Providing a Cloud Network Infrastructure on a Supercomputer

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A Utility Computing Vision

Generate Capacity

Metered and Billed In Units.

Re-Packaged & Refined (Selling SW Execution)

As "computers"

As Building Blocks

DB

CRM

OLTP

Optimizers

As Services

Generic IT

Niche providers

Re-branded

Traded

Producing, Distributing, Packaging: Generic Units of Computational Commodities which are Consumed and Utilized in the Provisioning of Value

1) Proprietary Production
2) Generically Used
3) Independently Metered and Traded on an ongoing Consumption Basis.
4) Global Scale
Abstract System View

Users (developers, service providers, resellers)  Public Access Network  The Computer

Service Interface
A Global-scale Computer

Large-scale Communication-centric System

Aggressive Integration

Control Channels

Raw Hardware Access

Communication Domains

Primitive for Competition & Cooperation
Communication Domains as Permission

isAllowed(X,Y)?

The Physical Owner wants this relationship enforced independent of software.
Communication Domains as Permission

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The Physical Owner wants this relationship enforced independent of software.
Public Access Control Channel as a Multicast Console Device

A “Super” Serial Line: A simple device for Raw Access

Node Control Channel Device

Users

Public Access Network

The Computer

Control Channel Configs

Node Pool
Bootstrapping: Open-source Software Appliances

Full Linux Install Image (Distribution)

Extract

Trace & Package

Bootable Ramdisks

10MB
3MB Shell
Shell Linux

11MB x86Linux
Shell sim Linux

12MB WebSite
RoR aoe
Linux

21MB DiskSrv
LVM+NFS
Linux

28MB FileSrv
Linux
CUC, Principals, Control Channels, Communication Domains

- Principals: 3, 1, 6
- Control Channel: 3, 1
- Communication Domains: Public, External

Common Units of Capacity
Hardware nodes: CPUs, Memory, Connectivity
Linux only the beginning

NODES

Linux + Ethernets

Linux* + Direct

Specialized Stand-alone

Hybrids (libOS/`cnk`)

Project Kittyhawk

Thursday, June 17, 2010
MemCACHED (mc) Exp

tcp_send(to, sbuf)
tcp_rcv(from,*sbuf)
rdma_put(to, *sbuf)
rdma_get(from,*dbuf,*sbuf)

MC
TCP/IP
bglnk
bgethernet
bgtorus
TCP/IP
mcServer
mcClient
NODE HW

Project Kittyhawk
Thursday, June 17, 2010
Open Source Kittyhawk

That’s to a lot of peoples!

http://kittyhawk.bu.edu/kittyhawk/Kittyhawk.html
http://git.anl-external.org/kittyhawk/
http://kh-wiki.bu.edu/tiki/tiki-index.php
http://cs-mailman.bu.edu/mailman/listinfo/kittyhawk

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DEMOS