Modern UI for CloudStack

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$ whoami: Anurag Awasthi

- **Software Engineer** @ ShapeBlue.
- From Kanpur, India.
- Background:
  - CloudStack feature development, KVM, VR.
  - Formerly at Twitter, PocketGems, Microsoft Research.
  - Diverse experiences - Backend, Web, iOS, Android, Machine Learning.
- Loves programming (github.com/anuragaw), dogs and trekking

$ whoami: Rohit Yadav

- **Software Architect** @ ShapeBlue.
- From Gurugram, India.
- Background:
  - Committer and PMC, 7 years and counting!
  - RM and maintainer for several minor and major releases
  - Specialize in design and architecture, framework, tooling, APIs, KVM, VMware, VR/networking, debugging.
  - Author of cloudmonkey 🐵 and several features in CloudStack.
- Love cats 🐱 and programming.

Topics

- State of Present CloudStack UI
- Lesson Learnt
- Modern UI Requirements
- Side Project
- Demo
- Proposal and Next Steps
- Q&A

State of CloudStack UI

- JQuery based single page app
- Own javascript framework, custom widgets
- Imperatively programmed, DOM manipulation
- Old styled css, static assets
- Hard to styling, templating, customisation
- Checked-in libraries within repo, hard to upgrade
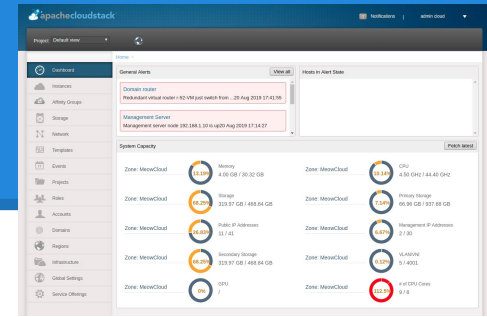
State of CloudStack UI

- No browser history
- Loss of context on refresh
- Hard to extend and integrate
- Single JS files with 1000s LoC
- system.js: 22kloc ruler-driven { } code
- Hard to maintain, develop, extend…
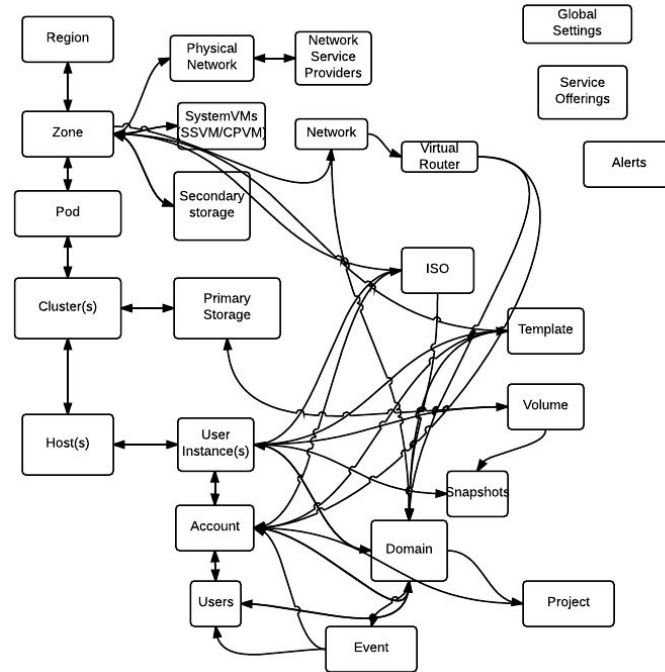- Difficult for new engineer(s) to get started

Lesson Learnt: ProjectX (~2014-2015)

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Lesson Learnt: CloudMonkey

- UI for the command-line
- API discovery and param-completion
- Small and concise codebase, data-driven UI, UX on terminal
- Convention based ("camelCase" -> "camel case")
- New CloudMonkey: Go-lang based, single binary, easy to install and use; separate release cycle from Apache CloudStack


```
bhaisaab@antrix   ~   [12:57:57]
> cmk
Apache CloudStack 🐵 CloudMonkey 6.0.0-beta3
Report issues: https://github.com/apache/cloudstack-cloudmonkey/issues

(rohitlab) 😺 >
```

https://github.com/apache/cloudstack-cloudmonkey/

Modern UI Requirements

- Declarative programming and web-component based
- API discovery and param-completion like CloudMonkey
- Auto-generated UI widgets, views, behaviour
- Data-driven behaviour and views, buttons, actions etc. based on role-based permissions
- Easy to learn, develop, customise, extend and maintain
- Use modern development methodologies, frameworks and tooling, vendoring etc.
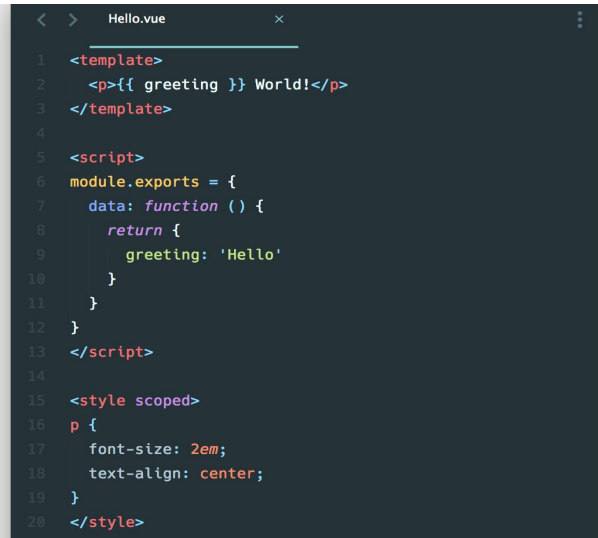- No DIY frameworks, reuse opensource project(s)

API-Discovery and Param Completion

- Discover APIs available for a role: listApis
- API name and request arguments (input and types)
- API response with keys and types of each key
- Convention driven mapping of APIs for input argument and types

What is a Web Component?

- Reusable building block
- Encapsulation and interoperability
- Custom element
- HTML Template, CSS styling
- Modular JS
- Spec:
  https://github.com/w3c/webcomponents


```
Hello.vue                          ×
1  <template>
2    <p>{{ greeting }} World!</p>
3  </template>
4
5  <script>
6  module.exports = {
7    data: function () {
8      return {
9        greeting: 'Hello'
10     }
11   }
12 }
13 </script>
14
15 <style scoped>
16 p {
17   font-size: 2em;
18   text-align: center;
19 }
20 </style>
```

(Opensource) CloudStack UIs

- Bitworks CloudStack UI (Primarily User UI)

  https://github.com/bwsw/cloudstack-ui

- Angular based UI (PoC)

  https://github.com/apache/cloudstack/tree/master/tools/ngui

- Misc CloudStack UIs and Portals (not opensource/free)

Survey: Frameworks and Tools

- JS frameworks:
  ReactJS, AngularJS, VueJS…
- Frontend frameworks:
  Bootstrap, Semantic-UI, Foundation,
  Material UI, Buefy, Quasar, Ant Design …
- Modern tooling: npm, ncu etc.

VueJS

The Progressive
JavaScript Framework

▶ WHY VUE.JS?   GET STARTED   ⚫ GITHUB

Approachable

Already know HTML, CSS and JavaScript? Read the guide and start building things in no time!

Versatile

An incrementally adoptable ecosystem that scales between a library and a full-featured framework.

Performant

20KB min+gzip Runtime Blazing Fast Virtual DOM Minimal Optimization Efforts

```
    Hello.vue                    ×                    ⋮
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6  module.exports = {
7    data: function () {
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```

https://vuejs.org/v2/guide/

Ant Design

Ant Design Vue

input search text

https://github.com/ant-design/ant-design

Components   Ecosystem   Support us   1.3.17-beta.1 ▼   中文

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Ant Design of Vue

Getting Started

Use in vue-cli

Customize Theme

Change Log

Internationalization

FAQ

Sponsor

Download Design Resources

Components(55)   ▲

Features
Environment Support
Version
Installation
Using npm or yarn
Import in Browser
Usage
Use modularized antd
Links
Contributing
THANK YOU

Ant Design of Vue

Following the Ant Design specification, we developed a Vue UI library `antd` that contains a set of high quality components and demos for building rich, interactive user interfaces.

Features

- An enterprise-class UI design language for web applications.
- A set of high-quality Vue components out of the box.
- Shared Ant Design of React design resources.

Environment Support

- Modern browsers and Internet Explorer 9+ (with polyfills)
- Server-side Rendering
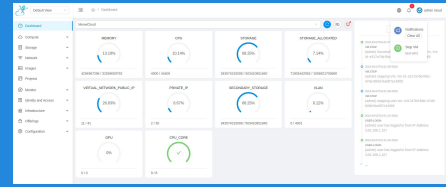
Introducing: Primate!

** incomplete features and bugs included ;)

Primate: A Modern UI

- VueJS and Ant Design based UI
- Declarative programming
- Hot-reloading, vendoring
- Clean and separate development lifecycle
- Easy to learn, develop, extend and maintain
- Multi-set: For admins, users, custom roles

Primate UI for CloudStack

- Clean Enterprise Admin UI (VueJS + Ant Design)
- API auto-discovery, widget auto-generation
- Config and Role-based rendering of buttons, actions, views etc. Dashboard, list and detail views
- URL router and browser history driven
- Misc: Local-storage based notification and polling, dynamic translations…
- Supports Desktop, Tablets, Mobile screen forms

Primate UI Demo!

Credits and Attributions

- Sven Vogel (eWerk): Review, feedback, support
- M. Weber (eWerk): CSS refactoring, styling changes
- Philipp Bankonier (eWerk): JS changes
- Anurag Awasthi - Translation and action notifications
- Giles Sirett, Paul Angus and team ShapeBlue - Requirements and support
- VueJS (https://vuejs.org)
- Ant Design Vue (https://vue.ant.design/)
- Ant Design Pro Admin Template (https://github.com/sendya/ant-design-pro-vue)
- Font/Fort-Awesome (https://github.com/FortAwesome/Font-Awesome)
- Cat Force Icons by Iconka (https://www.iconfinder.com/iconsets/cat-force, https://iconka.com/en/)

What's Next?

- Opensource under APL 2.0:
  https://github.com/shapeblue/primate
- Build Support: Start discussions on dev@, discuss Primate, seek reviews, requirements, feedback ***CCCNA19* UI Hackathon Track!**
- Next few months: complete all major goals, features and functionality on par with present CloudStack UI

Proposed Timelines

- Build support, propose, seek vote on dev@
- Primate codebase donated and accepted
- Technical preview/beta release ~4.14/Q1 2020, stop work on old UI
- Documentation and Notes
- Discuss and work on upgrade path and migration plan
- GA as default UI: ~H2/2020, 4.15+

Q&A - Thanks!

We're Hiring!

https://www.shapeblue.com/careers/