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Navigating the Future: Exploring the Latest in Kubernetes Dashboard Development

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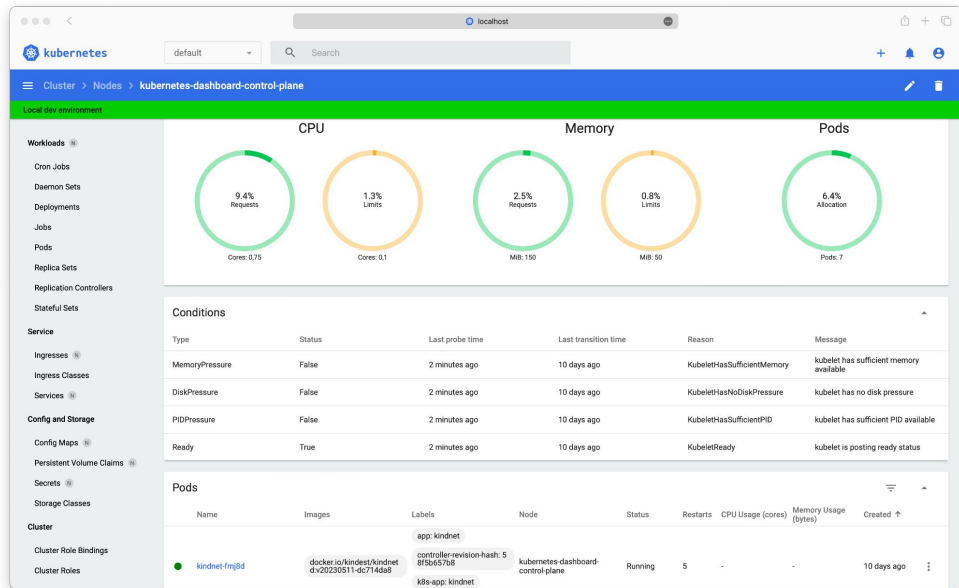
- Project Background
- Key Changes
 - New Architecture
 - Standalone API
 - Resource List Cache
- User Experience Enhancements
- Roadmap
- Q&A

Project Background

Kubernetes Dashboard

General purpose UI for Kubernetes clusters

- First commit in 2015
- v7.9.0 released 22th October with support for Kubernetes v1.31
- ~8 millions image pulls monthly
- >1,1 billion total image pulls

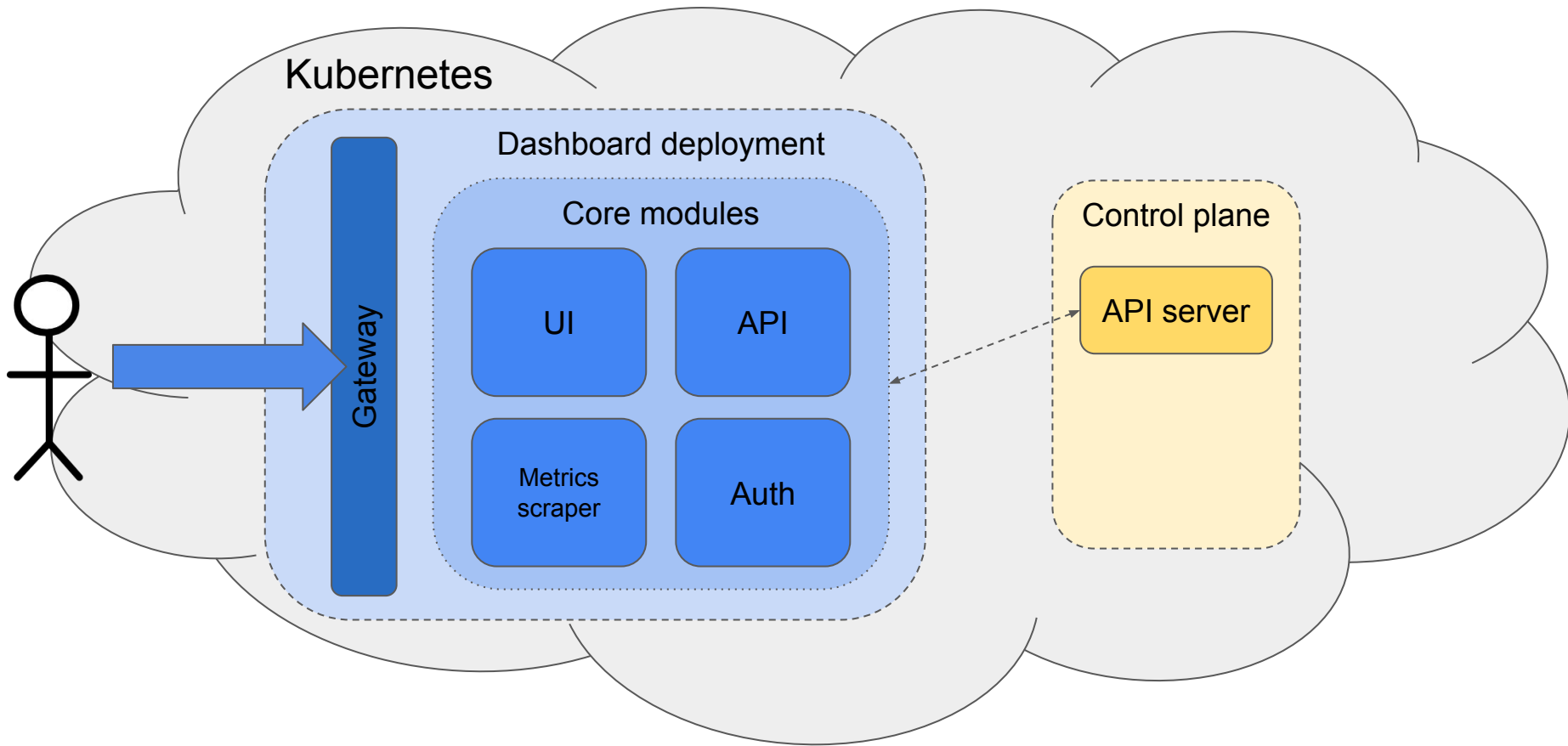


kubernetes/dashboard

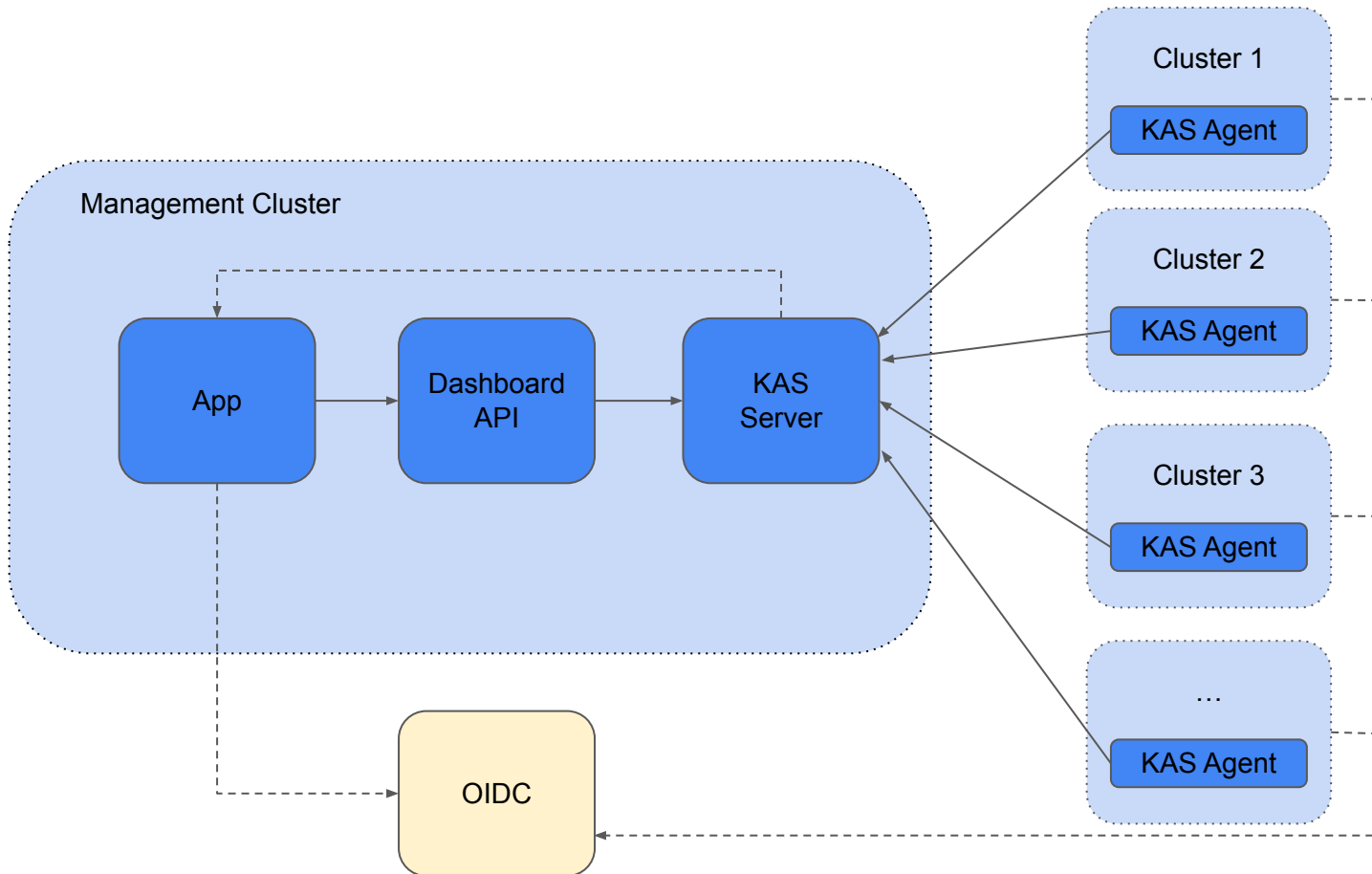


#sig-ui

Key Changes - New Architecture



Key Changes - Standalone API



Key Changes - Standalone API

The screenshot shows the Kubernetes Dashboard interface. The top navigation bar includes the 'Plural' logo, a dropdown menu for 'All projects', an 'Enterprise' badge, a search bar, and a user icon. The breadcrumb trail indicates the current location: 'kubernetes / plrl-dev-aws / workloads / deployments'. The left sidebar contains navigation links for 'Configuration', 'RBAC', 'Cluster', and 'Custom resources'. The main content area displays a table of Deployments for the 'plrl-dev-aws' namespace. The table columns are Name, Namespace, Images, Pods, Status, Labels, and Creation. The table lists several deployments, including 'ai-proxy', 'cert-manager', 'cert-manager-cainjector', 'cert-manager-webhook', 'cytoscape', 'dash-controller', 'echo', 'picsum', and 'guestbook-ui'. Each deployment row includes a 'Pods' column showing the number of pods (e.g., '1 / 1') and a 'Status' column (e.g., 'Running'). The 'Labels' column shows the deployment's labels (e.g., 'app: cert-manager'). The 'Creation' column shows the deployment's creation time (e.g., 'Jul 5, 2024 5:21 PM').

Name	Namespace	Images	Pods	Status	Labels	Creation
ai-proxy	ai-proxy	ghcr.io/pluralsh/ai-proxy:sha-fbea899	1 / 1	Running	app.kubernetes.io/instance: ai-proxy +5	Oct 28, 2024 2:13 PM
cert-manager	cert-manager	...io/jetstack/cert-manager-controller:v1.15.3	1 / 1	Running	app: cert-manager +7	Jul 5, 2024 5:21 PM
cert-manager-cainjector	cert-manager	...io/jetstack/cert-manager-cainjector:v1.15.3	1 / 1	Running	app: cainjector +7	Jul 5, 2024 5:21 PM
cert-manager-webhook	cert-manager	...io/jetstack/cert-manager-webhook:v1.15.3	1 / 1	Running	app: webhook +7	Jul 5, 2024 5:21 PM
cytoscape	dash	.../dash-sample-app-dash-cytoscape-lda:1.0	1 / 1	Running	dash.plural.sh/name: cytoscape	Jul 16, 2024 12:49 PM
dash-controller	dash	ghcr.io/pluralsh/dash-controller:0.0.8	0 / 1	Unknown	dash.plural.sh/name: dash-controller +1	Jul 16, 2024 12:49 PM
echo	dash	hashicorp/http-echo:0.2.3	1 / 1	Running	dash.plural.sh/name: echo	Jul 16, 2024 12:49 PM
picsum	dash	zreigz/dash-picsum:0.1.0	1 / 1	Running	dash.plural.sh/name: picsum	Jul 16, 2024 12:49 PM
guestbook-ui	default	gcr.io/heptio-images/ks-guestbook-demo:0.2	1 / 1	Running	plural.sh/managed-by: agent	Jul 24, 2024 10:20 AM

Key Changes - Resource List Cache

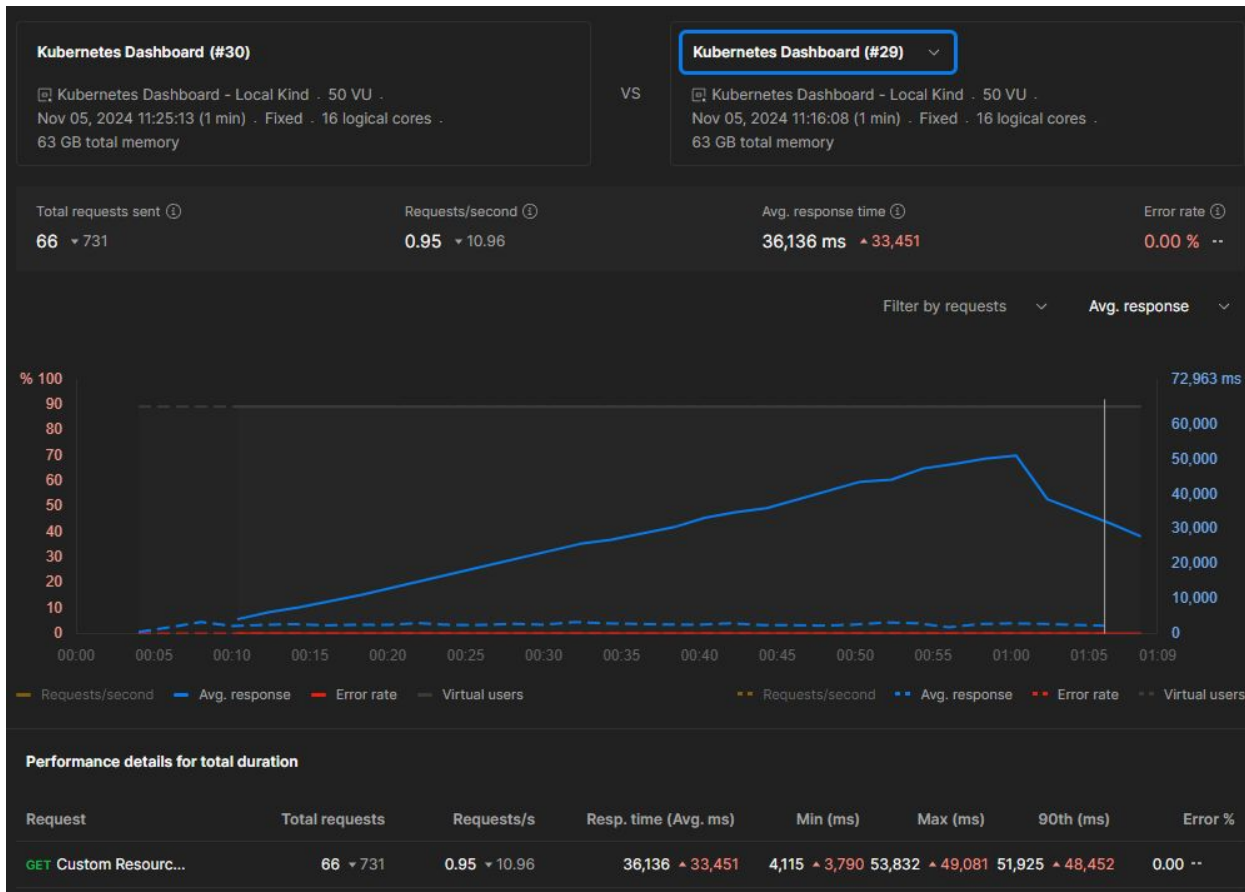
Benefits:

- Reduced latency - minimized time required to retrieve data from the Dashboard API during consecutive requests
- Enhanced user experience - smoother and more responsive experience
- Optimized resource utilization - less pressure on Kubernetes API Server, improved cluster performance
- Configurability and flexibility - cache can accommodate clusters of various sizes and complexities, it can run in multi-cluster mode as well. Users can opt-out and have same experience as before

Trade-offs:

- Using “cache-and-network” caching method can result in slightly stale data sometimes (affects only core resource lists)
- Increased average memory consumption but decreased peak memory usage

Key Changes - Resource List Cache



Test scenario:

- CRD List
- 50 virtual users
- Fixed request rate
- ~250 CRDs

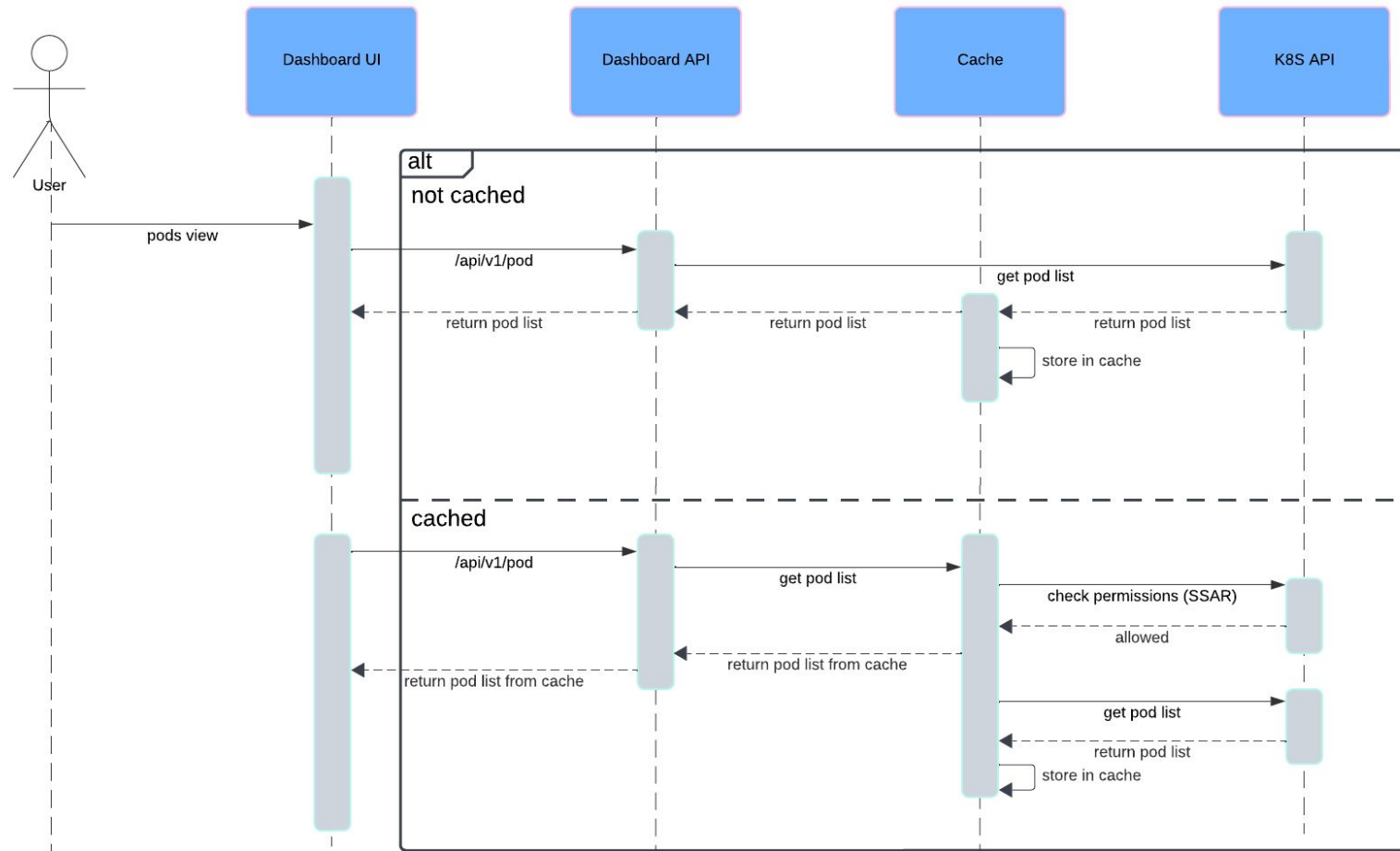
Without cache:

- Avg. response time: 36s
- Avg. requests/second: <1
- Total requests: 66

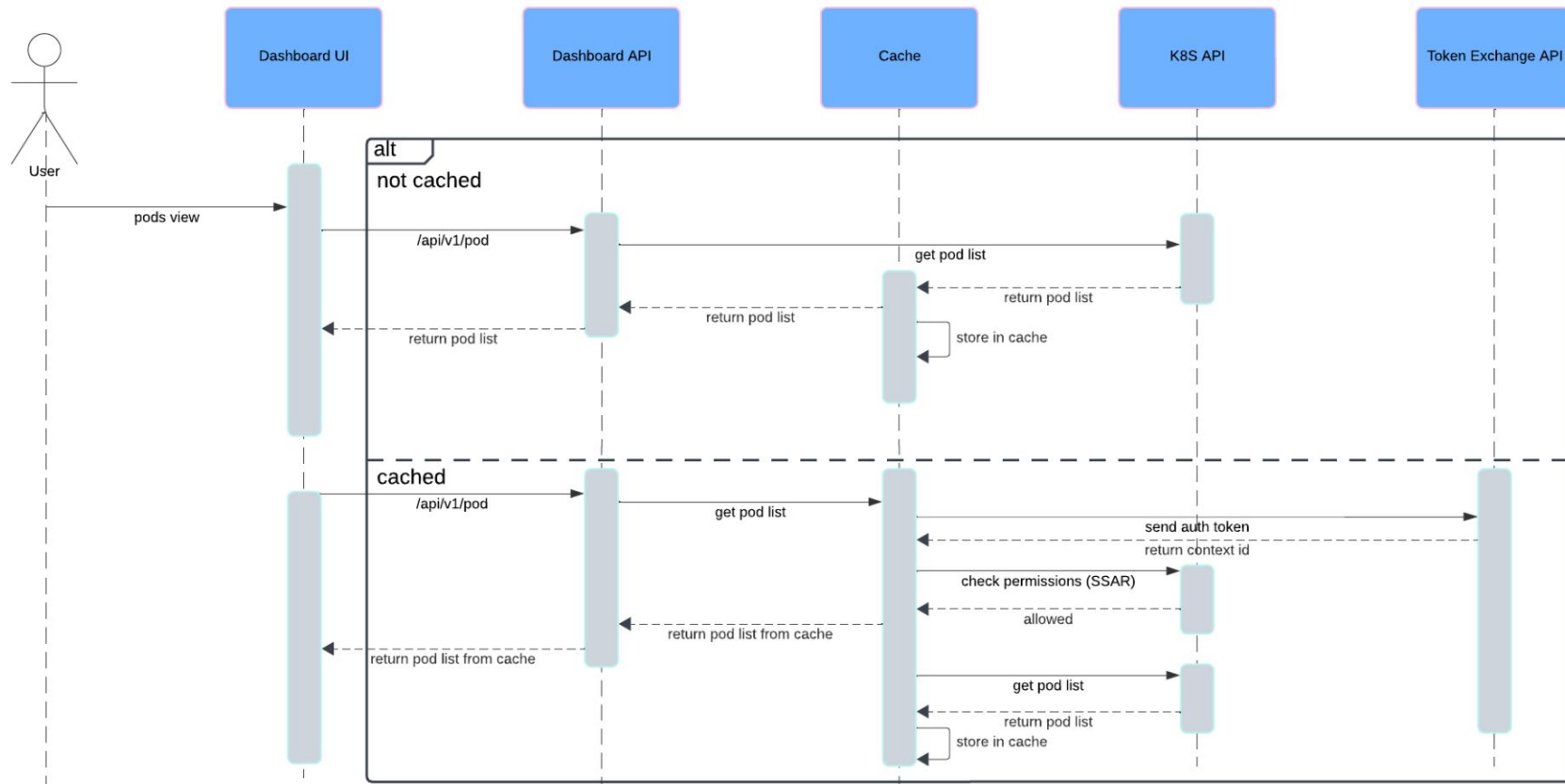
With cache:

- Avg. response time: 2.5s
- Avg. requests/second: >10
- Total requests: 797

Key Changes - Resource List Cache



Key Changes - Resource List Cache



User Experience Enhancements

Usability:

- Ingress paths are rendered as links
- About page is replaced by footer visible across the app
- Default resource auto refresh time interval was increased to 10 seconds
- Added username to user info panel
- Added support for delete propagation policy
- Added owner ref information to object meta
- Allowed hiding "All namespaces" in namespaces dropdown list

Security:

- Settings save relies on user permissions instead of Dashboard

Other:

- Improved pod container status logic to keep it in sync with kubectl
- Rewrite settings logic
- Added a small script to index.html to dynamically generate tag

Roadmap

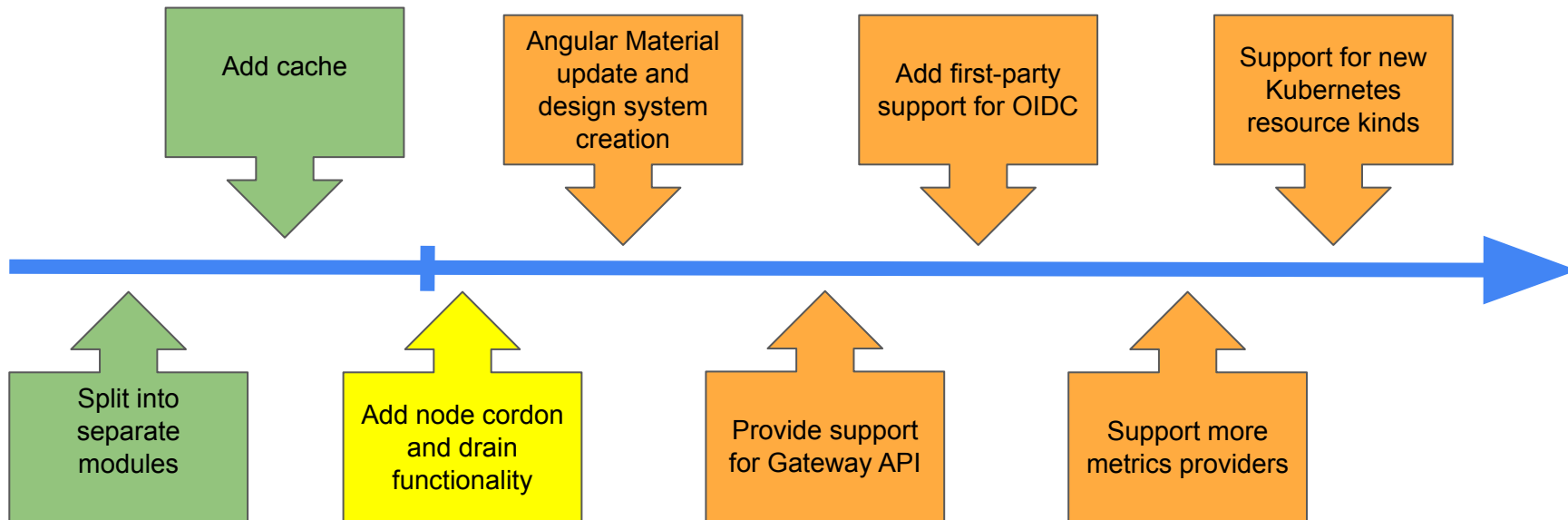


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Any questions?

Thank you!

