Cloud Computing

RTS Technical Colloquium 2010

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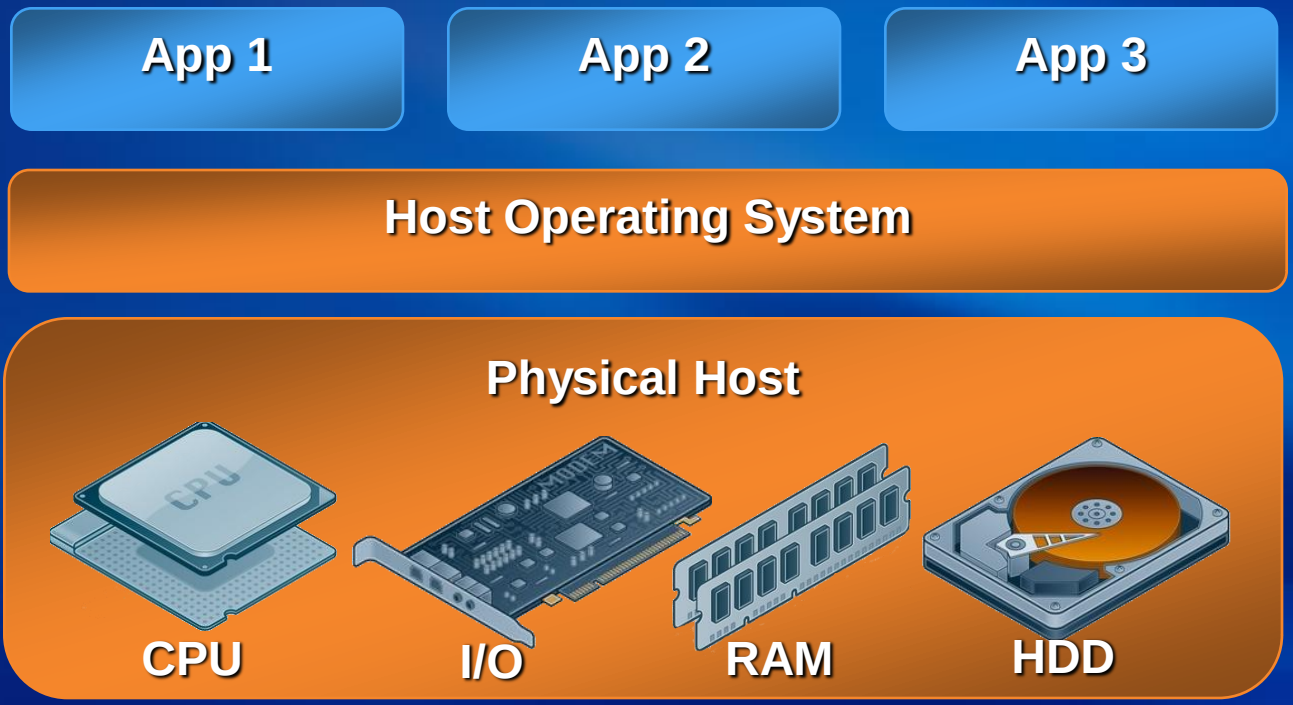
Introduction

- Virtualisation
- Can it work for Broadcasters
- Moving to the Cloud
- Recent Events and Cloud Enablers
- Current Applications in Broadcast
- Redundancy & DR
- Systems Integration of Cloud Systems
- Future Developments & Gap Analysis
- Conclusions & Questions

What Is Virtualization?



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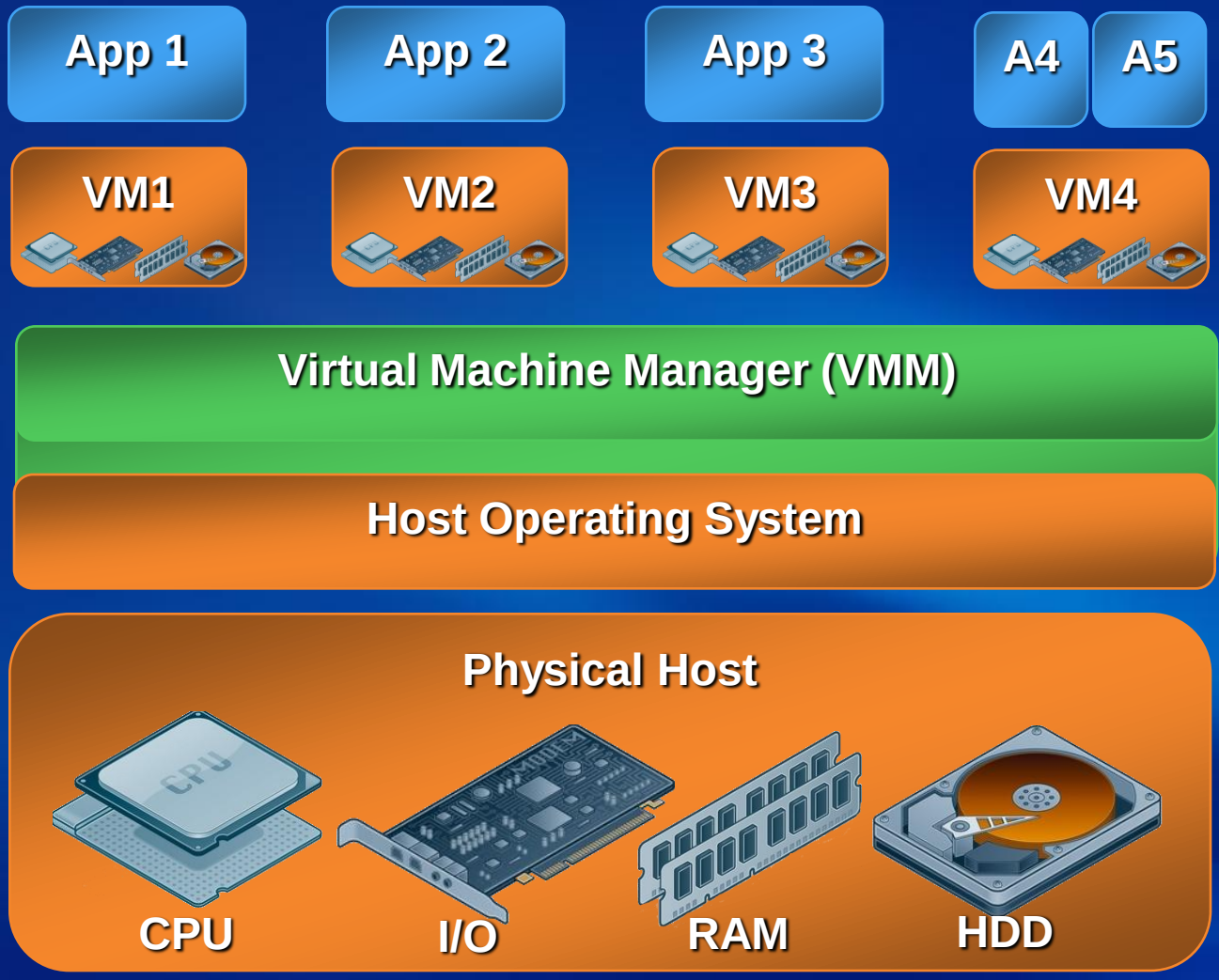

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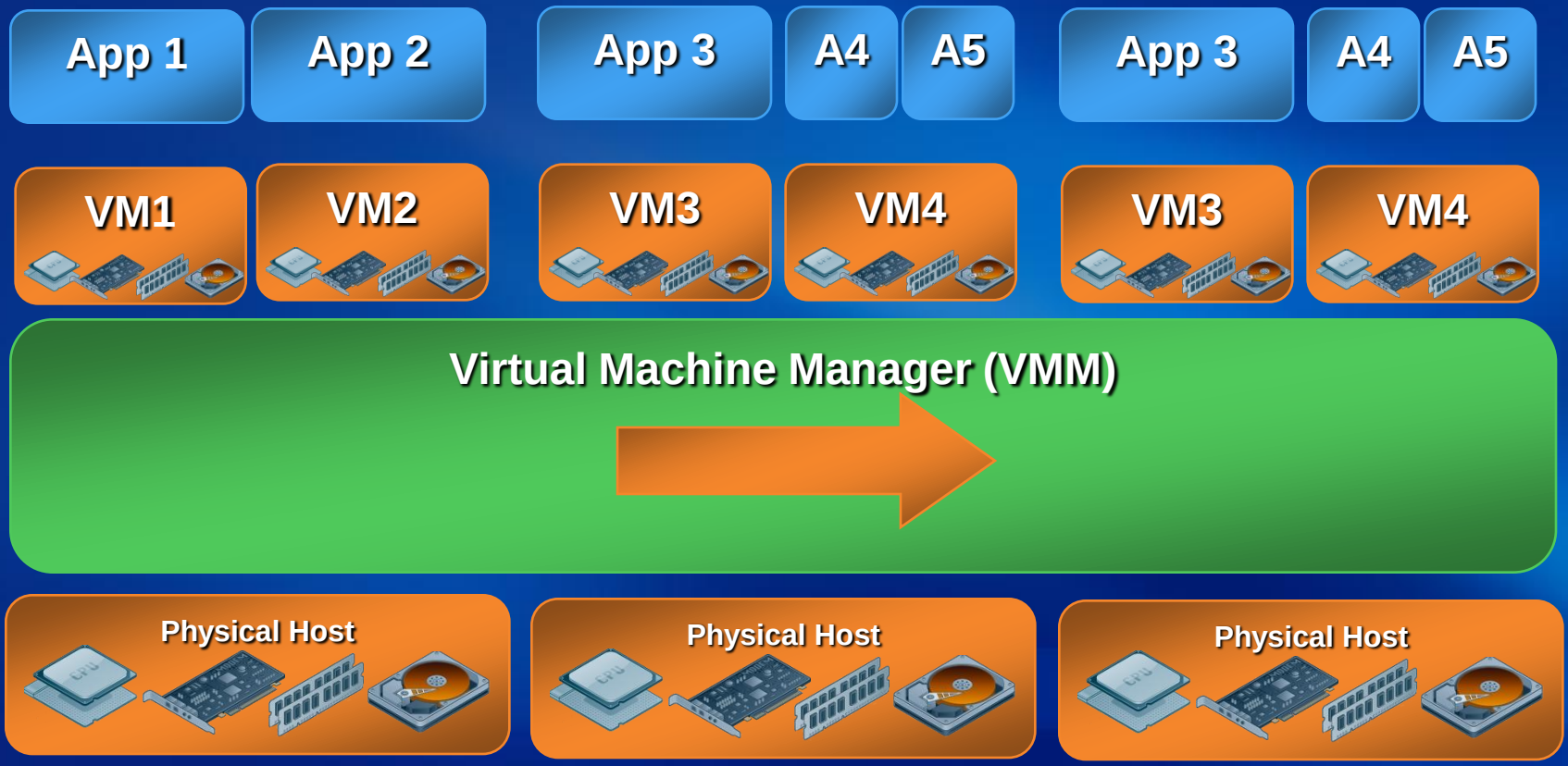
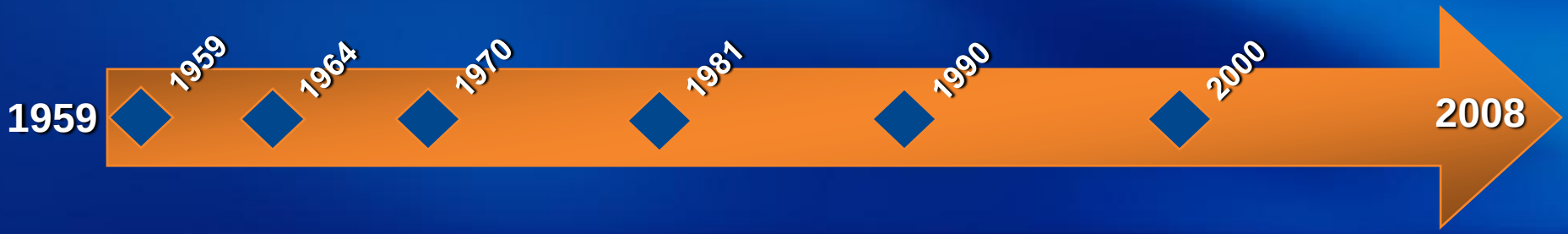


History and Timeline

- 1959 Chris Straches Paper
- 1964 IBM System 360
- 1970 IBM System 370
- 1981 IBM PC Launched
- 1990 Cheap Commodity Servers
- 2000 Virtualization for x86 mainstream



Why Virtualise?

1970

CPU Speed

Utilisation

Cost

1959 1959 1964 1970 1981 1990 2000 2008

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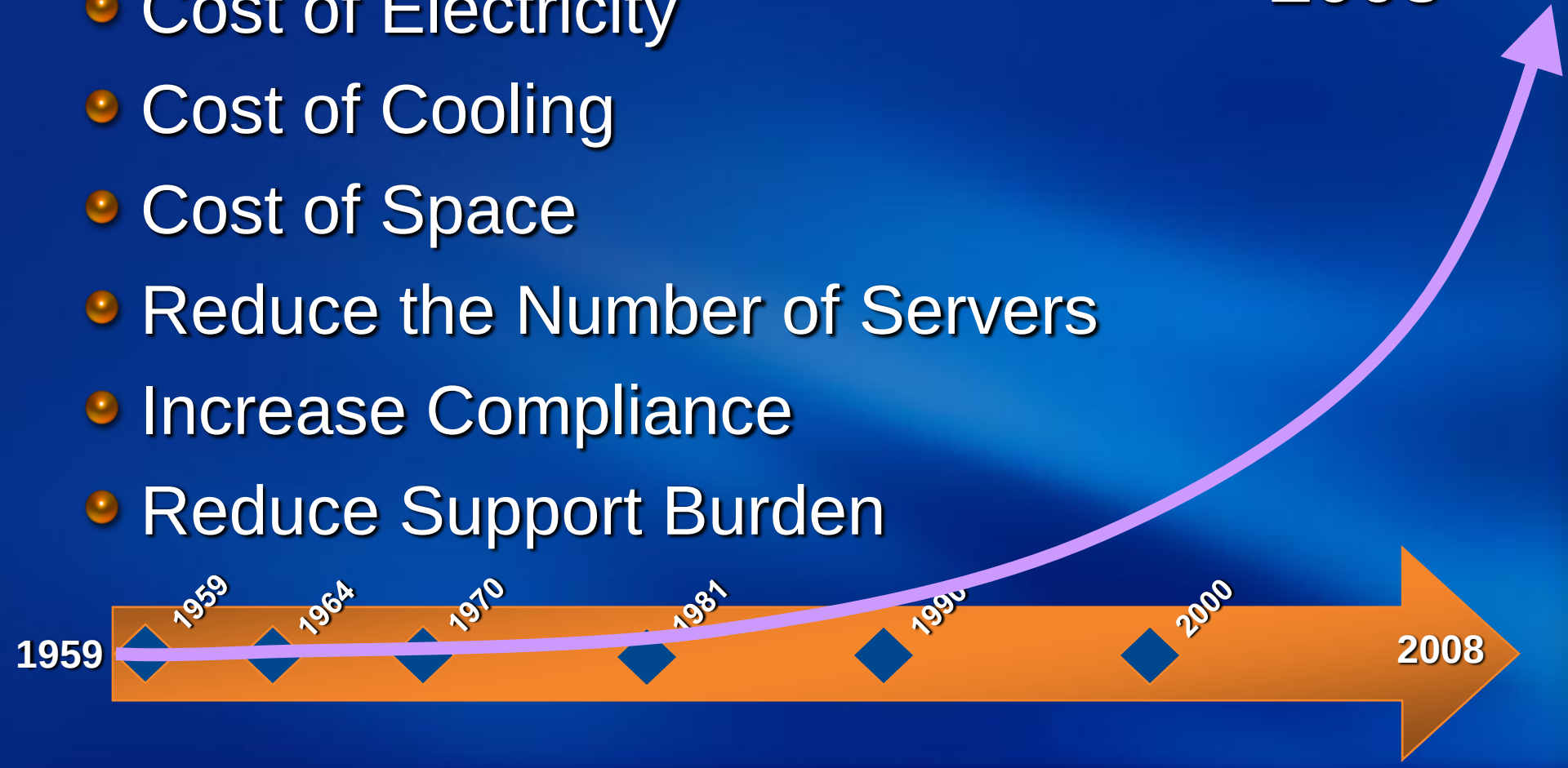
Why Virtualise?

- Cost of Electricity
- Cost of Cooling
- Cost of Space
- Reduce the Number of Servers
- Increase Compliance
- Reduce Support Burden

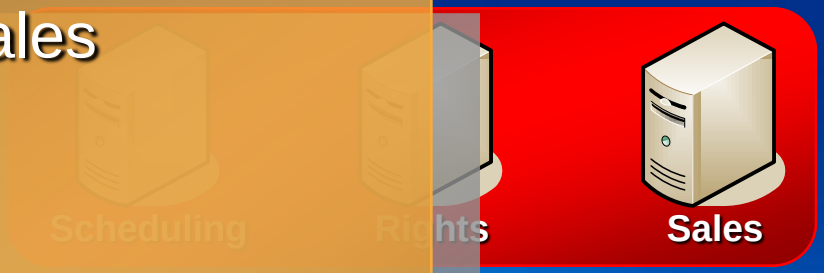


Can it work for Broadcasters?

Scheduling, Rights & Sales

- CPU % = Low
- Memory Use = Low
- I/O Requirements = Low
- Storage Needs = Low
- Real Time = No

Excellent Candidate Systems



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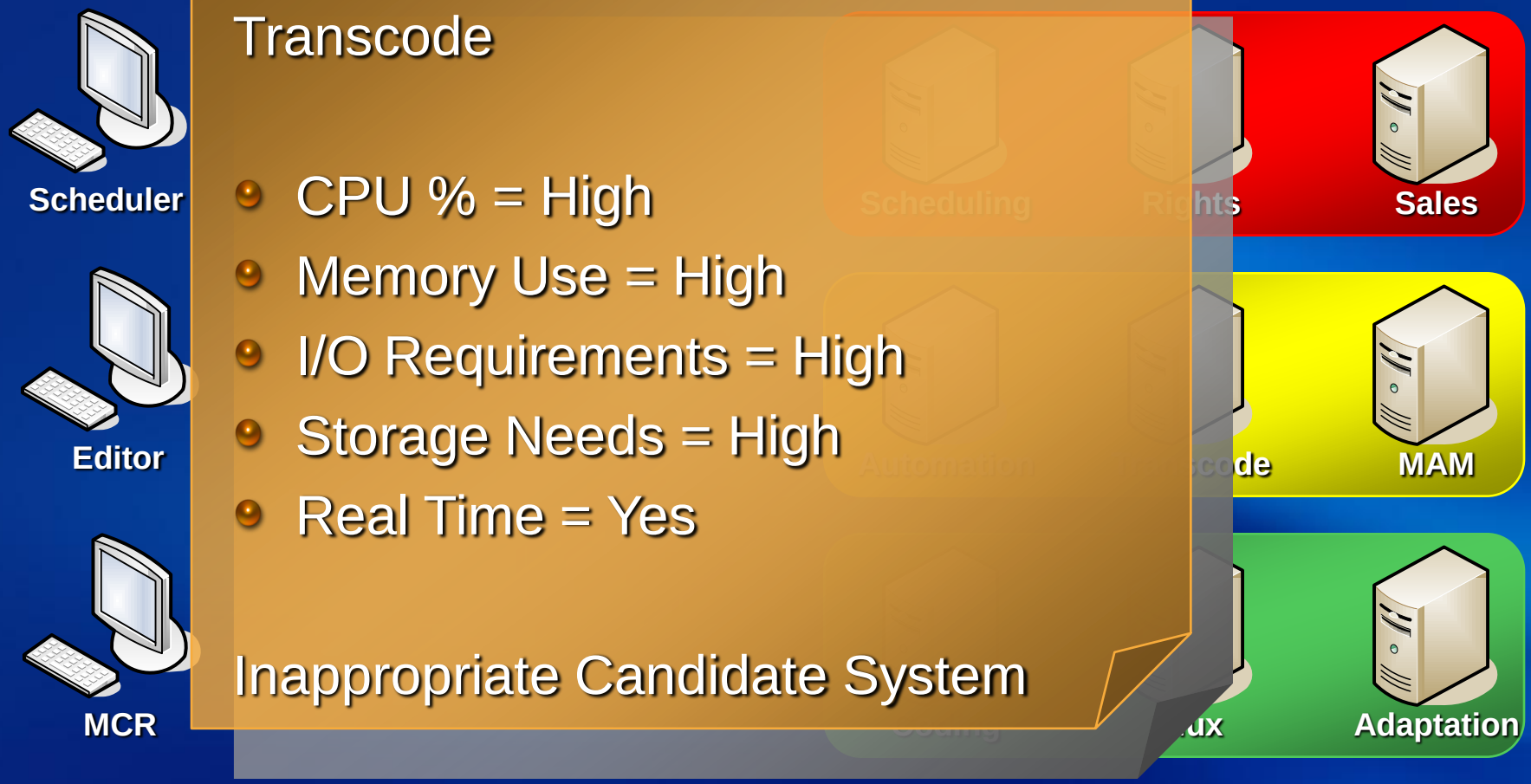

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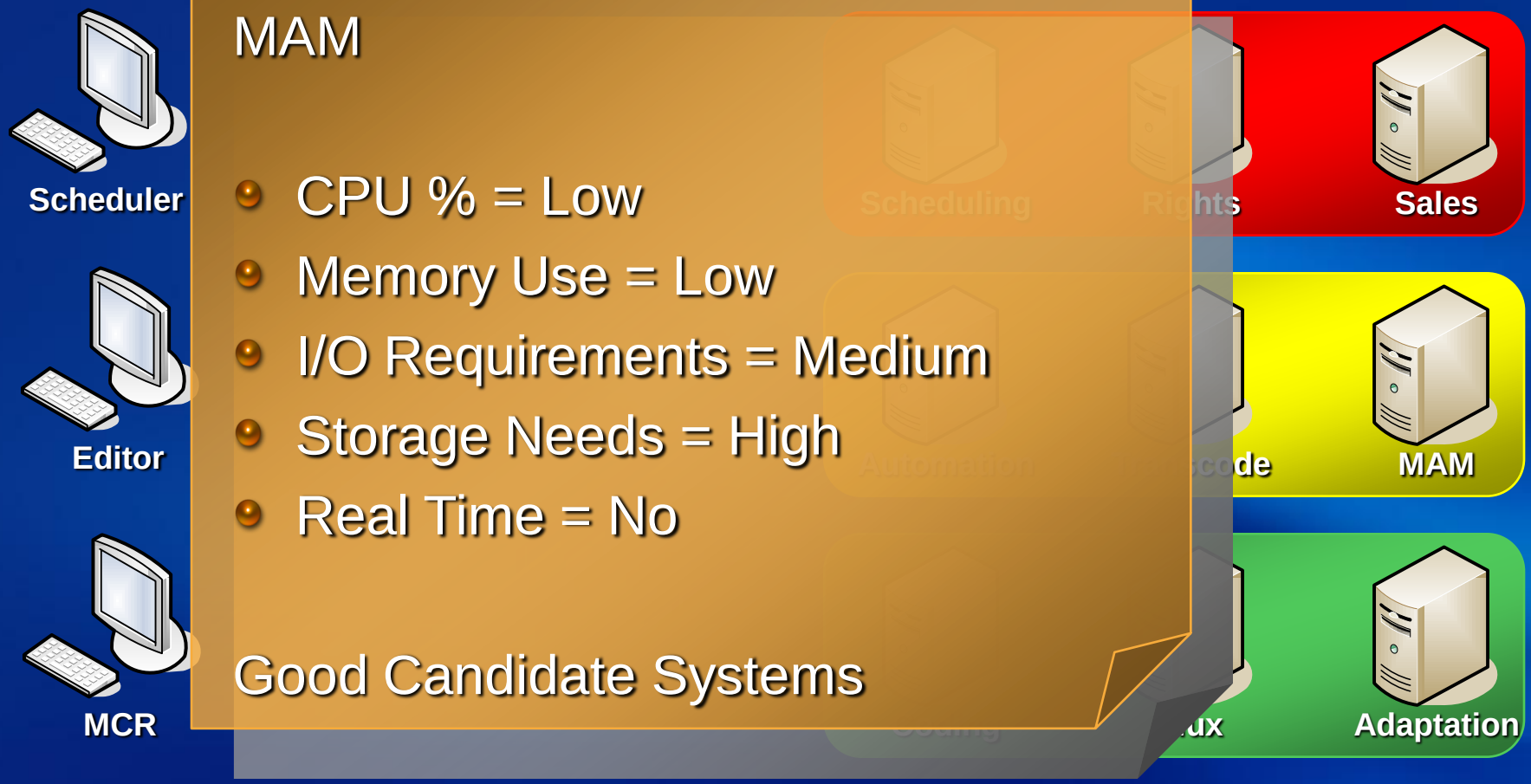

Future Developments

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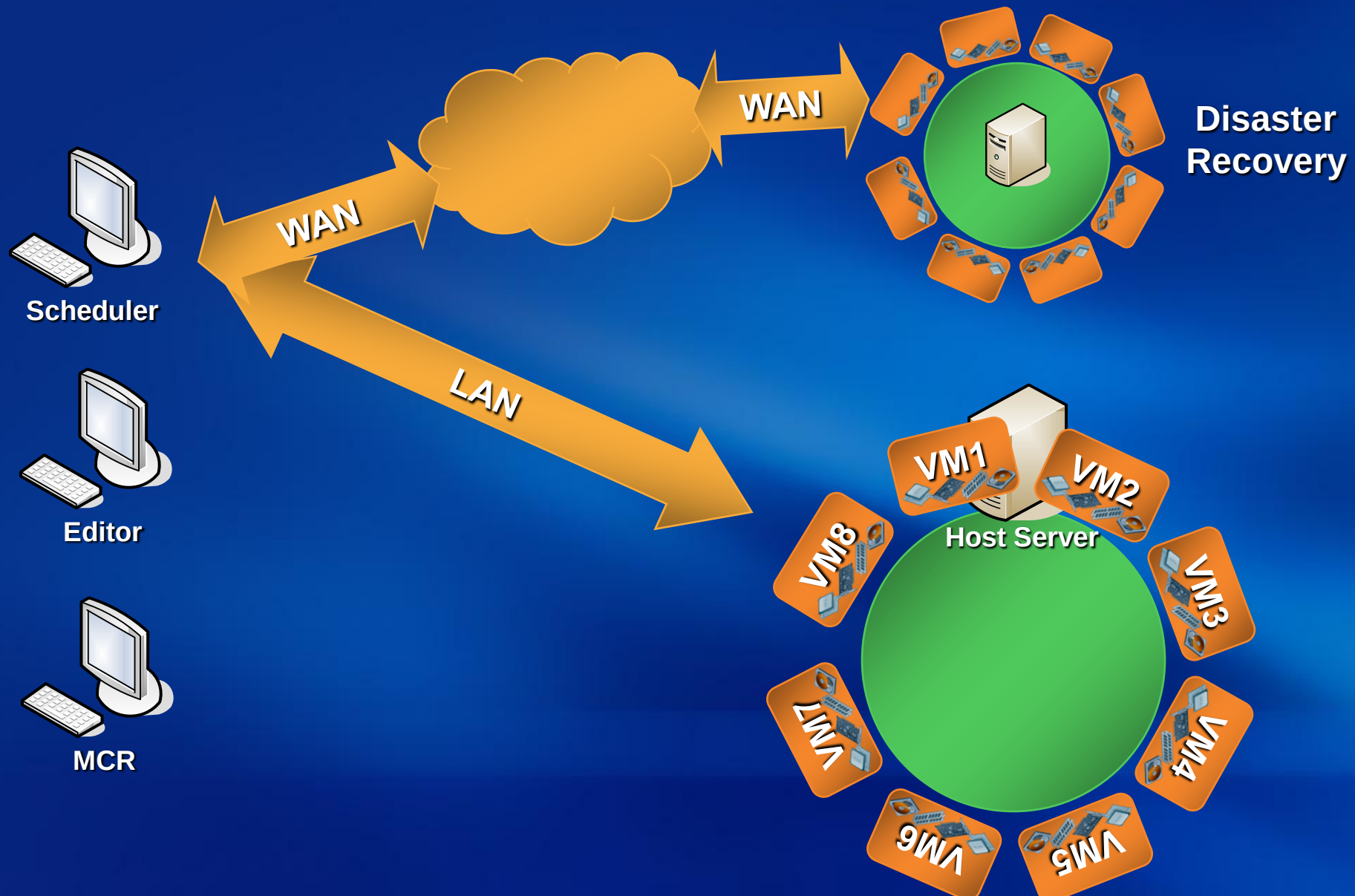

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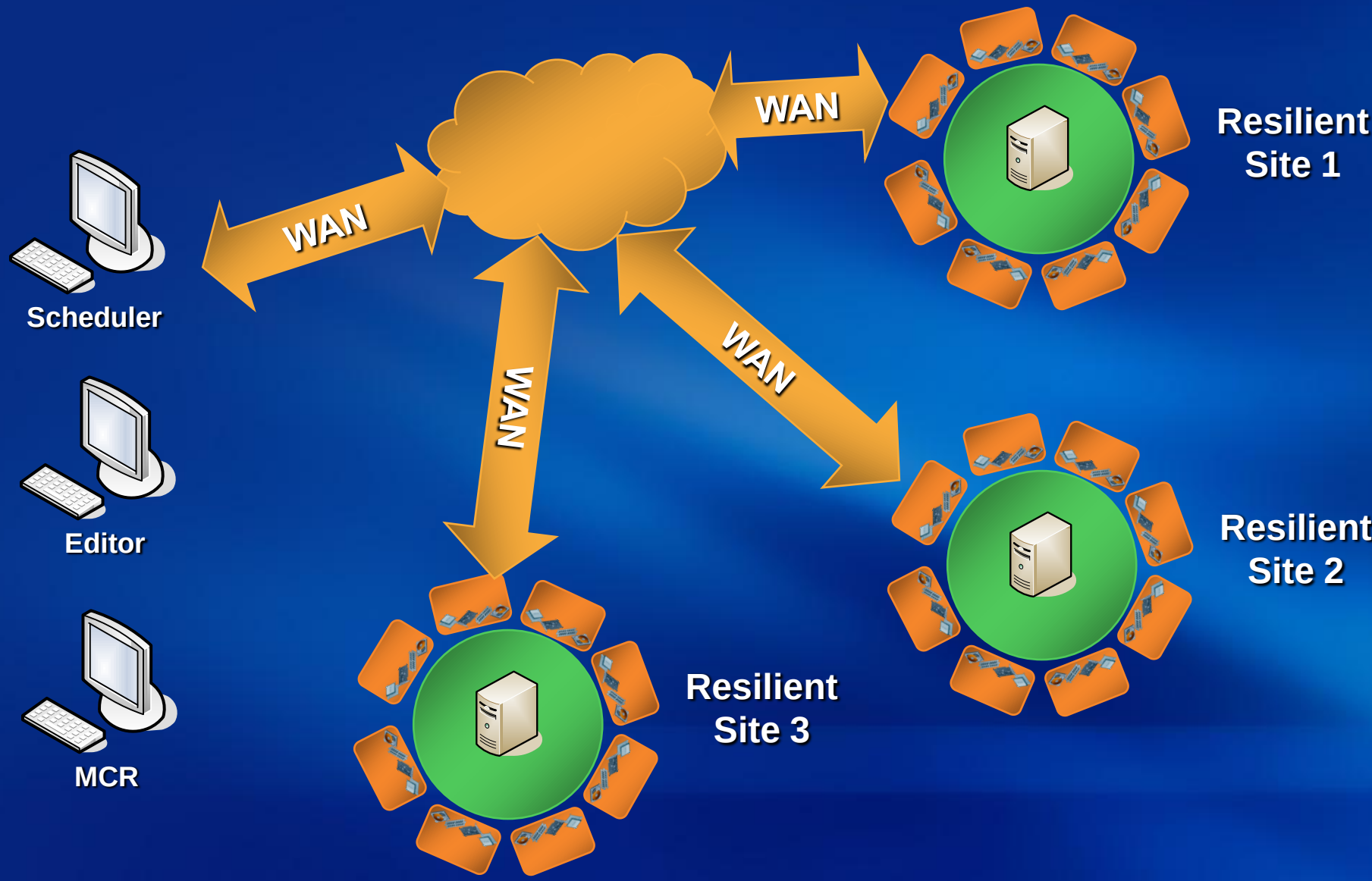

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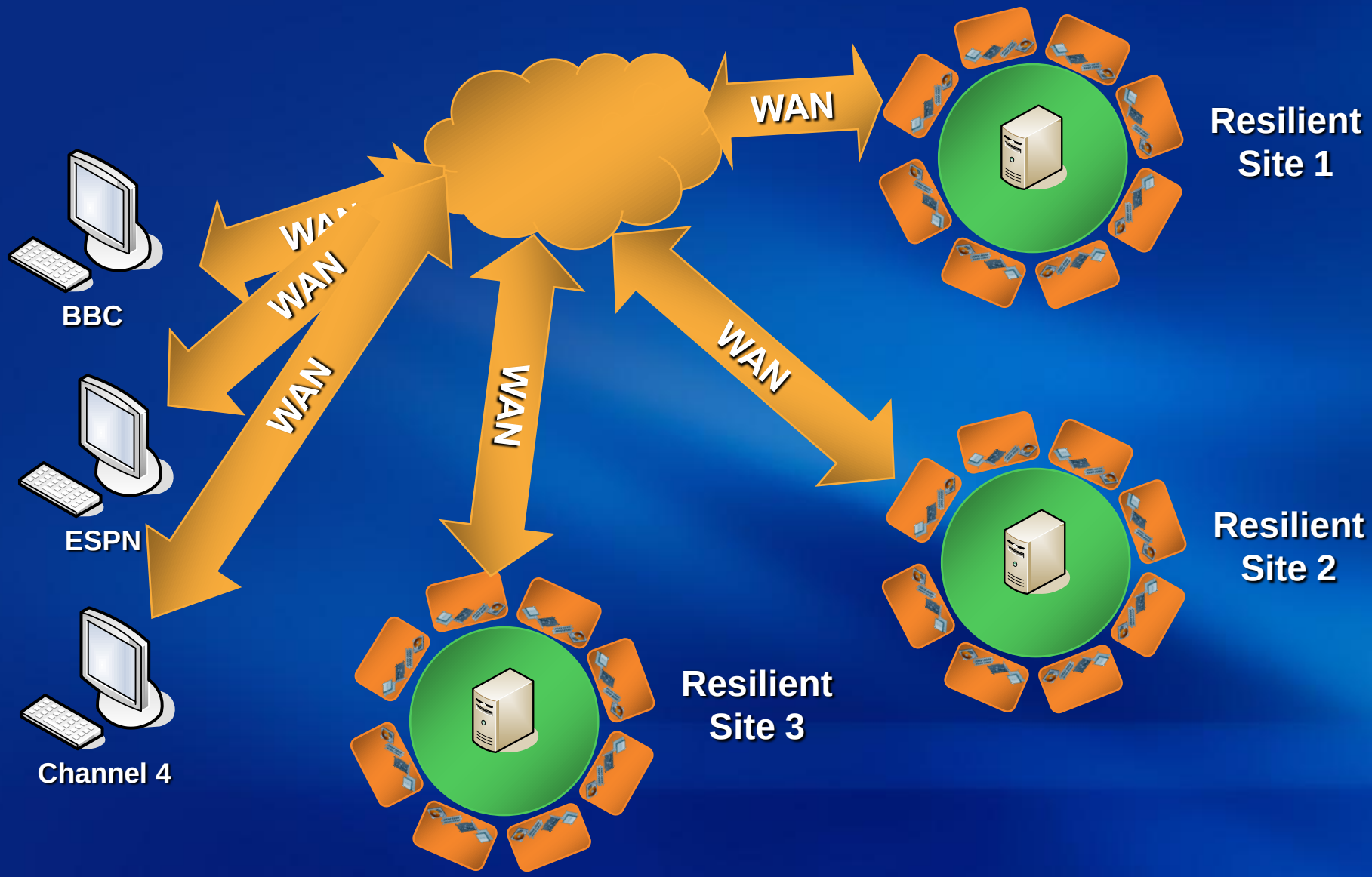
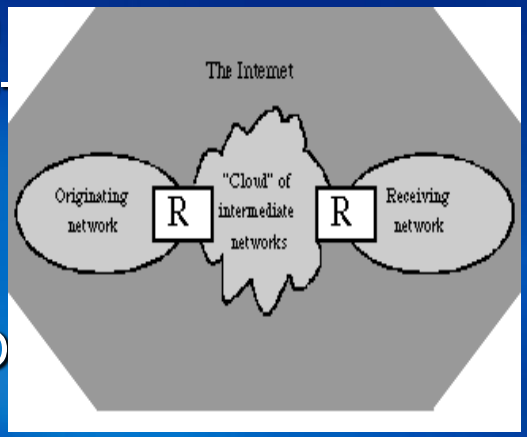


Moving to the Cloud

- Broadcasters use niche hardware & software to produce linear TV channels.
- Generally this equipment is owned and operated or entirely outsourced.
- High premium on launching new services
- Mirrors the issues in the IT industry before the dot com crash in 2000.
- Amazon creates Elastic Computing Cloud (EC2)
- After the dot com crash – The Silver Lining

Background of Cloud Computing

- Where did the term come from?
- “Cloud” probably first published in a 1996 paper from MIT on “the co-ordination of the internet”
- “Cloud Computing” much more recent.
- First coined by Eric Schmidt, CEO of Google on August 9th 2006.
- Less than month later Amazon announced its Elastic Computing Cloud (EC2) on August 24th 2006.



Early History 1

- Main frames used in the early days
- Standardisation has promoted the rise of the IBM PC.
- Linux and Windows NT provided the OS tools to allow the x86 to usurp the mainframe
- Cheap commodity hardware allowed companies to re-start shelved projects and access new markets.

Early History 2

- Compatibility issues led to 1 server 1 application deployments.
- Commonly known as “Server Sprawl”
- High Capex but the real issue was the Opex cost of Power, Cooling and Floor Space.
- As IT budgets increased speculators jumped on the bandwagon.
- The dot com bubble would be more accurately described as the technology bubble.

NASDAQ Composite

Recent Events

- Virtualisation become the solution to “Server Sprawl”
- Virtual Machines (VM’s) run on physical hardware but allow total isolation for applications and the OS.
- Several VM’s can run a single physical server increasing utilisation.
- The technology ironically has its roots in early mainframe designs from the 60’s and 70’s.
- Even early computer scientist could spot the potential in the 1960’s.

Recent Events

- “If computers of the sort I have advocated become the computers of the future, then computing may someday be organised as a public utility just as the telephone system is a public Utility . . . The computer utility could become the basis of a new and important industry.”
- John McCarthy 1961
- It took the biggest technology crash the world has ever see to jump start the process McCarthy predicted.

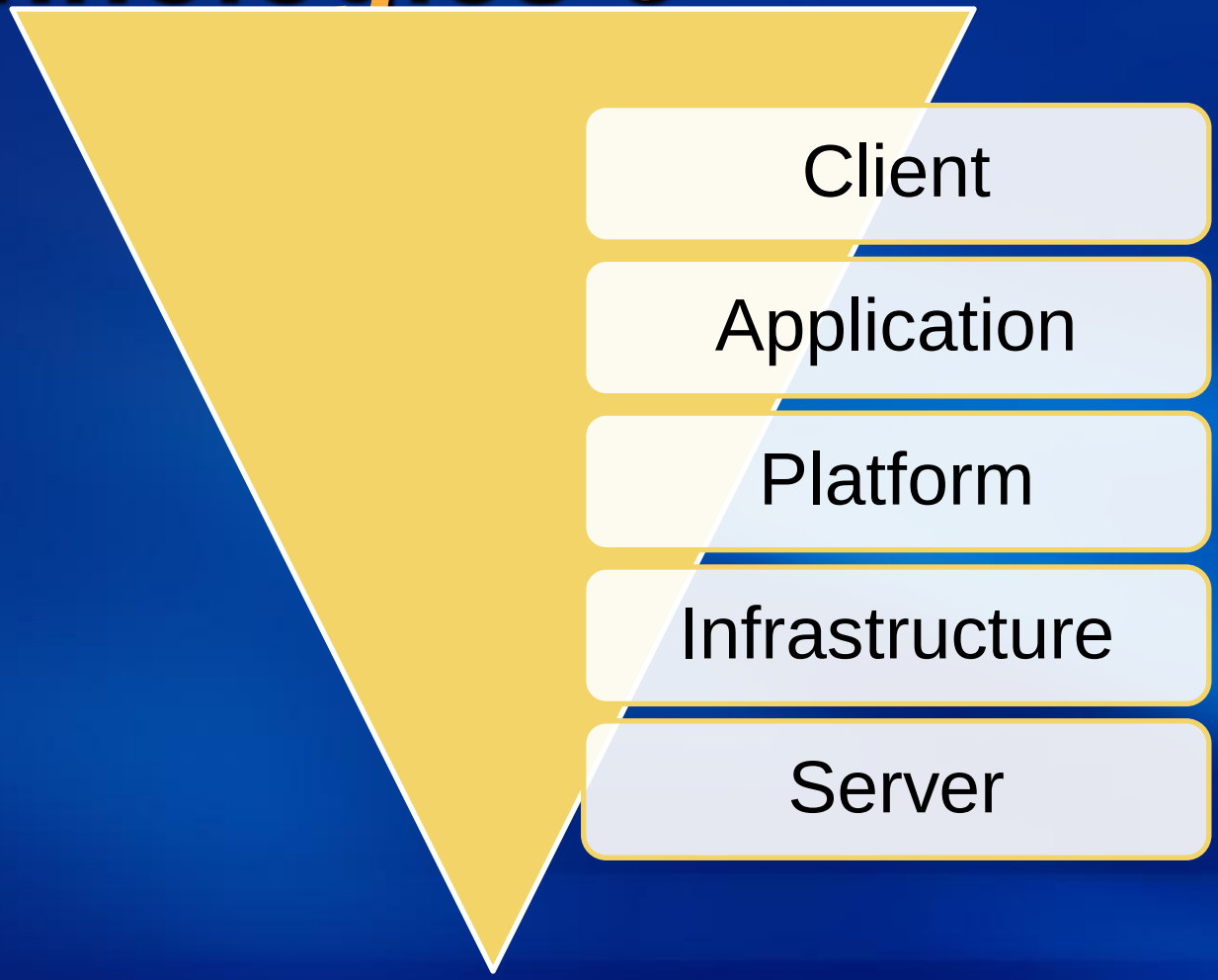
Cloud Enabling Technologies 1

- Number of Key Vendors making the technology that makes Cloud computing possible.
- All vendors support the VM model
- Open Virtual Format specification has been well received and supported offering interoperability between systems.
- Virtual appliances encapsulate virtual hardware with an OS and installed applications in to a single file.
- Today this is used for email severs, web servers etc.
- Channel in a box solutions could be packaged in the same way.

Cloud Enabling Technologies 2

- Cloud technology is “packaged” in different ways.
- Amazon EC2 provides servers and DB’s
- Third parties like JumpBox provide ready built appliances which run on EC2 such as Apache JumpBox.
- MS Azure provides higher level services based on MS DB products and platforms.
- A layer model can help to show the relationship between services and the client.

Cloud Enabling Technologies 3



Current Cloud Applications in Broadcast

- Recent takeup of x86 hardware for broadcast tasks
- Prevalent across the whole file based workflow.
- Ingest
- MAM, Automation and Traffic
- Transmission
- Uplink
- DVD Compliant Software MPEG2 encoding
- Creates the possibility for a “Stream Based Workflow”

Redundancy and Disaster Recovery

- Virtual broadcast centre cloning.
- Dual unicasts to uplink sites
- Redundant clouds can be dormant
- Rapid deployment in the event of disaster
- DR only paid for on a usage basis.
- Contrast with today's expensive second sites.
- Redundant cloud could mirror a broadcasters existing traditional TX server in low res.
- Stepping in when a failure occurs with economic DR.

System Integration 2.0

- Is this a pipe dream?
- Technology all exists in issolation
- Missing link is next generation systems integration.
- Using SOAP, XML and web services in place of the traditional GPI, RS422 and SDI.
- SI’s who have experience building file based workflows are best placed for building these stream based workflows.

Future Developments and Gap Filling

- Although the core applications exist for a stream based workflow and cloud playout some gaps do exist.
- Cloud based craft editing is still in the early days
- Source and Destination style abstractions for IP streams.
- Real time “proc amp” style tweaks of streams has more work to be done on it.
- Audio market show this type of development to be an opportunity rather than a threat.

Conclusions

- A polarising technology
- For some a solution to all their problems.
- For some a waste of time
- Certain to have far reaching implications in both the IT and broadcast markets.
- High quality IT savvy Systems Integration is the key to successful deployments of this technology.

- This is System Integration 2.0; This is the stream based workflow; This is the silver lining.

Questions