




FROM CODE TO CLOUD: THE DEVOPS EVOLUTION OF SMS SPAM DETECTION

Group 14: Boris Annink, Conall Lynch, Wilhelm Marcu, Jeffrey Meerovici Goryn, Alessandro Valmori



AGENDA

1. VERSIONING & RELEASE
 2. PROVISIONING
 3. DEPLOYMENT
 4. RATE LIMITING & MONITORING
 5. EXPERIMENTATION & EXTENSION
 6. Q&A
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VERSIONING & RELEASE

- Semantic versioning: The standard MAJOR.MINOR.PATCH structure is employed.
- Single Source of Truth (SSOT) for the front and backend are stored in:
 - pom.xml (app)
 - version.txt (model-service)

```
12     <groupId>sms</groupId>
13     <artifactId>frontend</artifactId>
14     <version>0.0.4</version>
```

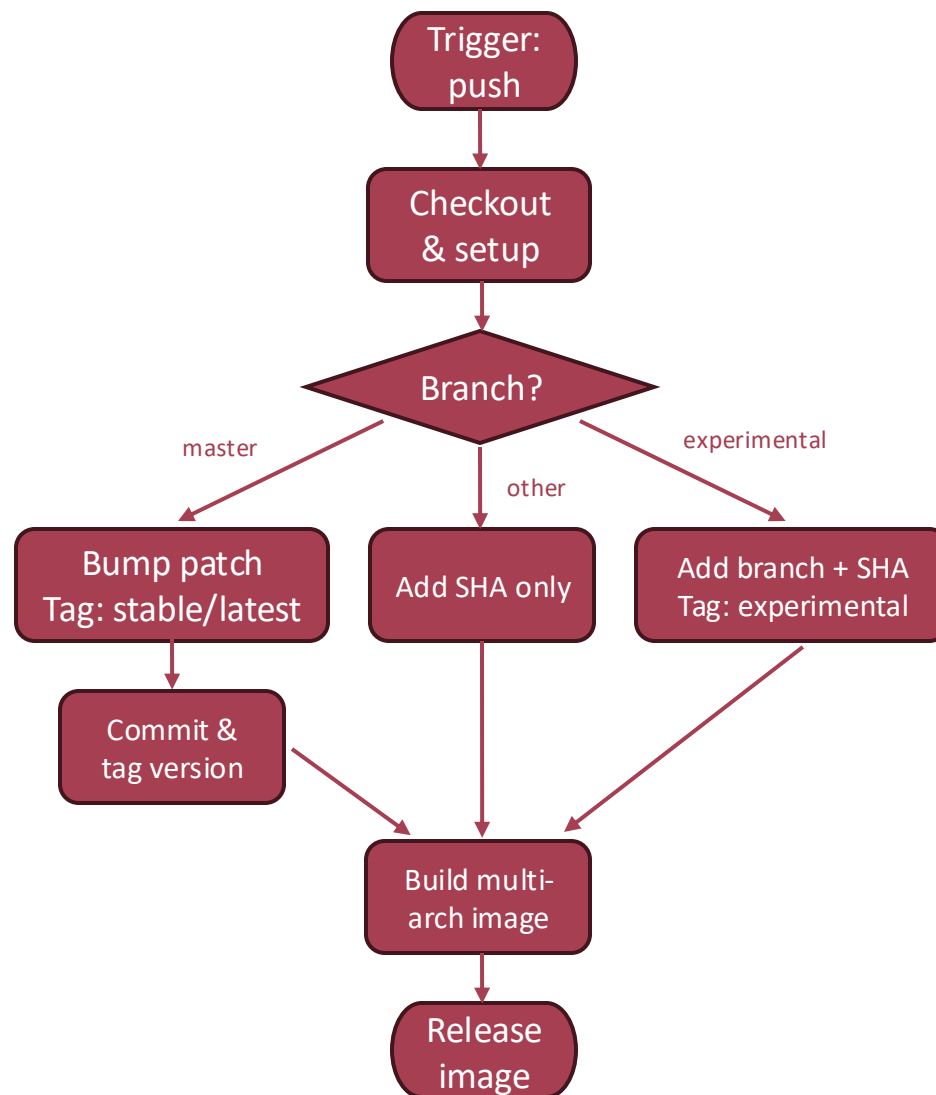
Versioning SSOT for Frontend

- Automated workflows via GitHub Actions:
 - **App:** Automated Releases
 - **Model-Service:** Automated Training Runs & Releases
- Triggered on:
 - Push to Master
 - PR Events
 - Manual Trigger for testing purposes
- Tags for:
 - Regular Release
 - Experimental Branch



Frontend Release Workflow

RELEASE PIPELINE

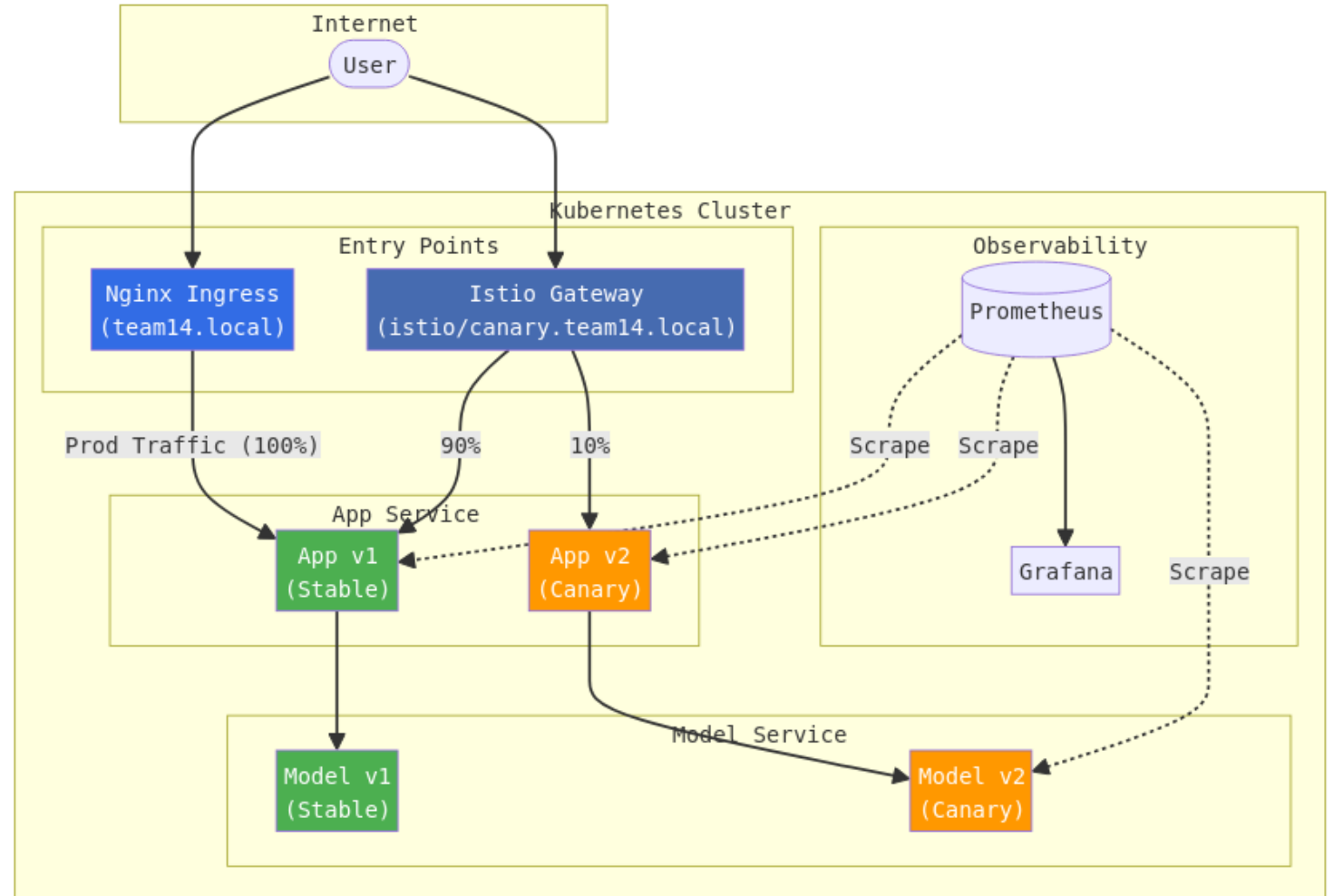
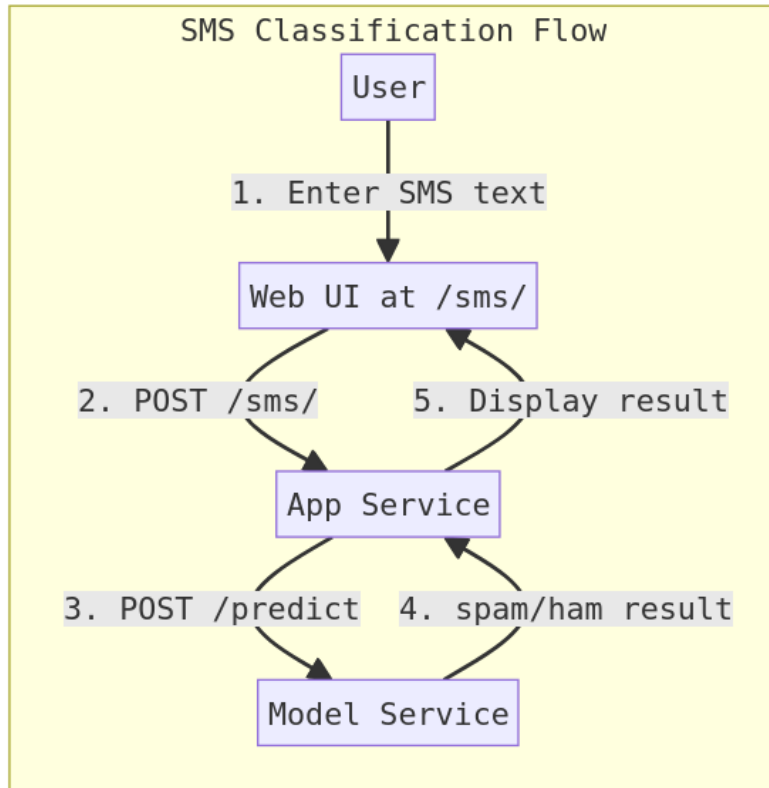


PROVISIONING



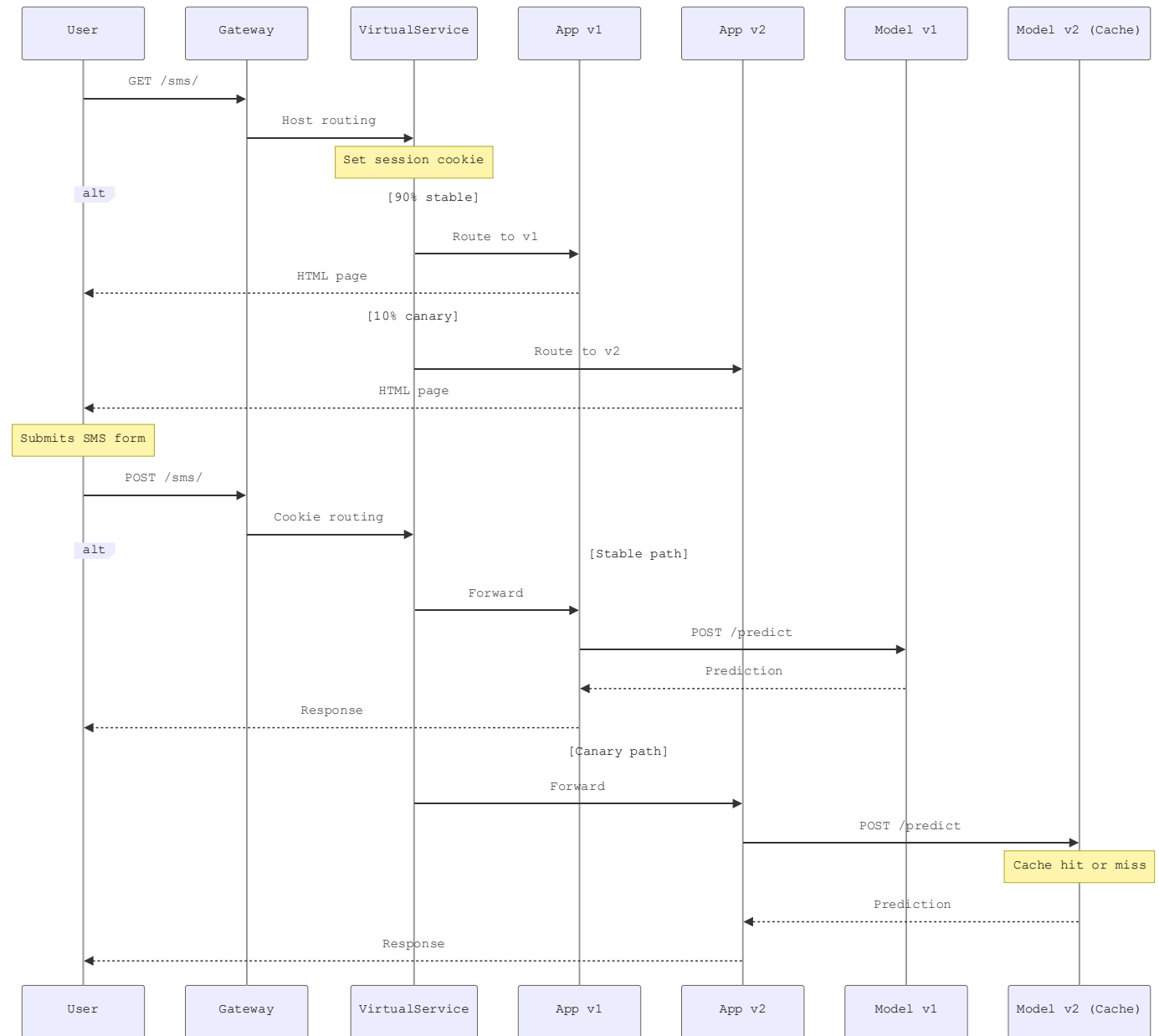
- Ansible Playbooks are employed to provision the cluster.
- Two Types: Ctrl and Node
 - **Node:** Runs Standard Setup playbooks and a **node** specific playbook which joins the node to the cluster.
 - **Ctrl:** Our control node. Runs standard playbooks and **ctrl** specific playbook which installed the ctrl requirements, creates a shared folder at `/mnt/shared/` and generates the join command
- Drawbacks discussed in the *Extension* section
- Our implementation runs on a Vagrant Virtual Machine Cluster.
- Implementation is cluster agnostic.
- Bash scripts provided for easier provisioning with:
 - Minikube (local testing)
 - Docker
 - Vagrant VMs

DEPLOYMENT



TRAFFIC ROUTING

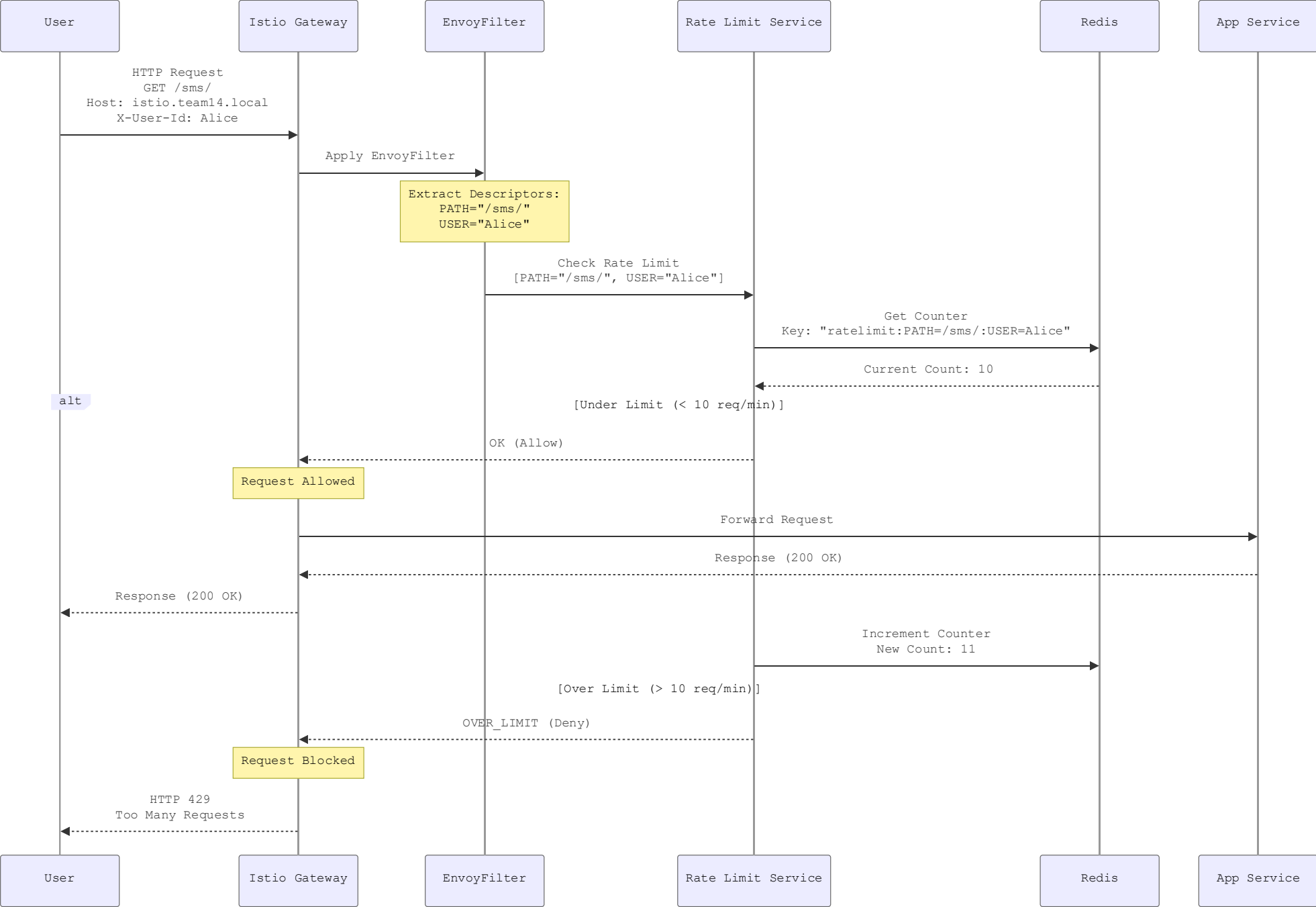
- Ingress provides access to stable release
- Istio service mech for advanced routing
 - Access both stable and experimental
 - Destination rule for configuring split
 - 90/10
 - Cookies for sticky sessions



RATE LIMITING

- Need a way to deal with excessive traffic
 - Malicious: Denial of Service attacks
 - Unintentional: bugged client in endless loop
- Service degradation
- Resource starvation
- Increased costs
- Implemented at the Istio service mesh level
- EnvoyFilter to extract descriptors
- 10 req/min on /sms path





METRICS



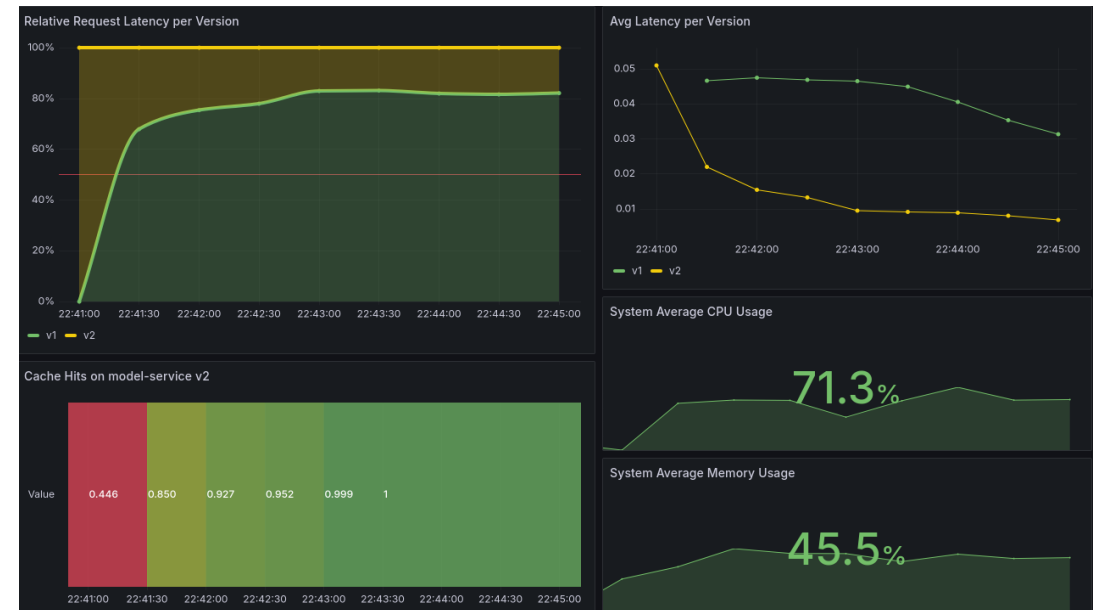
- /metrics endpoint exposes data
 - % messages classified as ham
 - # active users
 - request rate
 - average latency
 - CPU / memory usage
- ServiceMonitors periodically scrape endpoints



EXPERIMENTATION

- Currently: every request submitted to ML model
 - High overhead, repeated requests, scales poorly
- Idea: cache requests, only use ML model if needed
 - Size: 1000, TTL: 1h, FIFO eviction
 - Key = SHA-256 of message
- Caching feature can be toggled
 - Only used if X-Cache-Enabled header is set

- Metrics: prediction latency (ms), CPU usage (%)
- Hypothesis: reduce metrics by at least 20%



EXTENSION

- IaC used: Kubernetes, Helm, GH workflows, Vagrant, Ansible
- Inconsistency: Ansible is imperative, everything else is declarative
- Pain point: updating playbooks slow and tedious
 - Long provisioning times
 - Non-atomic updates: error = broken VM
 - No rollback mechanism
 - Not truly reproducible: convergent but not congruent

- Solution: NixOS: Linux distro built on the Nix package manager
- Purely functional, declarative system config
- Strong guarantees about correctness and reproducibility
- Atomic updates: error = stay on prior version
- Rollback built in
- Potential drawbacks: steep learning curve, packages must be specifically designed for Nix





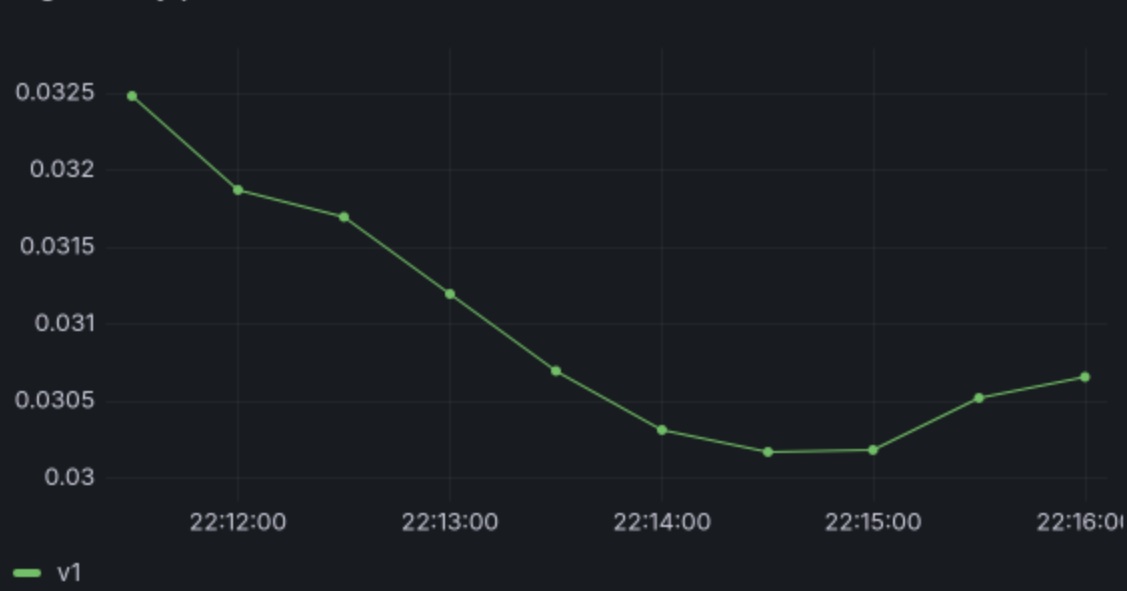
THANK YOU!

ANY QUESTIONS?

Relative Request Latency per Version



Avg Latency per Version



Cache Hits on model-service v2



System Average CPU Usage



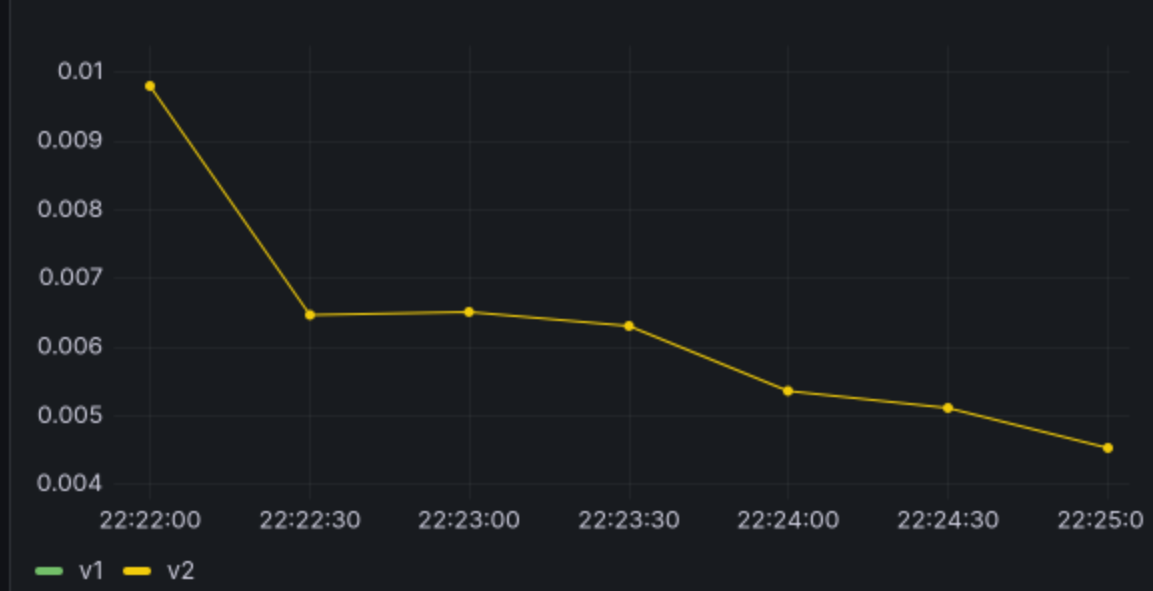
System Average Memory Usage



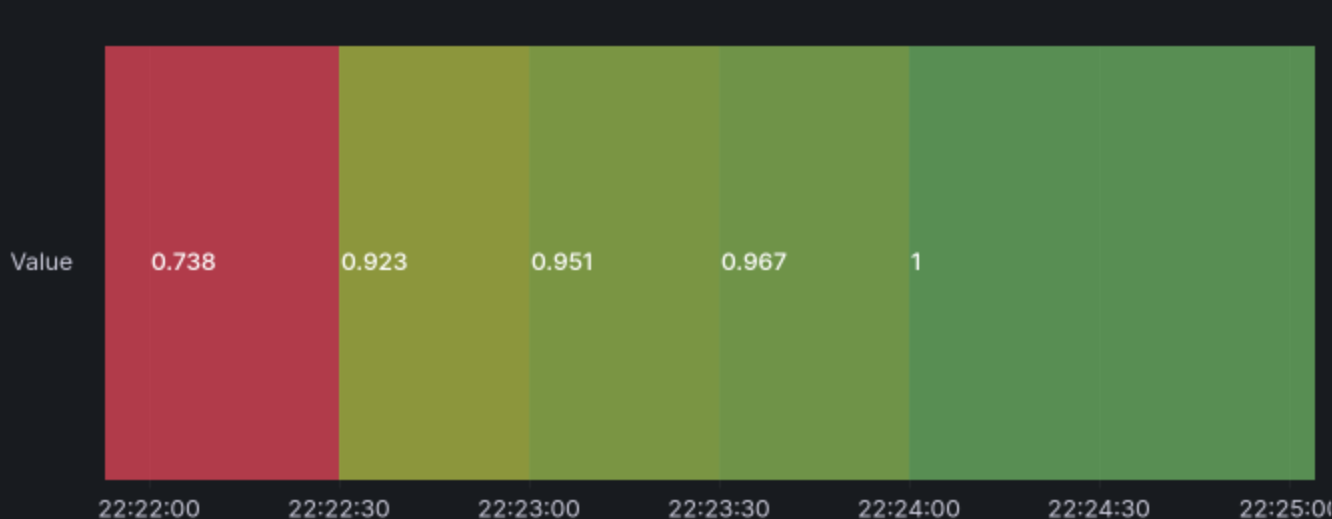
Relative Request Latency per Version



Avg Latency per Version



Cache Hits on model-service v2



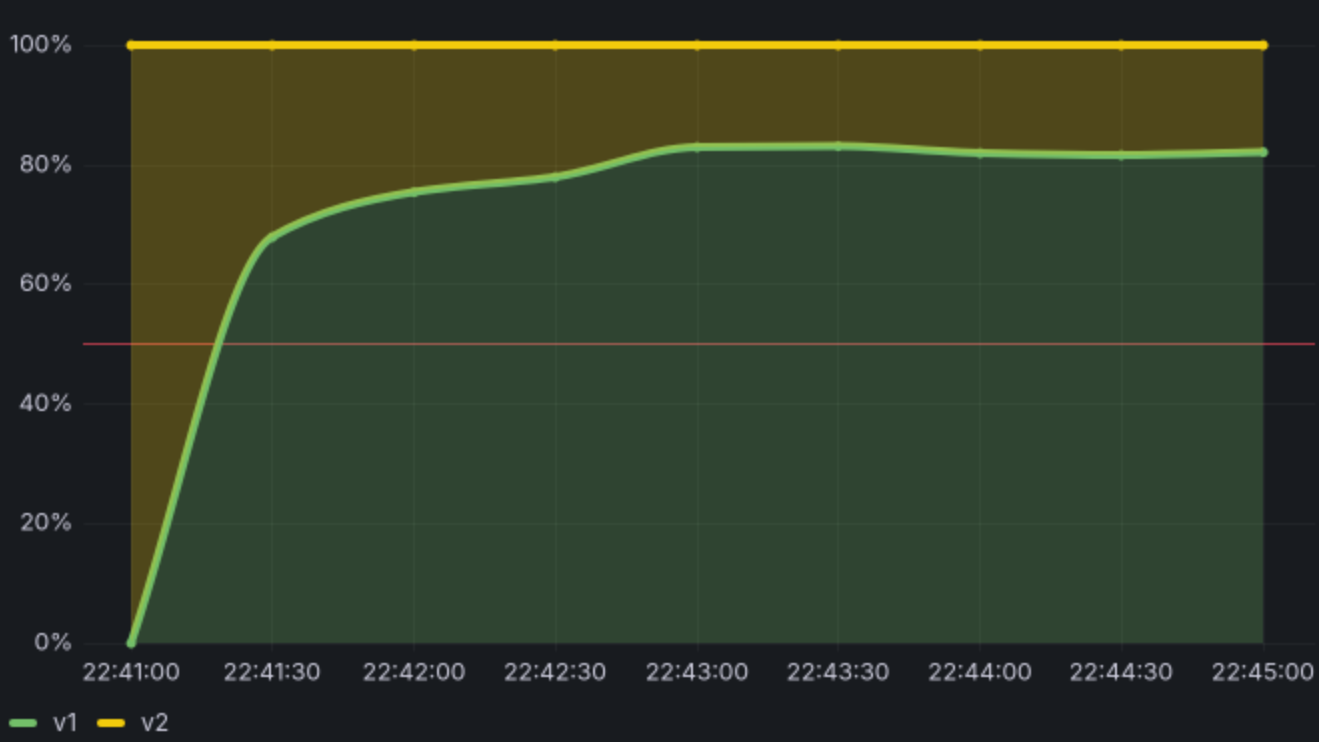
System Average CPU Usage



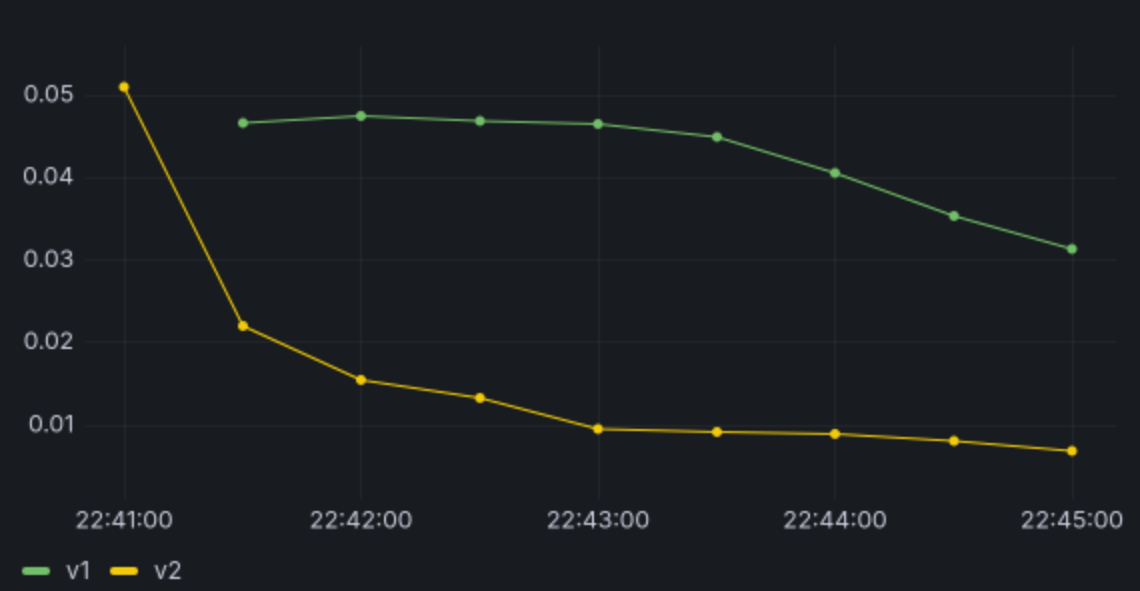
System Average Memory Usage



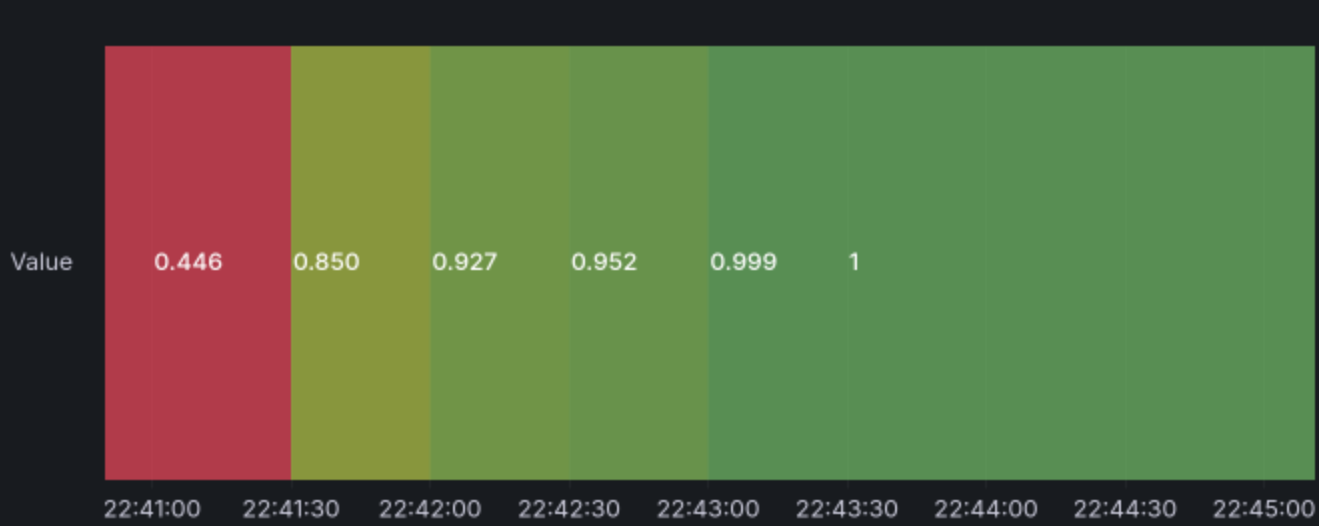
Relative Request Latency per Version



Avg Latency per Version



Cache Hits on model-service v2



System Average CPU Usage



System Average Memory Usage



THE FOLLOWING SLIDES ARE
PART OF THE TEMPLATE

PLEASE LEAVE THEM UNCHANGED (COPY THEM IF NEEDED)



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AGENDA

1. INTRODUCTION

2. BUILDING CONFIDENCE

3. ENGAGING THE AUDIENCE

4. VISUAL AIDS

5. FINAL TIPS & TAKEAWAYS

6.

7. Q&A



THE POWER OF COMMUNICATION

OVERCOMING NERVOUSNESS

CONFIDENCE-BUILDING STRATEGIES





ENGAGING THE AUDIENCE

- Make eye contact with your audience to create a sense of intimacy and involvement
- Weave relatable stories into your presentation using narratives that make your message memorable and impactful
- Encourage questions and provide thoughtful responses to enhance audience participation
- Use live polls or surveys to gather audience opinions, promoting engagement and making sure the audience feel involved



SELECTING VISUAL AIDS

ENHANCING YOUR PRESENTATION

EFFECTIVE DELIVERY TECHNIQUES

This is a powerful tool in public speaking. It involves varying pitch, tone, and volume to convey emotion, emphasize points, and maintain interest:

- Pitch variation
- Tone inflection
- Volume control

Effective body language enhances your message, making it more impactful and memorable:

- Meaningful eye contact
- Purposeful gestures
- Maintain good posture
- Control your expressions

NAVIGATING Q&A SESSIONS

1. Know your material in advance
2. Anticipate common questions
3. Rehearse your responses

Maintaining composure during the Q&A session is essential for projecting confidence and authority. Consider the following tips for staying composed:

- Stay calm
- Actively listen
- Pause and reflect
- Maintain eye contact

SPEAKING IMPACT

Your ability to communicate effectively will leave a lasting impact on your audience

Effectively communicating involves not only delivering a message but also resonating with the experiences, values, and emotions of those listening



DYNAMIC DELIVERY

Learn to infuse energy into your delivery to leave a lasting impression

One of the goals of effective communication is to motivate your audience

METRIC	MEASUREMENT	TARGET	ACTUAL
Audience attendance	# of attendees	150	120
Engagement duration	Minutes	60	75
Q&A interaction	# of questions	10	15
Positive feedback	Percentage (%)	90	95
Rate of information retention	Percentage (%)	80	85

FINAL TIPS & TAKEAWAYS

Consistent rehearsal

- Strengthen your familiarity

Refine delivery style

- Pacing, tone, and emphasis

Timing and transitions

- Aim for seamless, professional delivery

Practice audience

- Enlist colleagues to listen & provide feedback

Seek feedback

Reflect on performance

Explore new techniques

Set personal goals

Iterate and adapt

SPEAKING ENGAGEMENT METRICS

IMPACT FACTOR	MEASUREMENT	TARGET	ACHIEVED
Audience interaction	Percentage (%)	85	88
Knowledge retention	Percentage (%)	75	80
Post-presentation surveys	Average rating	4.2	4.5
Referral rate	Percentage (%)	10	12
Collaboration opportunities	# of opportunities	8	10



THANK YOU

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