Integration of Citrix XenDesktop and XenApp with CloudStack

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Agenda

• An engineer’s introduction to XenDesktop and XenApp
• Why CloudStack?
• Development highlights
• Development challenges
An Engineer’s Introduction to XenDesktop and XenApp
XenDesktop vs XenApp

• What’s the difference?
• For the purposes of this discussion, there is none
• XenApp was an older project with a different architecture
• XenDesktop introduced a newer architecture known as FMA
• Both products now use the newer architecture
• The only difference is the in the use cases: VDI or applications (single-session or multi-session VMs)
• The two distinct brands are maintained to characterize these use cases
Why CloudStack?
Why CloudStack?

- Open standards mean choice of hypervisor, storage and network technologies
- Storage tiered into local/shared/secondary layers
- Flexibility to build in premise or use public infrastructure
- Able to use client Windows OS (not available on AWS)
- Expand on demand
- Build at any scale
- Single management console, regardless of scale
- For example…
Scale Test Rig: 1000 Desktops
Dev Rig: About 5 Desktops
Development Highlights
Development Highlights

- Similarity to AWS
- The project resulted in several CloudStack enhancements
- Flushed out useful bugs
Similarity to AWS

• We ran two integration projects in parallel: CloudStack and AWS
• It was helpful that CloudStack followed the AWS model
• Many concepts in common: regions, zones, security groups, templates, service offerings, VPCs, networks
• Similar semantics and APIs
• Service offerings can even be enumerated!
• Allowed for a useful amount of code sharing
• Allowed for similar user experience between the platforms
CloudStack Enhancements

- XenDesktop team had an excellent dialog with CloudStack engineers within Citrix
- This allowed for some more streamlined integration patterns, compared with AWS
- API to reset machines to their base template, or update to a new one in situ
- Create machines in stopped state
- Implicit dedication
- 16k user data allowance
Flushed out bugs

• Over 100 bugs reported throughout the project so far
• 63 fixed and closed in the 4.3 and 4.2.1 branches at time of writing
• 11 reported by me!
• A few examples…
• DNS registrations not forwarded by virtual router
• Custom disk offerings created disks of the wrong size
• Data disk IDs changed on cluster migration
Development Challenges
Development Challenges

- Understanding storage performance
- API documentation
- Error reporting
- Hypervisor-specific behaviour
Storage Performance

- XenDesktop/XenApp works with Windows images
- Templates typically 30GB or bigger
- Copying to primary storage is significant overhead
- Many components contribute to this overhead
- Pinpointing bottlenecks is difficult
- Non-obvious linearization constraints in multi-user system
- Some test rigs needed a lot of work to be useable
- Sometimes taking 90mins to start an instance
Documentation

• API coverage is complete
• Behaviour specifications are very brief
• Parameter specifications sometimes unclear
• Page/pagesize parameters not documented for list requests
• Enumerations not always documented
• String length/content constraints not always documented
• Sometimes not clear how HTTP request should be structured
• For example…
## createTags

Creates resource tag(s)

### Request parameters

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>resourceids</td>
<td>list of resources to create the tags for</td>
<td>true</td>
</tr>
<tr>
<td>resourcetype</td>
<td>type of the resource</td>
<td>true</td>
</tr>
<tr>
<td>tags</td>
<td>Map of tags (key/value pairs)</td>
<td>true</td>
</tr>
<tr>
<td>customer</td>
<td>identifies client specific tag. When the value is not null, the tag can't be used by cloudStack code internally</td>
<td>false</td>
</tr>
</tbody>
</table>
Error Reporting

• Distinct problems often covered by single error code (eg. 530)
• Sometimes needed to parse error strings, which was a source of bugs
• Need to consult management logs to debug VM deployment failures
Hypervisor-specific Behaviour

• We encountered cases where the hypervisor abstraction wasn’t complete
• Cases that tested successfully on XenServer failed on VMware
• Disk device position mapping was an example
Thank You