SpotCheck: Designing a Derivative IaaS Cloud on the Spot Market
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**IAAS CLOUDS**
- Infrastructure as a Service (IaaS)
- Examples: Amazon EC2, Google Compute Engine, Rackspace
- IaaS rents out physical or virtual computing resources

Cloud servers have different costs and availability tradeoffs:
**On-demand Servers:**
- Fixed price per unit time
- Non-revocable

**Spot Servers:**
- Variable prices based on market conditions
- Revocable ⇒ lower availability
- Prices tend to be lower than On-demand servers
- Allow cloud provider to sell surplus capacity

**PROBLEM STATEMENT**
Run interactive applications on mix of Spot & On-demand servers

**SPOT INSTANCES**
- 2nd price auction determines spot price
- (Spot price > Bid) ⇒ termination
- Small termination warning (~2 minutes)

**OUR SOLUTION: DERIVATIVE CLOUDS**
- System to manage mix of spot and on-demand instances
- Intermediate layer between users and IaaS cloud provider
- Provide similar interface to users as provided by IaaS (Virtual Machines)
- Transparently migrate VMs between pools

**OUR SYSTEM: SPOTCHECK**
SpotCheck : derivative cloud on spot and on-demand instances
1. Ability to run interactive, disruption-intolerant applications
2. Not lose application state
3. Provide servers to customers at low cost
4. Not adversely impact application performance

**BOUNDED TIME VM MIGRATION**
**Bounded time migration : VM migrates within specified time**
1. VM dirty memory pages transferred to a backup server continuously, incrementally, and asynchronously
2. Backup server able to support multiple (~50) VMs
3. Memory checkpoint *lazyly* restored from backup server if spot instance terminates — fetch page on first access

**AVAILABILITY**
- Unavailability is due to migrations from spot to on-demand
- Small downtime (~20 seconds) during migration
- Due to latency of IaaS operations detaching & reattaching network & storage

**COST**
Expected Cost = 0.2 × On-Demand = $0.014 / hour
Save 80% on your EC2 bill

**PERFORMANCE & SCALABILITY**

**Spot instances are really cheap!**