Interoperability between Sun Grid Engine and the Windows Compute Cluster

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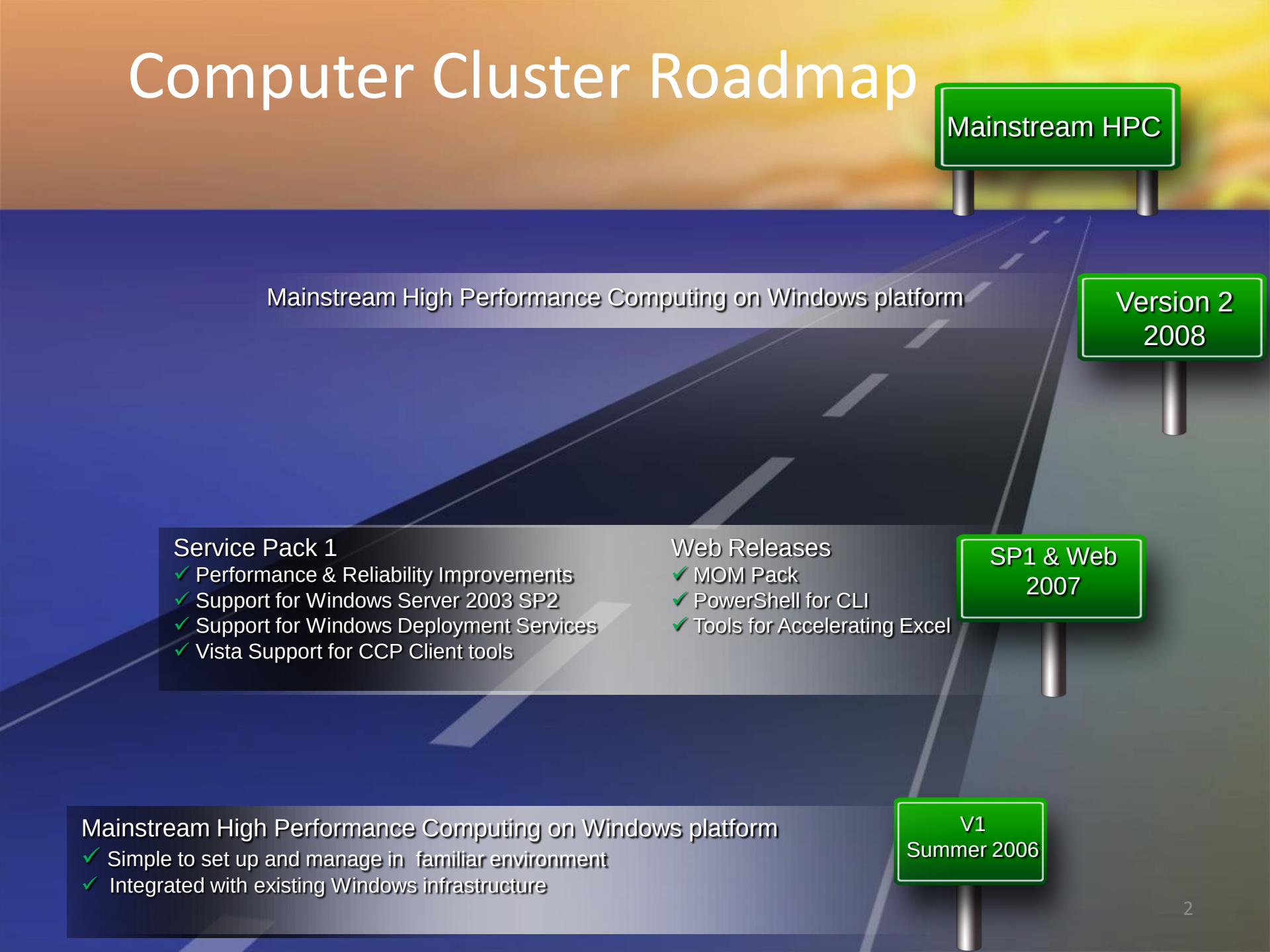
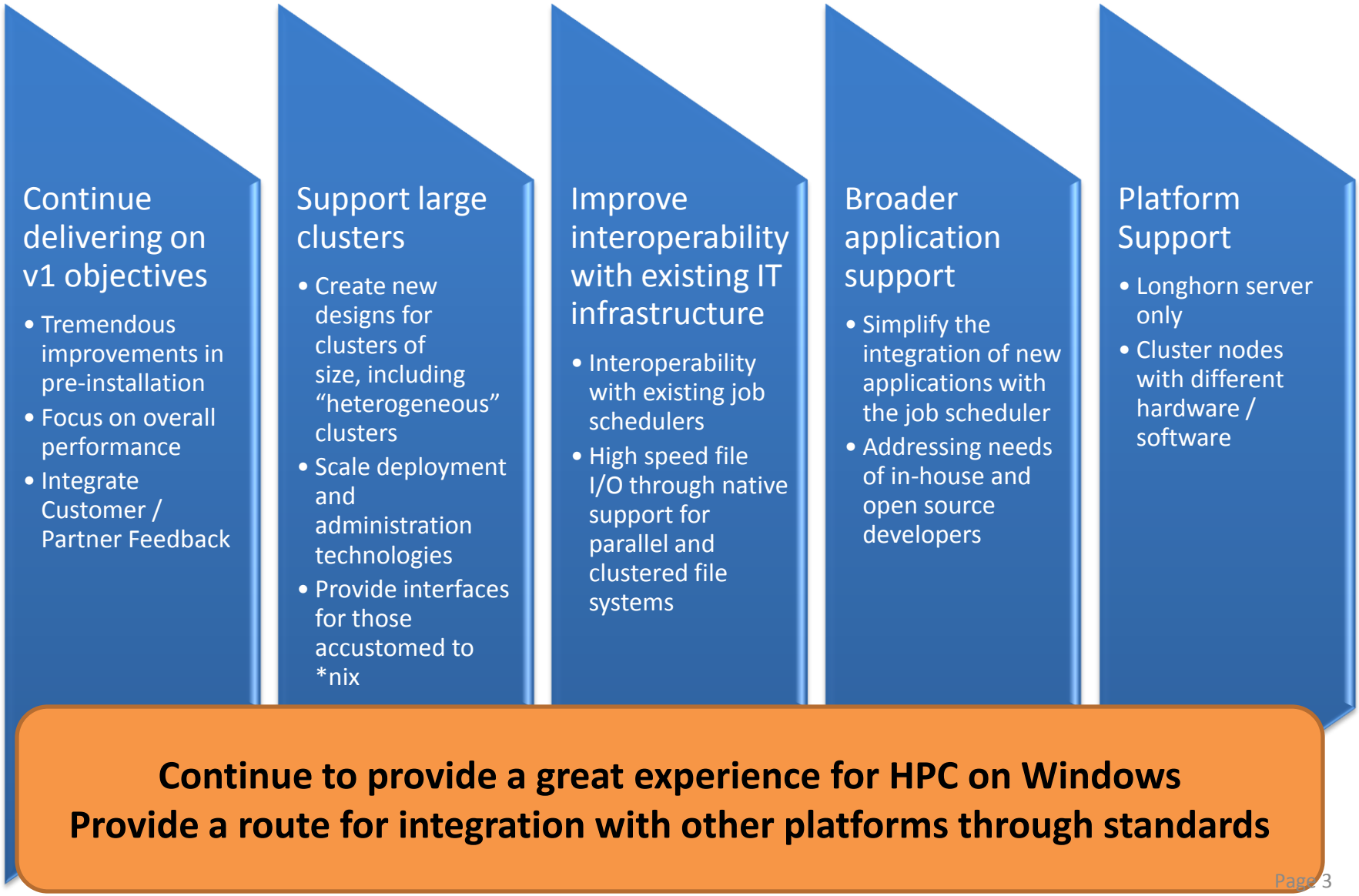
Computer Cluster Roadmap

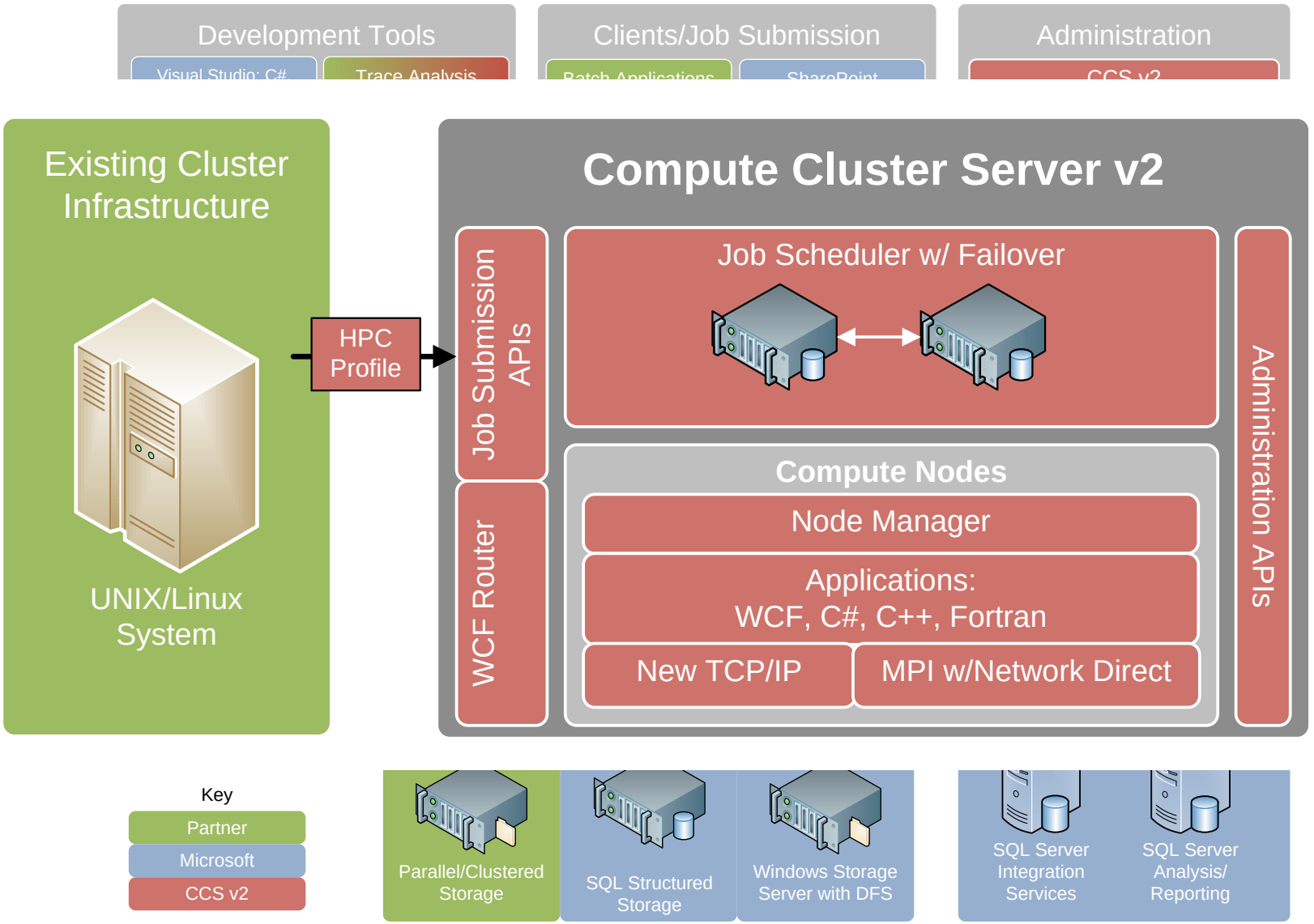


Mission and Vision for CCS V2

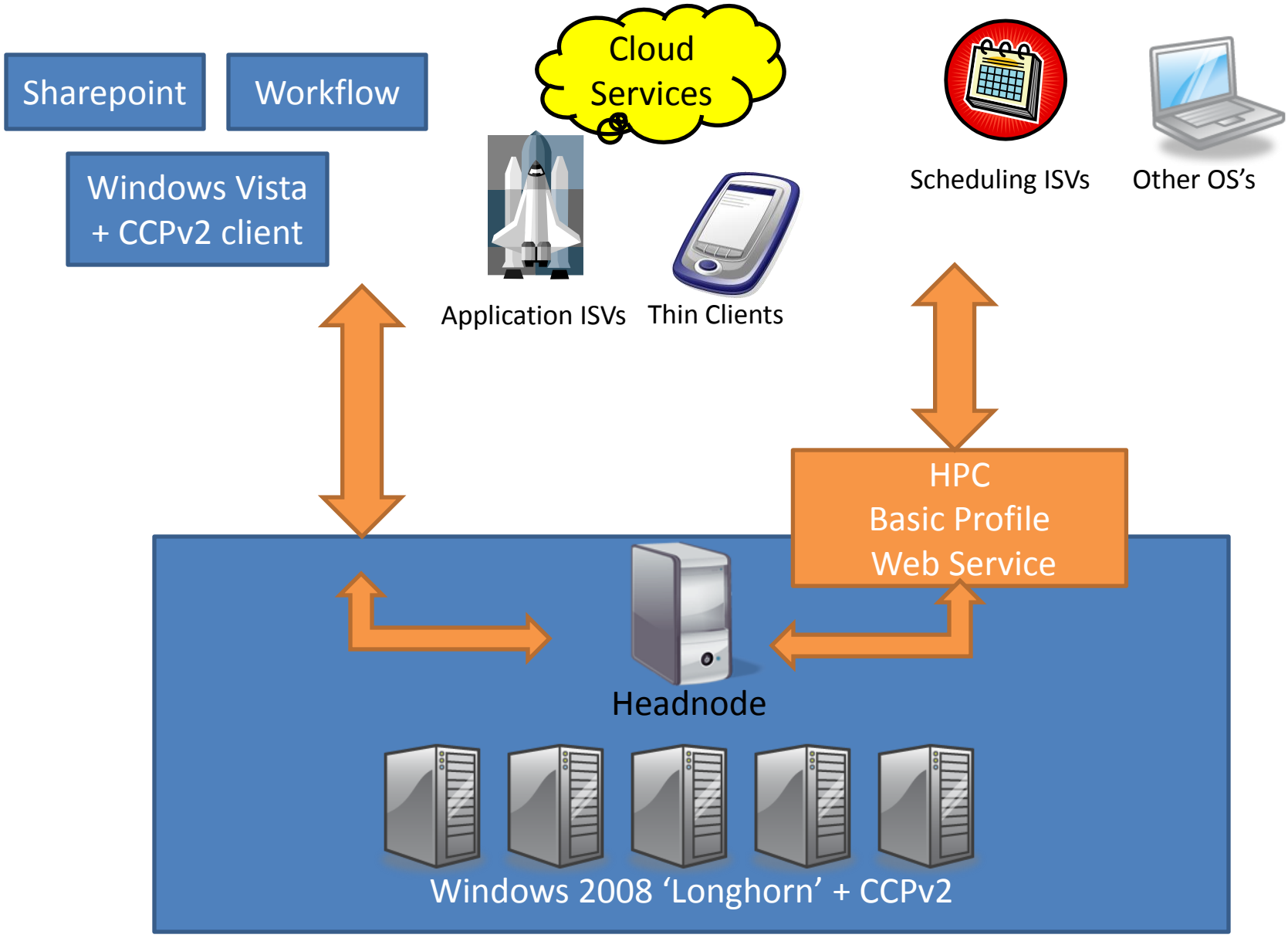


Continue to provide a great experience for HPC on Windows
Provide a route for integration with other platforms through standards

High Productivity Computing



The need for interoperability



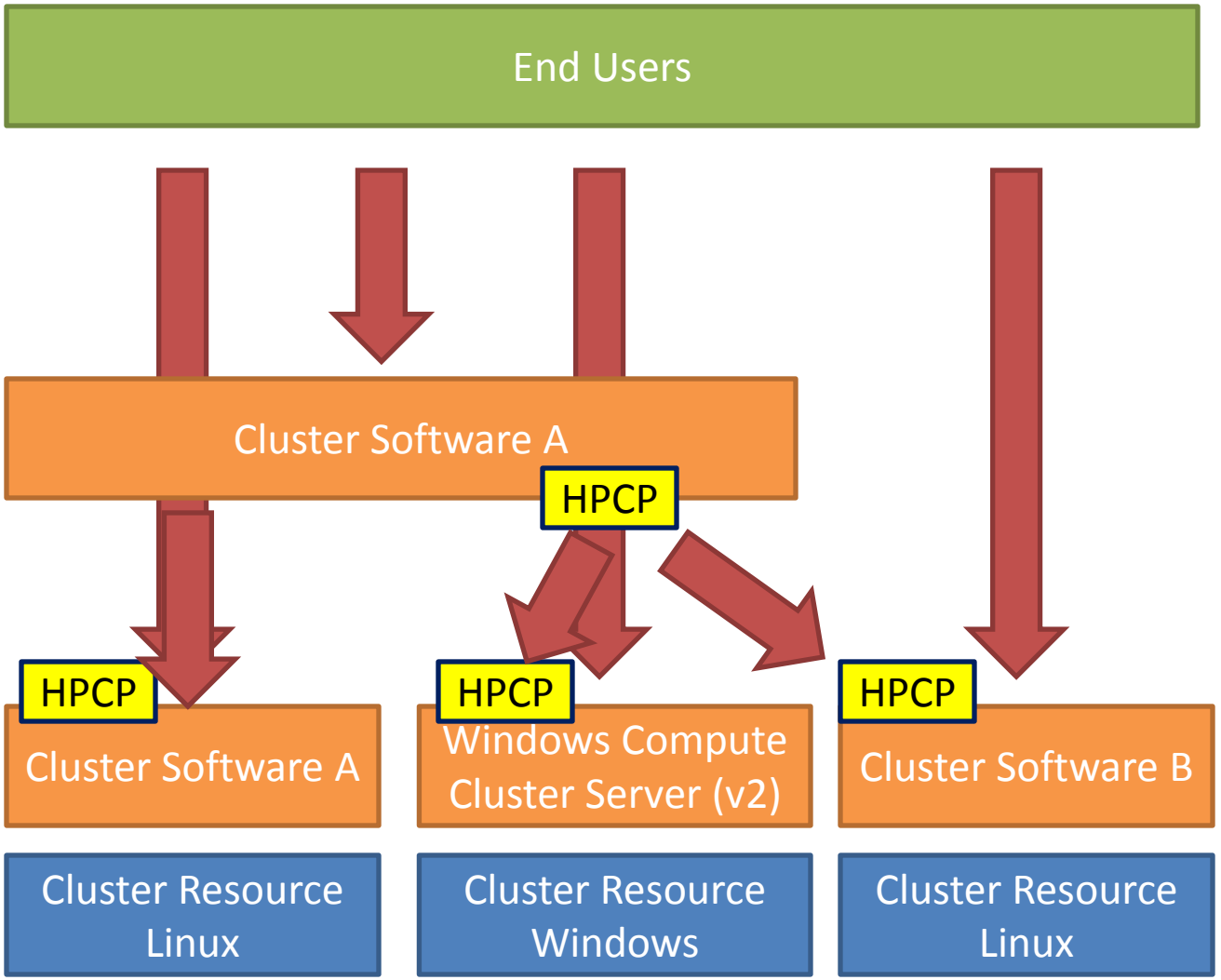
What is the HPCBP?

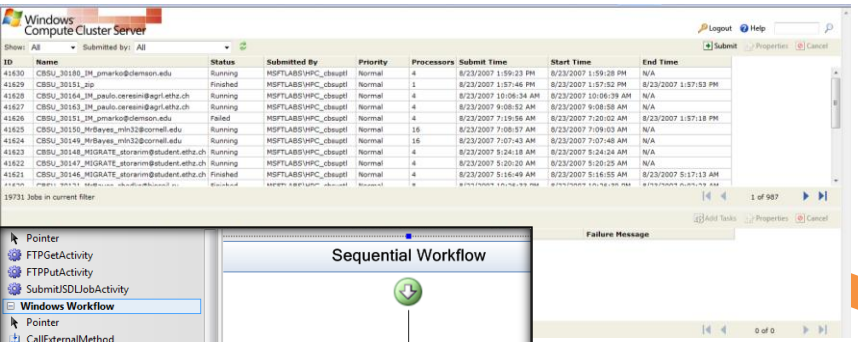
- HPCBP: High Performance Computing Basic Profile
  - A web service to interact with HPC resources
  - 'Basic' as it deals with the core common use cases
- A standard from the Open Grid Forum (OGF)
- Two supported security schemes (WS-Security)
  - Username & password over TLS
  - X.509 certificate based mutual authentication
- Demonstrated interoperability
  - Draft specification & prototypes at SC06
  - Final specification & product prototypes at SC07

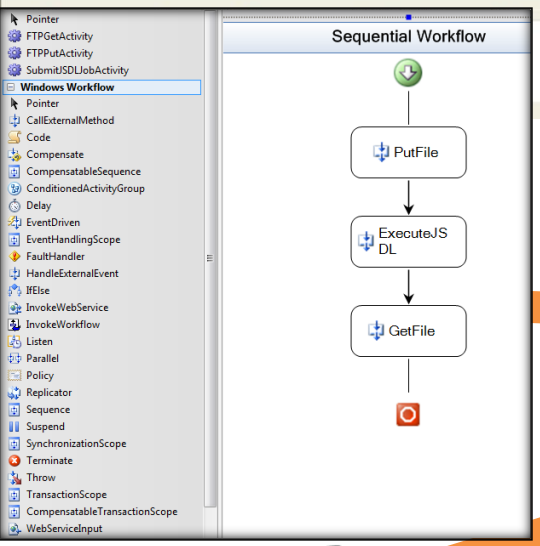
What does the HPCBP do?

- Create a Job
  - As defined by the HPC Application Profile (XML Schema)
- Manage a Job
  - Determine its status
  - Terminate its activity
  - Discover the job's configuration
- Interaction with the compute resource
  - An information model for jobs and the resource
  - Start & stop the creation of new jobs

Support for MetaScheduling





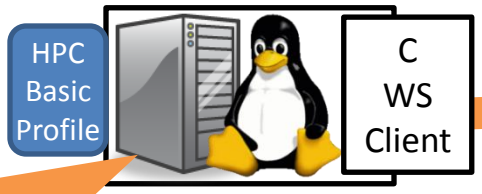


C#

SGE cmds

CCSv1

LSF 7.0.1



SGE 6.1

SGE Integration

- Use transfer queue mechanism
  - Starter method script
- Job script
  - Can contain SGE directives
  - Commands for execution on Windows cluster
- Generate JSDL wrapper for the job script
  - Job script stripped of SGE directives
  - Batch script FTP'ed to Windows cluster
- Use HPCBP WS to start JSDL specified job

SGE Integration

- Poll for remote job completion through HPCBP
- Retrieve standard input & output files
  - As a result of running the remote job
- Add to local job's standard input & output
- Not implemented
  - Suspend & remove: no support in HPCBP
  - Load Average

Issues

- Need to access Windows cluster
  - Remote domain\user name & password
  - Remote FTP filepath for each user
  - Currently hard wired single user (so secure!)
- Load average
  - HPCBP can retrieve number of remote activities
- Application file staging
  - Declaration of application input & output files
  - Proposed extension to HPCBP

Summary

- Demonstrated proof of concept
  - Not and (probably) never will be product
- Looking for collaborations to:
  - Support customer deployments
  - Drive use cases for further HPCBP activity
- Will document on www.windowshpc.net
- Contact:
  - steven.newhouse@microsoft.com
  - www.windows.com/hpc