A Smart Rolling Update Methodology adopt Intelligent DevOps workflow – Take Cloud Project as Use Case

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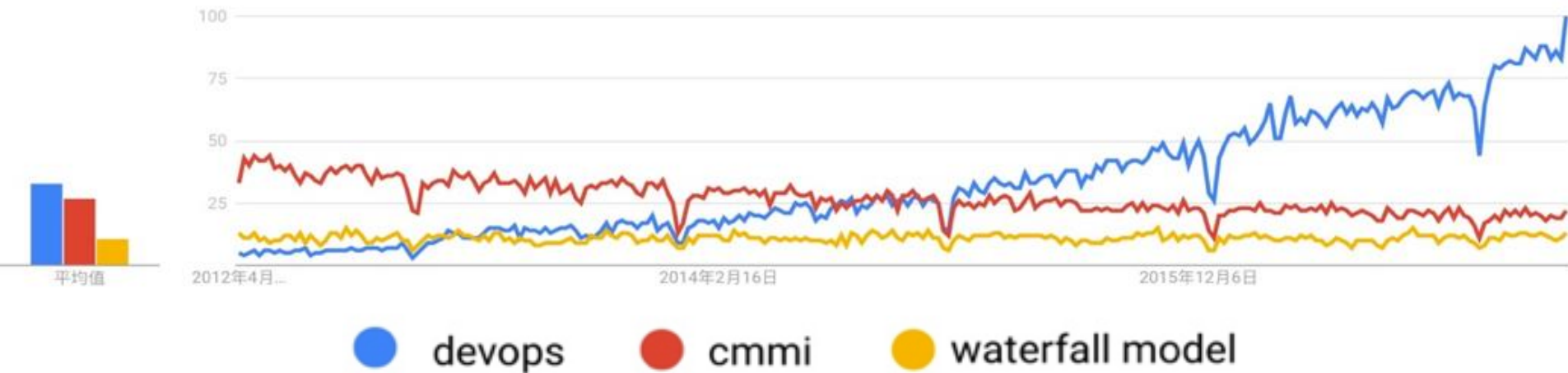**27 Sept 2017**

Introduction(1/4)

❖ **In past five years, the DevOps workflow had been more and more popular compared with CMMI and waterfall model.**

❖ Advantages of DevOps

- Catch up the newest trend in the market
- Bridge the gap between Develops and Operators
- Delivery software and service rapidly and reliability
- Regression, Continuous feedback
- Productive team work

❖ Problems of DevOps

- ▪ Too many DevOps tools and methodologies

- ▪ Although DevOps had been mature, it lacks central version management

- ▪ Lack Automatic Tag mechanism in DevOps workflow

Introduction(4/4)

❖How Chunghwa Telecom solve problems

- Choose suitable DevOps tools and methodologies and then used them into our large cloud project

- Purposed Smart Tag Engine Application Manager (STEAM) to strengthen rolling update which is part of DevOps Workflow
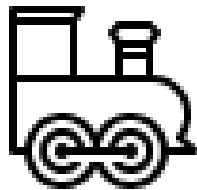
STEAM

- Provide real-time release version searching
- Rolling update system Easily
- Management Friendly
- System's Loopholes indexing

Related Work

❖ **IBM's DevOps Workflow**

- Continuous Planning
- Continuous Integration
- Continuous Deployment
- Continuous Testing
- Continuous Monitoring
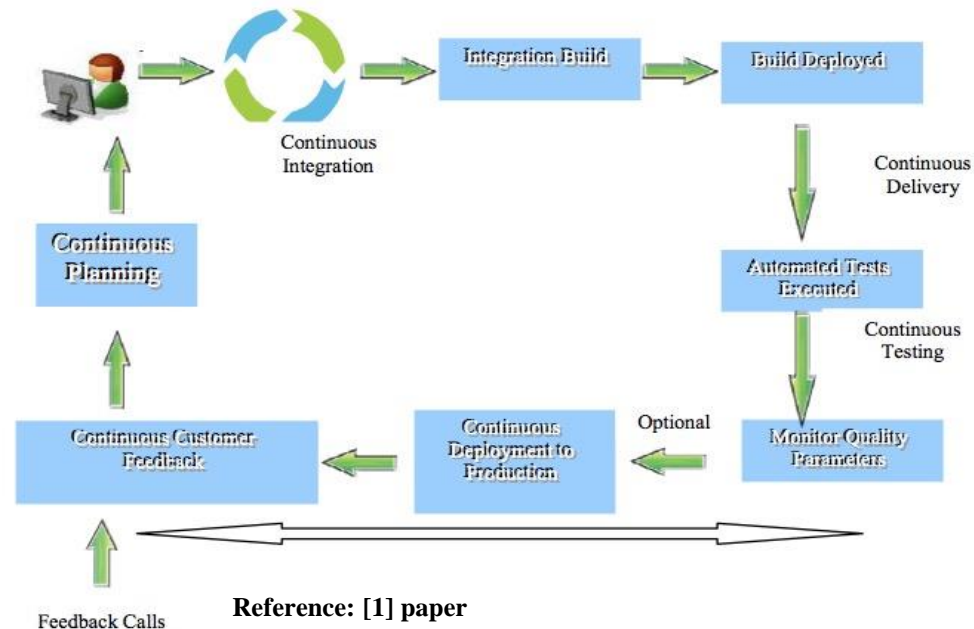
Reference: [1] paper

Why we need Smart Tag Engine Application Manager (STEAM)

What feature does this release version included?

3rd party announce security issue, does our system use this version?

I need rolling update system without offline Service

Could I just update one microservice?

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STEAM in CHT DevOps Workflow Approach

2. Fetch code

Implementation

Developer3
Developer2
Developer1

GitLab

git (+git-web)
Authoritative repository

4. Jenkins listens to gitlab-events, then run verify test, build docker images for microservice

Developer

1. Discussion

3. Push code

Supervisor

CI Build Server (Jenkins)

Regression

5. Generate unique tag for each docker images and save tag info to STEAM

6. Push image to docker registry

8. Test new feature and bugs. If success, store info to STEAM

Smart Tag Engine Application Manager (STEAM)

Docker Registry

QA Tester

Ansible

7. Start to deploy. Get tag info from STEAM, and get containers from docker registry

Testing

STEAM Implementation(1/2)

Smart Tag Engine
Application Manager
(STEAM)

❖ Front-End

- Use Swagger UI Framework to show STEAM Service
  - a specification for defining the interface of a REST web service

STEAM Implementation(2/2)

❖ **Back-End**

- ▪ Use Tree Structure
- ▪ Searchable
- ▪ Provide Standard REST API
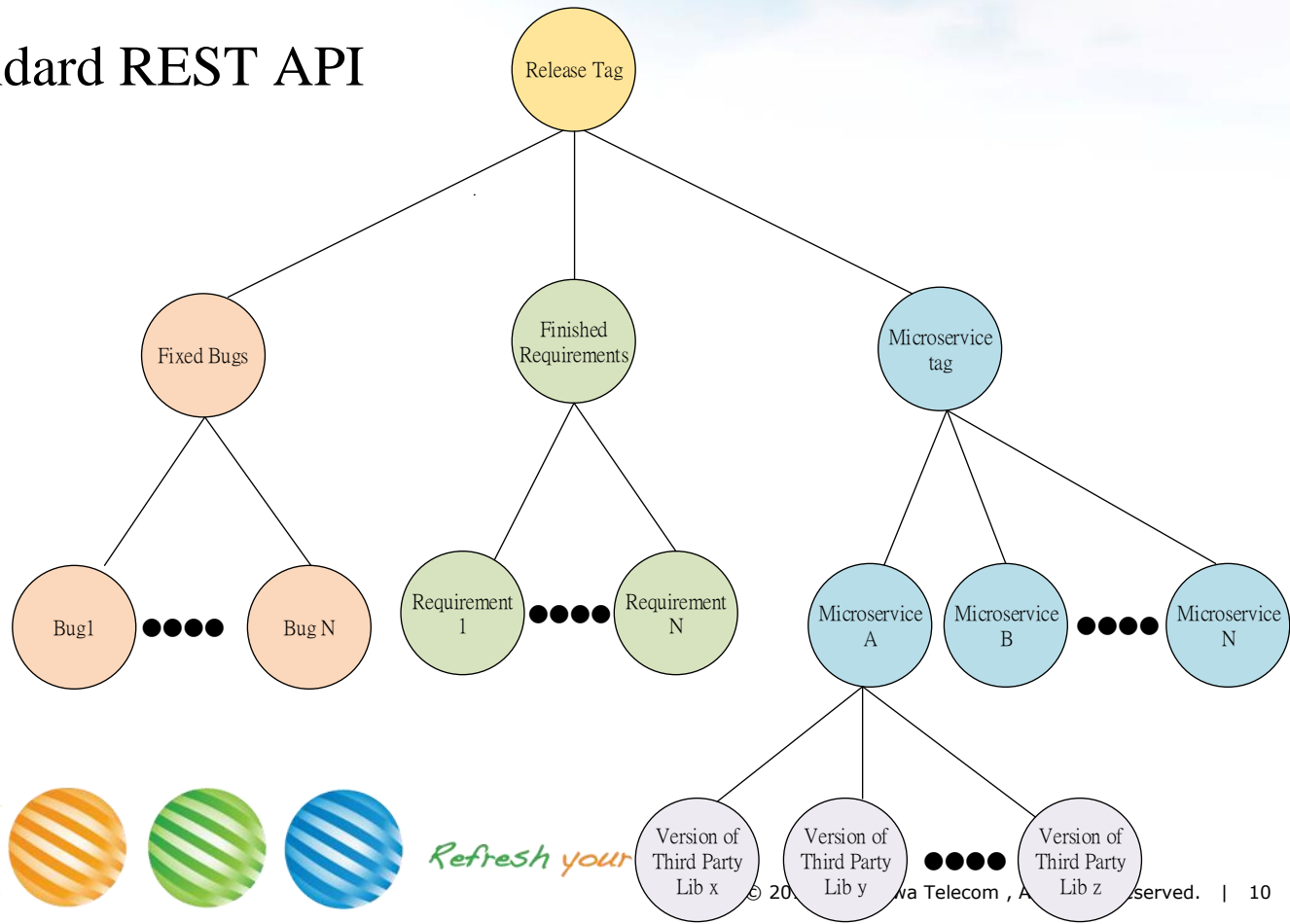
STEAM Content

❖ **Each release tag contains**

- Finished requirements
- Fixed Bugs
- Microservice's version
- 3rd Party Libs

Release Tag

2.0.1 → 2.0.2

Microservice 1	2.0.master.20170502.25	Microservice 1	2.0.master.20170610.42
Microservice 2	2.0.master.20170304.18	Microservice 2	2.0.master.20170612.34
Microservice 3	2.0.master.20170501.69	Microservice 3	2.0.master.20170611.82
Microservice 4	2.0.master.20170502.71	Microservice 4	2.0.master.20170611.92
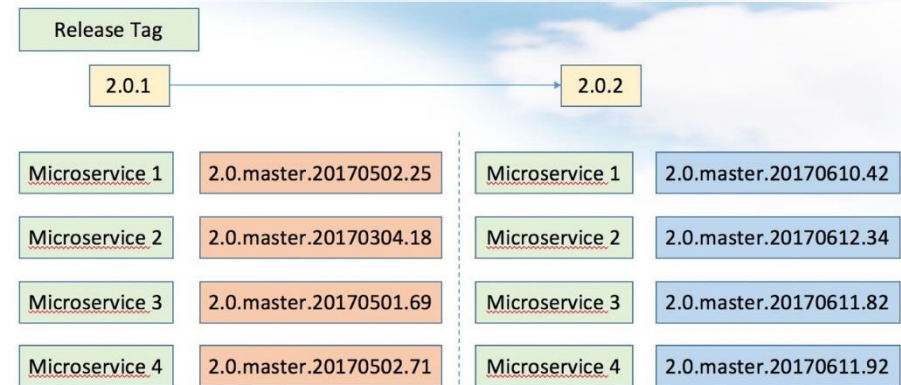
Microservice tag: major tag + minor tag + branch name + tag Date + Jenkins build number

Major tag: this tag only increase when make incompatible API or finished huge milestone
Minor tag: increase when add functionality in backwards-compatible manner
Tag date: when this container be made
Jenkins Number: every time Jenkins started to build, it will give a unique ID to make sure the build is unique

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Refresh your life

Advantages of STEAM

❖ **Advantages of STEAM**

- ▪ Provide real-time release version searching
- ▪ Rolling update system Easily
- ▪ Management Friendly
- ▪ System's Loopholes indexing
  - Can search the 3rd party libs' version if 3rd party for announce security issue

Use Case – STEAM in deploy strategy

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❖ **Build and Deploy Strategy**

CI Build Server (Jenkins)

STEAM

Send Usage Content

Latest Build Version

Alpha Version

Release Tag Version

Develop

Regular Deploy

Alpha Test Deploy

Production Delivery

*RD *

- Commit merge
- Git Hook
- Generate microservice tag

Continuous Delivery

- Every Monday and Thursday
- For Develop

Continuous Testing

- For Test Team

Continuous Deploy

- Rolling Update

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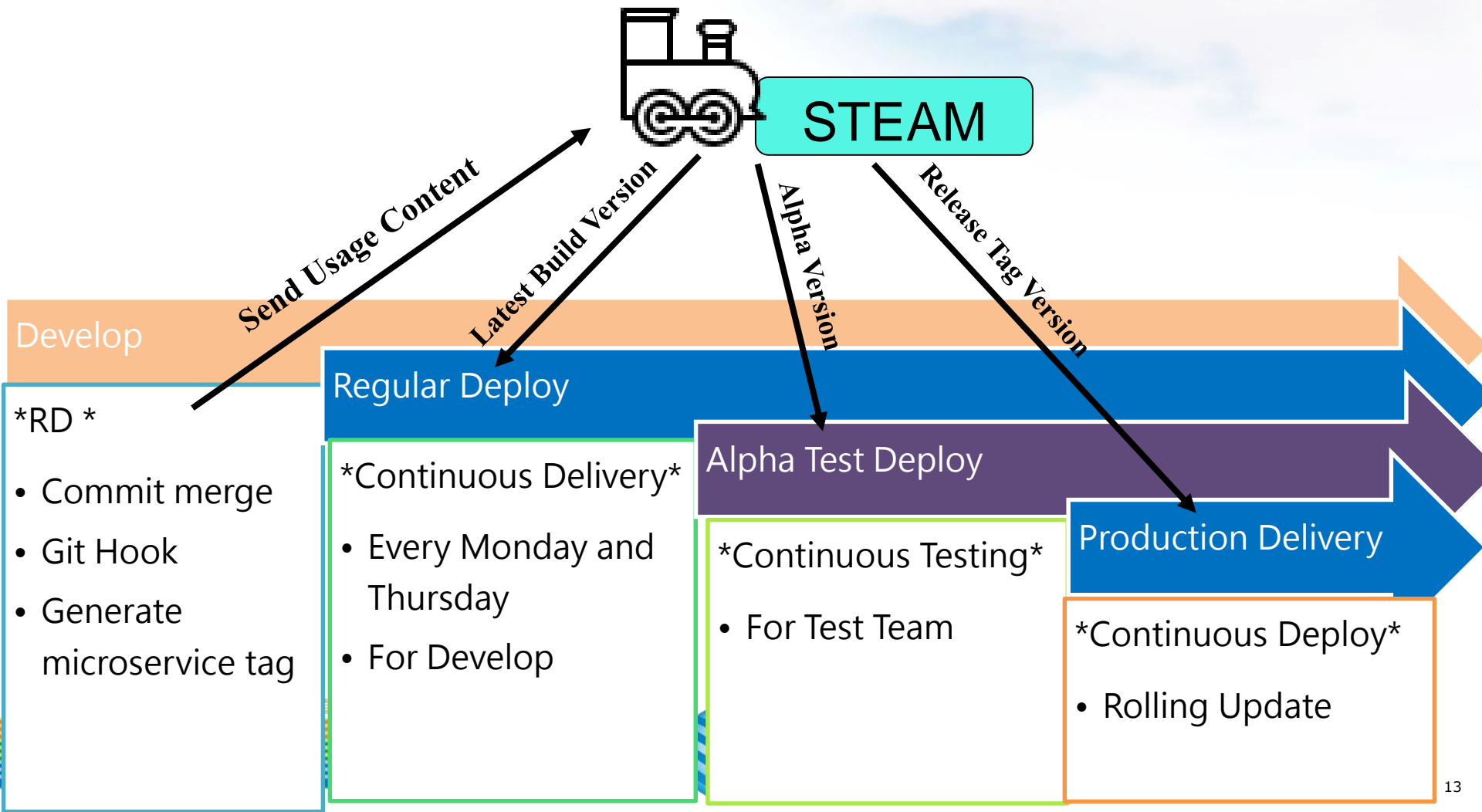
Use Case – STEAM in rolling update

❖ **Achieve Smart Rolling Update**

Should upgrade for new feature

(Before)

(After)

Portal

Load Balancer

System With Release version V2.0.1	System With Release version V2.0.1

Portal

Load Balancer

System With Release version V2.0.1	System With Release version V2.0.3
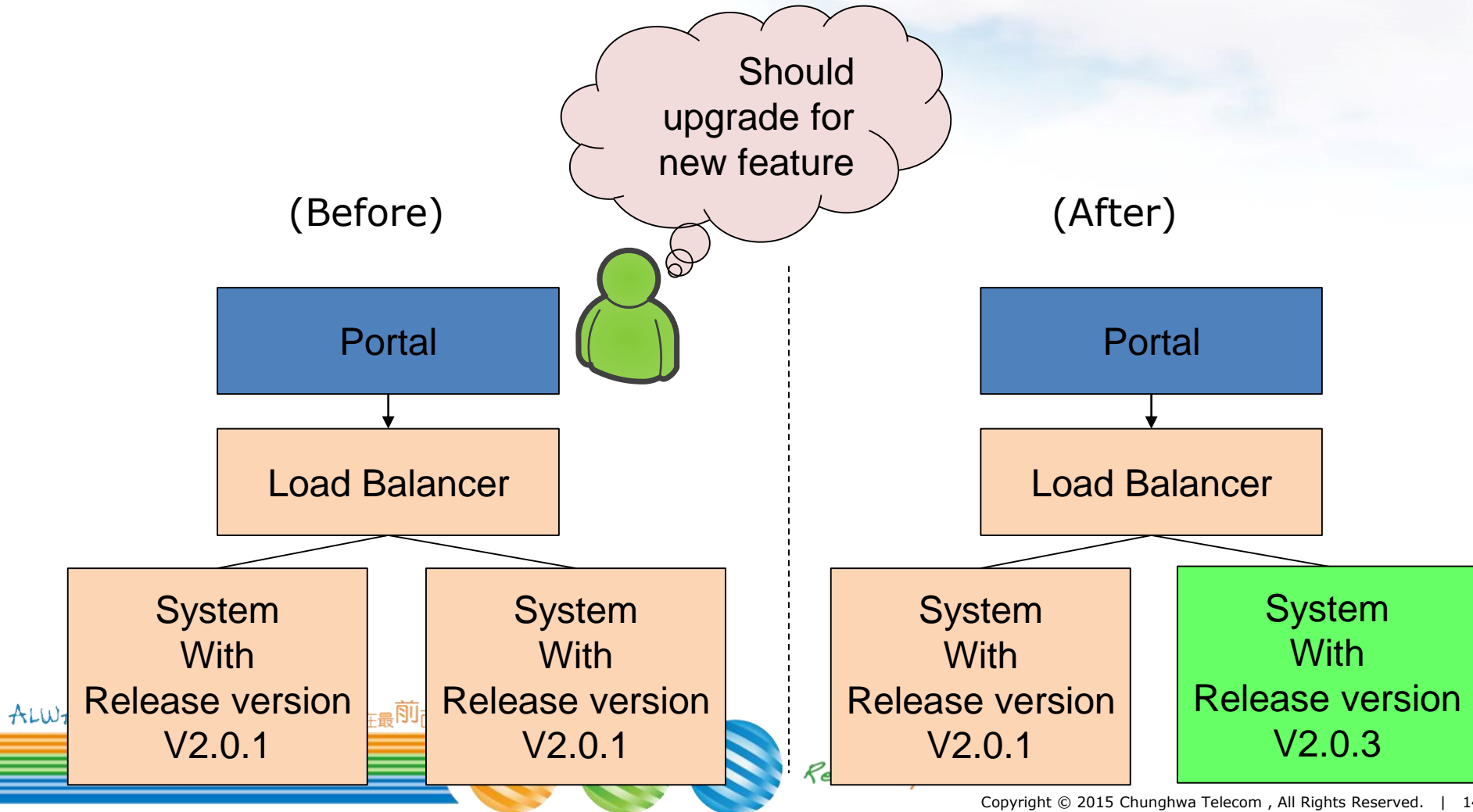
Use Case – STEAM in Security

❖ **Patch severity security issue announced by 3rd party/organization**

❖ **Avoid putting production system in danger**

Search

Message view

From	Mark Thomas <ma...@apache.org>
Subject	[SECURITY] CVE-2017-5650 Apache Tomcat
Date	Mon, 10 Apr 2017 20:53:13 GMT

CVE-2017-5650 Apache Tomcat Denial of Service

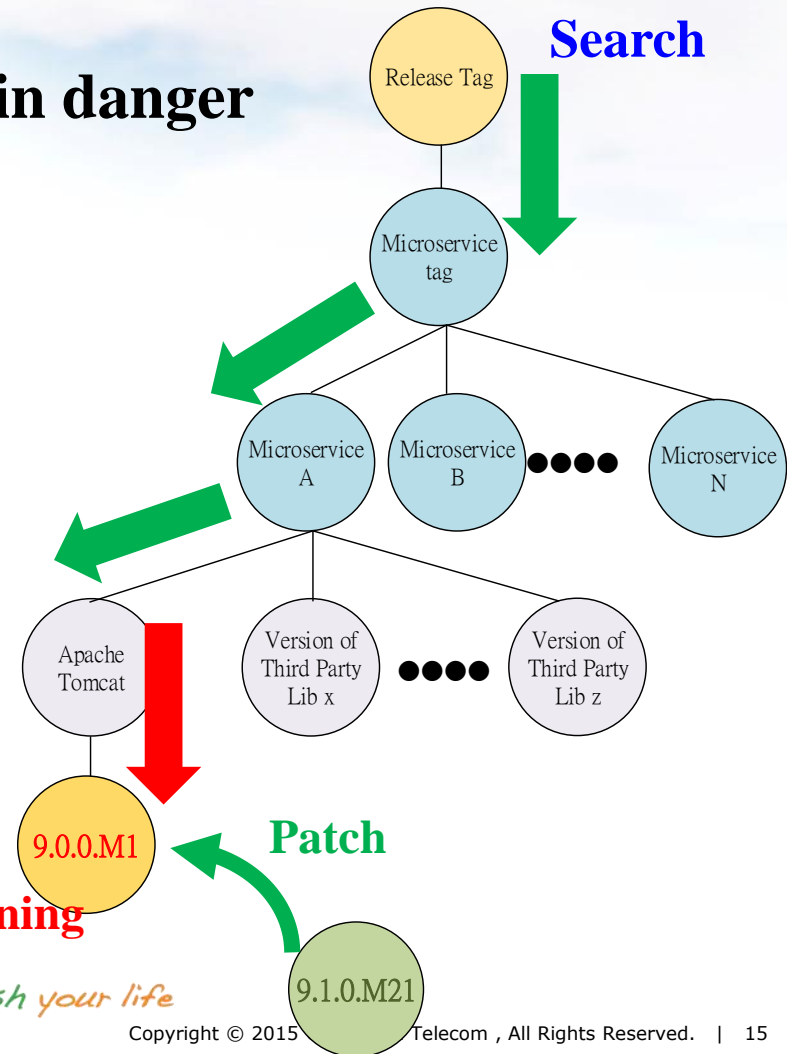Severity: Important

Vendor: The Apache Software Foundation

Versions Affected:
Apache Tomcat 9.0.0.M1 to 9.0.0.M18
Apache Tomcat 8.5.0 to 8.5.12
Apache Tomcat 8.0.x and earlier are not affected

Description
The handling of an HTTP/2 GOAWAY frame for a connection did not close streams associated with that connection that were currently waiting for

Reference: https://goo.gl/OcWqxc

Release Tag

Microservice tag

Microservice A — Microservice B ●●●● Microservice N

Apache Tomcat — Version of Third Party Lib x ●●●● Version of Third Party Lib z

9.0.0.M1

Warning

Patch

9.1.0.M21

Conclusions

❖ **DevOps can bridge the gap between develops and operators**

❖ **Operator can choose correct version**

❖ **Make rolling update more stability**

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Thanks for your listening

Q & A

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