



**APACHECON**  
North America

**cloud  
STACK**  
COLLABORATION  
CONFERENCE  
U S A

# Modern UI for CloudStack

**Anurag Awasthi**

Software Engineer, ShapeBlue  
[anurag.awasthi@shapeblue.com](mailto:anurag.awasthi@shapeblue.com)

**Rohit Yadav**

Software Architect, ShapeBlue  
[rohit.yadav@shapeblue.com](mailto:rohit.yadav@shapeblue.com)

# \$ 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](https://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.



@rhtyd | rohityadav.cloud

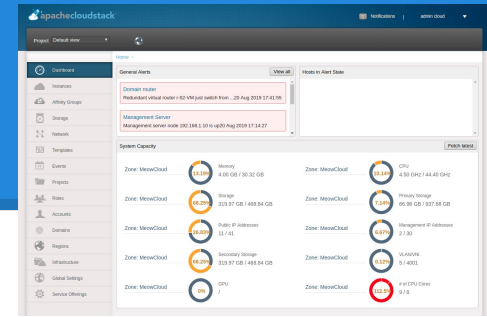
# Topics

- 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

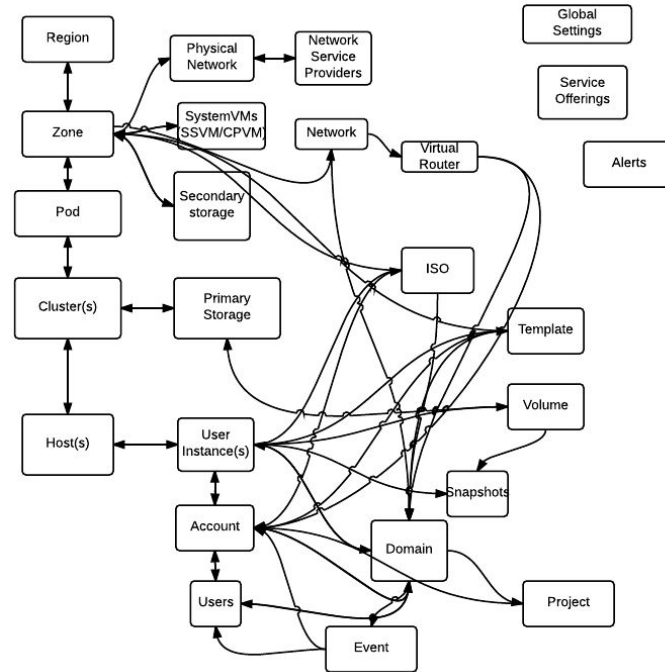


# Lesson Learnt: ProjectX (~2014-2015)

The screenshot displays the CloudX web interface. On the left is a dark navigation sidebar with categories: Cloud (Dashboard, Instances, Network, Storage, Templates) and Infrastructure (Zones, Pods, Clusters, Hosts). The main content area is titled 'Instances' and features a search bar and a list of VMs. The selected VM, 'VM-60d42d66-0de0-4441-9860-21251f75f114', is shown in a detailed view on the right, including tabs for Details, Nics, Volumes, and VM Snapshots. A table of VM details is visible below the tabs.

Account	admin
Created	2015-01-06T00:44:39+0530
Destroyed	false
Deviceid	0
Displayvolume	true
Domain	ROOT

# Lesson Learnt: ProjectX (~2014-2015)





# 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]
30> 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>

```
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>
```

<hello />

# (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

 vue

🔥 Vue.js is a progressive, incrementally-adoptable JavaScript framework for building UI on the web.

🟡 JavaScript ★ 147k 🐦 21.6k



## 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 x
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>
```

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

# Ant Design

 ant-design

 A UI Design Language

 TypeScript ★ 51.1k 🍴 18.2k

 ant-design-vue

An enterprise-class UI components based on Ant Design and Vue. 🐼

 Vue ★ 8k 🍴 976



Ant Design Vue

🔍 input search text

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

[Components](#)

[Ecosystem](#)

[Support us](#)

1.3.17-beta.1 ▾

中文

Sponsors



Become a Sponsor

Ant Design of Vue

Getting Started

Use in vue-cli

Customize Theme

Change Log

Internationalization

FAQ

Sponsor

Download Design Resources

Components(55)

## 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

Features

Environment Support

Version

Installation

Using npm or yarn

Import in Browser

Usage

Use modularized antd

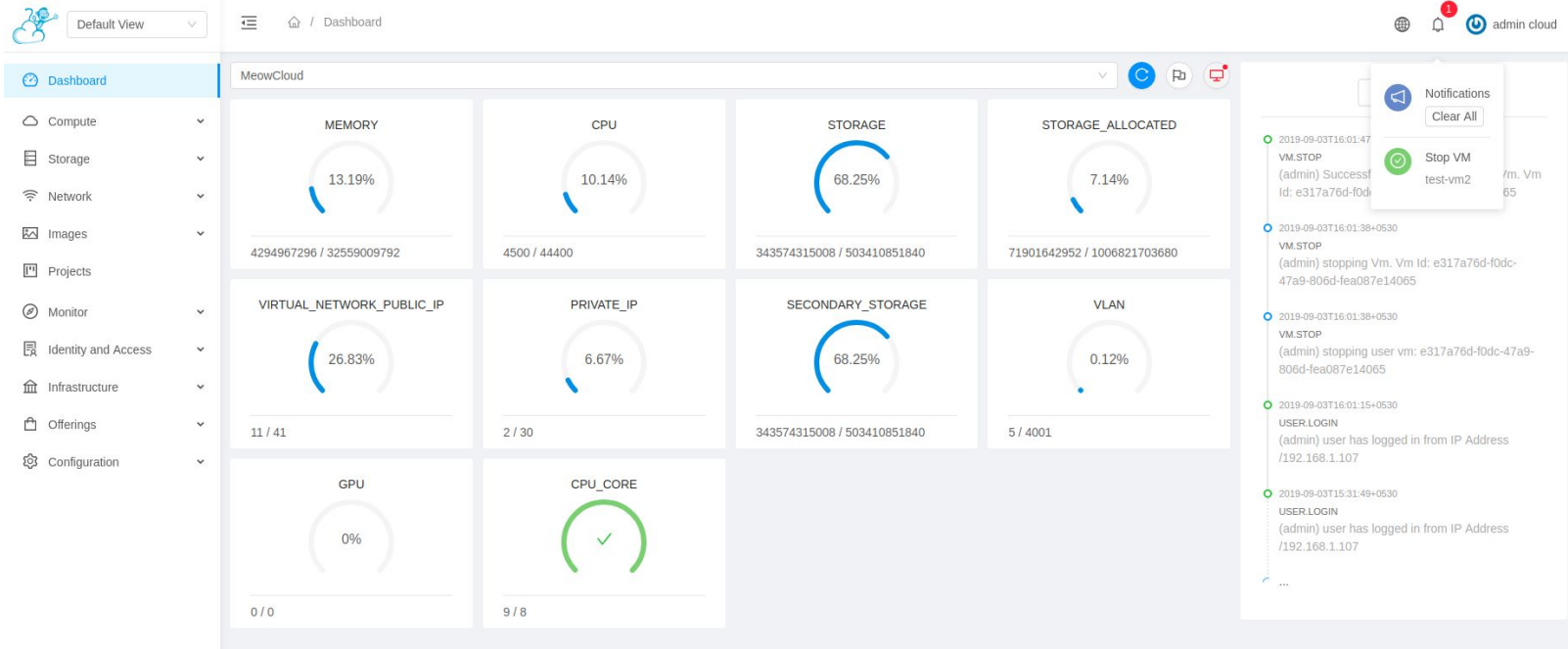
Links

Contributing

THANK YOU



# Introducing: Primate!



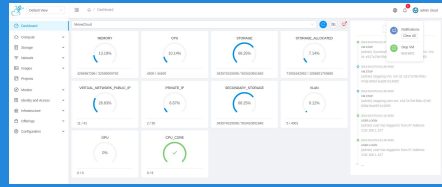
**\*\* incomplete features and bugs included ;)**

# 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/>

