Integrating CloudStack in your Organization using Single Sign On

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Shape Blue The Cloud Specialists

apachecloudstack open source cloud computing

About Me

- Software Architect with ShapeBlue
- Specialise in….
  - 3rd party integrations and features in CloudStack
  - KVM, API, DB, Upgrades, SystemVM, Build system, various subsystems
- Contributor and Committer since 2012
- Author and maintainer of CloudMonkey
- Rides castorboards like a boss™
- Loves to experiment with woodwinds such as Bansuri, Concert Flutes. Rusty beatboxing skills

About ShapeBlue

"ShapeBlue are expert builders of public & private clouds. They are the leading global Apache CloudStack integrator & consultancy"

… and we're hiring!


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Agenda

- CloudStack in your organization
- Authentication and Authorization in CloudStack
- SAML2 SSO Plugin for CloudStack
- Design and Implementation
- Assumptions and limitations
- Real world usage and example
- Demo and Q&A

CloudStack in your organization

- CloudStack provides notion of accounts, users (aliases to an account), domains and roles
- Organization creates and maps users in their user directory services either manually or using LDAP plugin to import users or some custom automation scripts
- Organization may create their own UI/business layer and integrate on unauthenticated port 8096 (default integration port)
- Bypass or proxied authentication using single pre-shared key

Authentication & Authorization in CloudStack

- Authentication: “you are what you say you are”
- Authorization: “you can do what you’re trying to do”
- Existing authentication methods:
  - CloudStack own cookie based authentication
  - Signature/HMAC based authentication (apikey/secretkey)
  - Single pre-shared key based authentication
  - Authentication bypass on integration port (default: 8096)
- Static Role based Authorization: Admin, Resource Admin, Domain Admin, User. Statically set in command.properties file

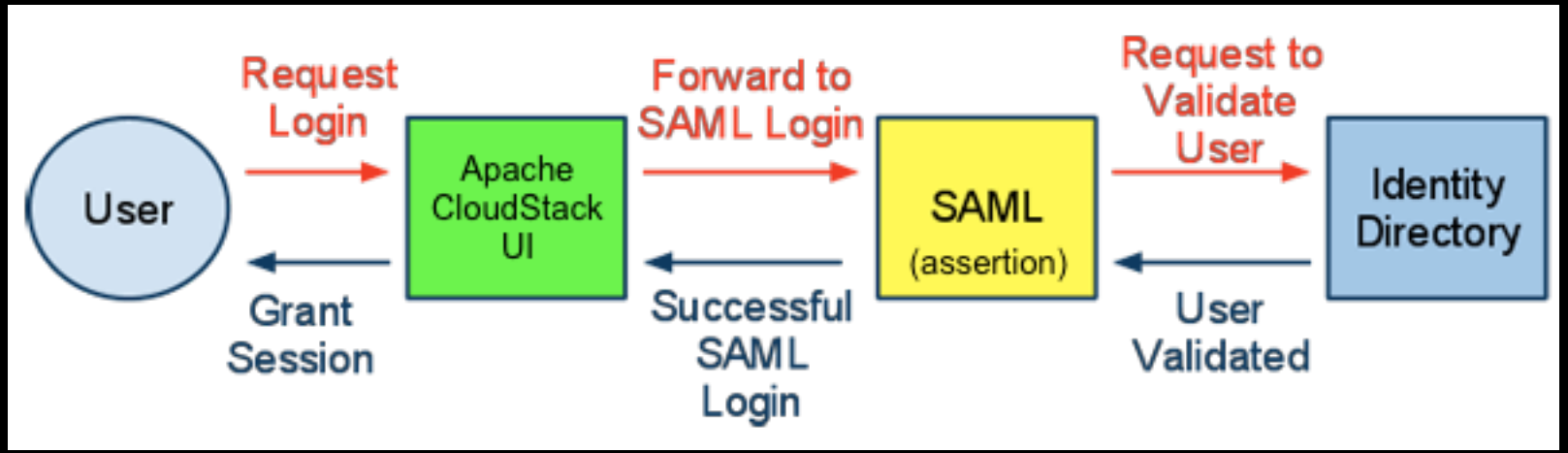
Single Sign On in your Organization

- SSO is widely used in many small to large organizations
- Typical user management using a directory service such as LDAP or Microsoft AD
- Common use-case: Authentication using SAML Identity Provider server backed by LDAP/AD
- SAML server provider means to authentication (protocol) and LDAP/AD providers means to user/group management (identity)

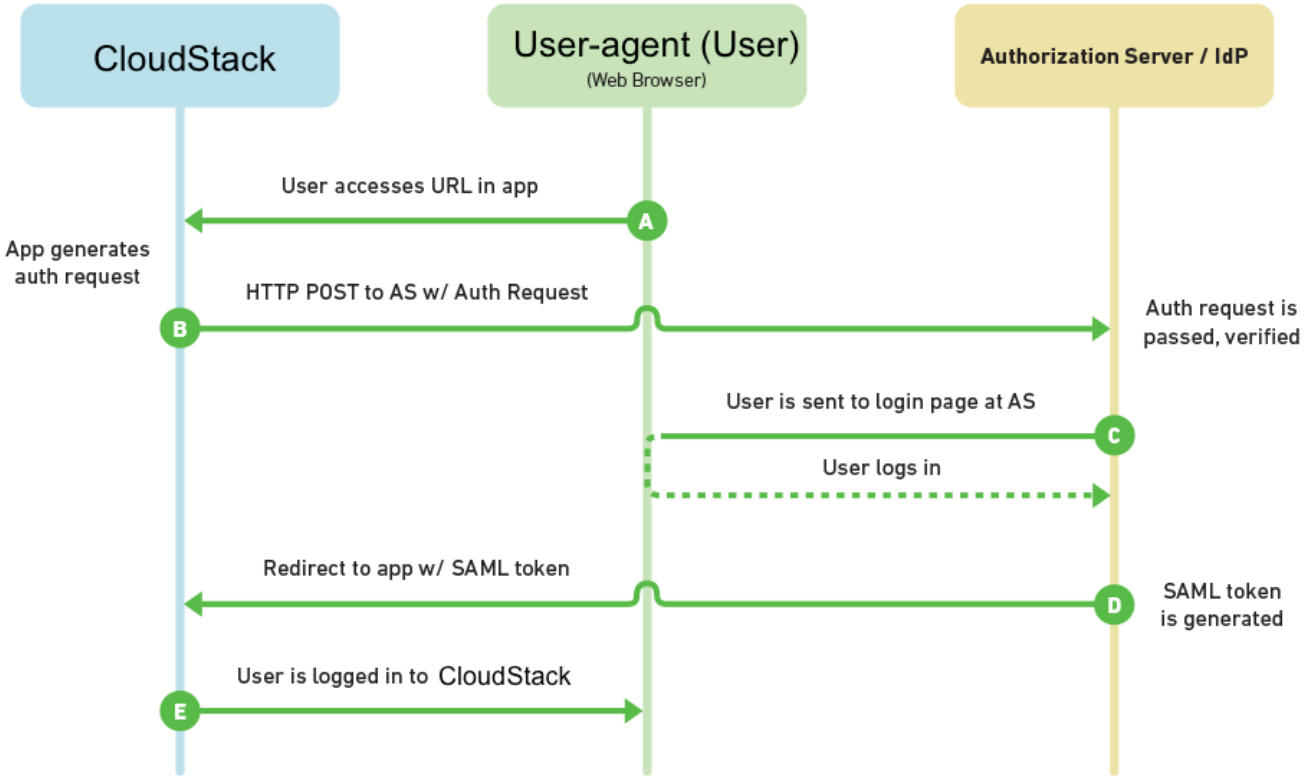
SAML Concepts

- Service Provider: Your application that communicates with IdP in order to obtain information about the user it interacts with
- Identity Provider: Entity that knows how to authenticate users and provide information about their identify to service providers or relaying parties
- Agent: User or the browser
- Metadata: XML describing IdP or SP used to establish federation
- Bindings: Mechanism used to delivery SAML messages such as HTTP-POST, HTTP-Redirect etc.

How SAML works?



SAML 2.0 Flow


CloudStack
User-agent (User)
(Web Browser)
Authorization Server / IdP
User accesses URL in app
A
App generates auth request
HTTP POST to AS w/ Auth Request
B
Auth request is passed, verified
User is sent to login page at AS
C
User logs in
Redirect to app w/ SAML token
D
SAML token is generated
User is logged in to CloudStack
E

CloudStack SAML2 Plugin SSO Process

- Admin imports or adds user. Enables SAML SSO for a user account against a specific IdP server.
- User visits CloudStack login page, selects a IdP server from the dropdown (or local login, in case of CloudStack's own username/ password based login)
- User is taken to the IdP login page, on successful authentication browser is redirected to CloudStack
- CloudStack SAML2 plugin checks if the authenticated user exists in CloudStack for the IdP server and is allowed to proceed
- User is logged into CloudStack or is shown an error message

SAML2 SSO CloudStack Plugin features

- Support for multiple IdP servers and federated SSO
- Pre-authorization based workflow
- UI enhancements
- Supports both file and URL based metadata discovery
- Switching across multiple SAML enabled domain/accounts
- Tested and works with Shibboleth IdP server, Microsoft AD with SAML SSO, OneLogin, OpenFiede etc.

Assumptions and Limitations

- CloudStack's SAML2 SP Plugin requires pre-authorization i.e. user account need to be added (if they don't exist) and authorized to allow SAML based SSO, by an admin or domain admin, prior to SSO
- SSO is SP initiated, IdP provider cannot initiate SSO. This means users need to start the SSO process from CloudStack's screen

Configuring/Using CloudStack SAML2 Plugin

- Available with CloudStack 4.5.2+
- Global settings (Demo)
- Configuring IdP server to allow CloudStack SP, using SP Metadata
- Both file and URL based

Real World Usage and Examples

- USP's CloudStack cloud uses SAML2 SSO Plugin
- CAFe federated SSO login tested
- Dev-test environments know to be running successfully against Microsoft ADFS
- Upcoming Brazilian universities to use federated SAML2 based SSO, CAFe compliant

Thank You

Questions?