

# Grid Middleware Convergence

Andrew A. Chien  
[achien@ucsd.edu](mailto:achien@ucsd.edu)  
SAIC Chair Professor  
Director, Center for Networked Systems  
University of California, San Diego  
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Shanghai, China



## How Did Unix/Linux Converge?

- Two decades of Shared Community Knowledge and Development (BSD, SVR4, etc)
- Stage I: DeFacto Standard for Shared Use
  - » Started as an low-end alternative to VMS and MVS
- Stage II: Vendor Differentiation “my Unix is better than yours”
  - » Vendor Disagreements “OSF should have ...”
  - » “We are going to differentiate to add value... “
  - » ATT/SCO/Unix International, etc. .. Still ongoing!
- For at least a decade, not converged

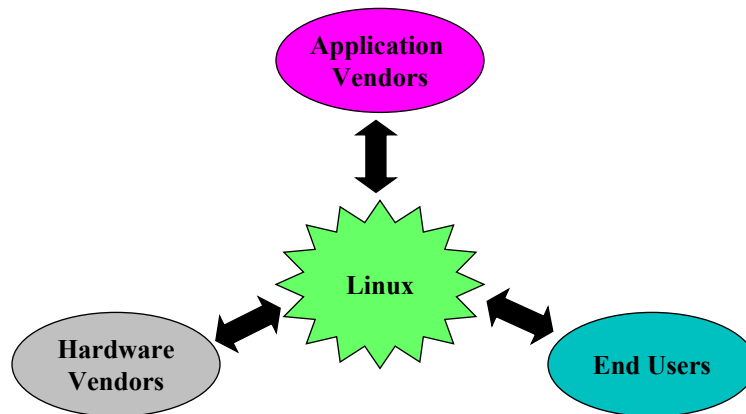
## Stage III: Convergence

- Shared Interfaces + Shared Implementation

What changed?

- Windows NT motivation
- Demonstrated Leverage with Applications
  - » Couldn't get application vendor ports
- Innovative Software Licensing
  - » GPL and "Open Source"
- Shared Interests of Application Vendors, Hardware Vendors, End Users
  - » Breakthrough commitments by major vendors – IBM, SGI, HP, Sun, ...

## Harmonious Cycles



## Where is Grid Today?

- ~5 years of Shared Community Knowledge and Development
  - » Linux Clusters, Servers, and Globus Grids
- Advanced Understanding of Sharing, Licensing
- Shared Interests of Application Vendors, Hardware Vendors, End Users
- Early commitments by major vendors – IBM, SGI, HP, Sun, ...

## Three Views

- Stage I: De Facto Standard for Shared Use
  - » Adds Value, Easy Entry, Basic Interoperation
- Stage II: Vendor Differentiation
  - » Commercial Products and Diverging Implementations
  - » Commercial Competition
  - » An Interoperation Technology? (hard)
- Stage III: Convergence
  - » Can we skip ahead?
  - » Experience and Wisdom vs. Centrifugal Forces

# Summary

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- Convergence is not easy or rapid in all cases
- Powerful forces encourage differentiation
- Interface versus Implementation Convergence
- Current Transition from Academic to Industrial Drivers is Critical
  
- Q: Is Globus the Linux for the Grid?
- A: Maybe, but it clearly isn't yet.