address translation in software
  - Extra memory required (e.g., translated code, shadow tables)

# Intel® Virtualization Technology (VT)

**Provides silicon-based functionality that works *together* with compatible VMM software to provide new capabilities**

- **Enables richer software capabilities**
  - **64-bit guest OS support in virtualized environment**
  - **Support for unmodified, heterogeneous guest operating systems to run on new VMM's**
- **Common virtualization standards from client to servers**
- **Broad availability of both client and server platforms since November 2005 for accelerated software development**

# Intel® Virtualization Technology Evolution



# A Better Platform for Virtualization

- **First to Market & Massive Ecosystem Support:**
  - **Choice**: Broadest virtualization software support in the industry
    - **Robust**: First x86 hardware assisted virtualization technology (Intel VT)
    - **Innovation**: common specification = enhanced virtualization on x86 and will set the standard
    - **Flexibility**: Leverage Intel® Xeon® processor-based servers widely deployed infrastructure for advanced failover and dynamic load balancing
- **Better Platform Reliability:**
  - Critical for more applications on the same server
  - More reliability features
  - Proven Platform Architecture - almost 40X more IA based servers than AMD based since 1996[1]


- **Performance Headroom**
  - Intel® Xeon® processors have **key performance features** for virtualization: dual-core, hyper-threading, I/O, memory, and larger caches

# Intel: Transforming Virtualization from Mainframes to Mainstream

- Providing balanced platform solutions that delivers CPU, memory, I/O and advanced technology support for Client and Server Virtualizations
- Supplying the most reliable, thoroughly validated & widely deployed Virtualization platforms available in the market
- Working with the industry to build a vibrant ecosystem and build solutions to enhance computing efficiency