17256
Five CICS Multi-versioning Scenarios that Reduce the Risk of Change

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Abstract

- CICS Transaction Server V5.2 introduces many new features that will help you manage the application lifecycle, in particular the transition from the current version of an application to a new version of an application. Think 'newcopy', but smarter. The CICS Application and Platform capabilities introduced in CICS TS V5 will help you manage applications as a single entity, reduce the risk associated with application updates, and provide you with capabilities to roll back to an earlier version of an application if things don't go to plan. Come to this session to see five examples of how the multi-version capabilities in CICS TS V5.2 can help you better control application changes in your organization.

Topics

- Cloud enablement in CICS: Quick Recap

- 5 compelling reasons for CICS Cloud

  1. Web Scenario: New Features

  2. Traditional 3270 Scenario: Bug Fix

  3. MQ Scenario: Application roll-out

  4. Server Consolidation Scenario

  5. Application Modernization Scenario

- How does it work?

What is Cloud Computing?

NIST Definition :
- Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to
- a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services)
  - that can be rapidly provisioned and released
  - with minimal management effort or service provider interaction
- Composed of 5 essential characteristics, 3 service models, 4 deployment models.

4 Deployment Models

- **Private cloud**
- **Public cloud**
- **Hybrid cloud**
- **Community cloud**

3 Service Models

- **Software as a Service (SaaS)**
- **Platform as a Service (PaaS)**
- **Infrastructure as a Service (IaaS)**

5 Characteristics

- **Rapid elasticity**
- **Broad network access**
- **Resource pooling**
- **Measured service**
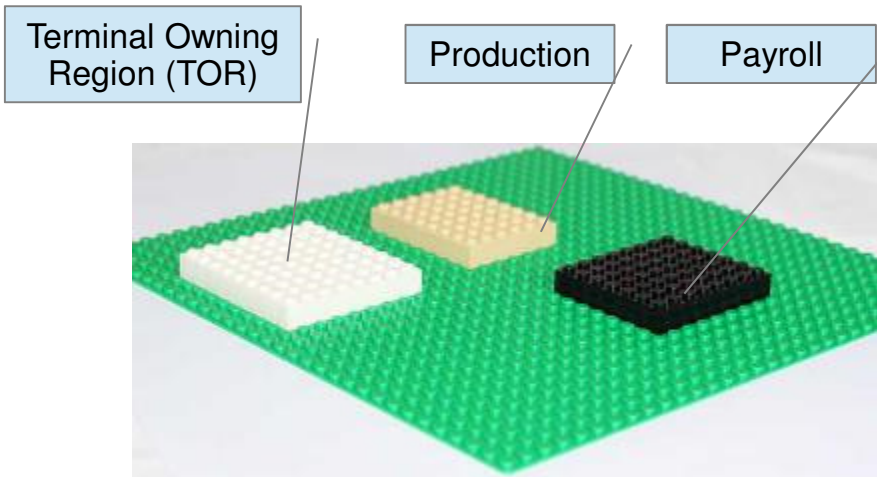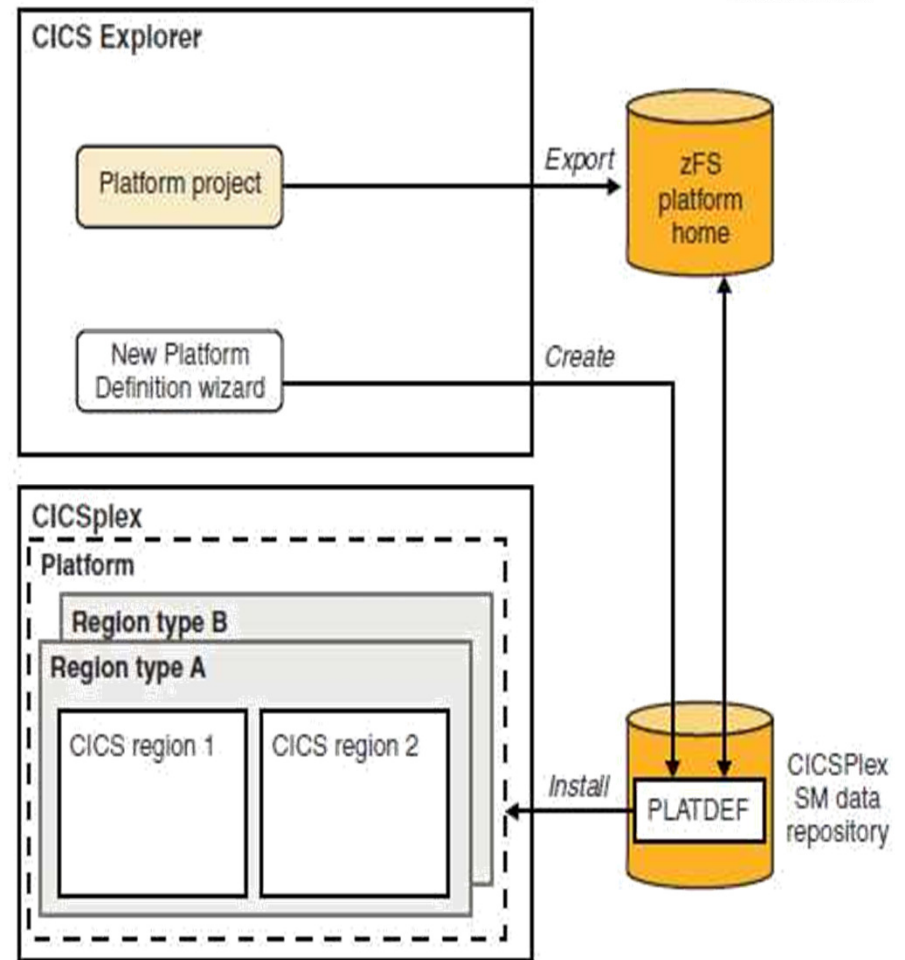- **On-demand self-service**

http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

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A CICS Region: you already know (and love)

Region R

Stage 1: Create a platform

- Simple layer of abstraction to decouple applications from the underlying complexities of a CICS topology
- Consists of **Region Types**
  - logical grouping collecting CICS regions with common characteristics
  - enables them to be managed as a unit in a platform
  - Created: define a region type & set up new CICS region definitions
  - Adopted: adopt existing CICS system group (CSYSGRP) as region type with its existing CICS regions

Terminal Owning Region (TOR)

Production

Payroll

CICS Explorer

Platform project

New Platform Definition wizard

Export → zFS platform home

Create

CICSplex

Platform

Region type B

Region type A

CICS region 1

CICS region 2

Install ← PLATDEF

CICSPlex SM data repository

A CICS **Platform**: abstraction of underlying CICS Region topology to simplify deployment

Region R

Platform M
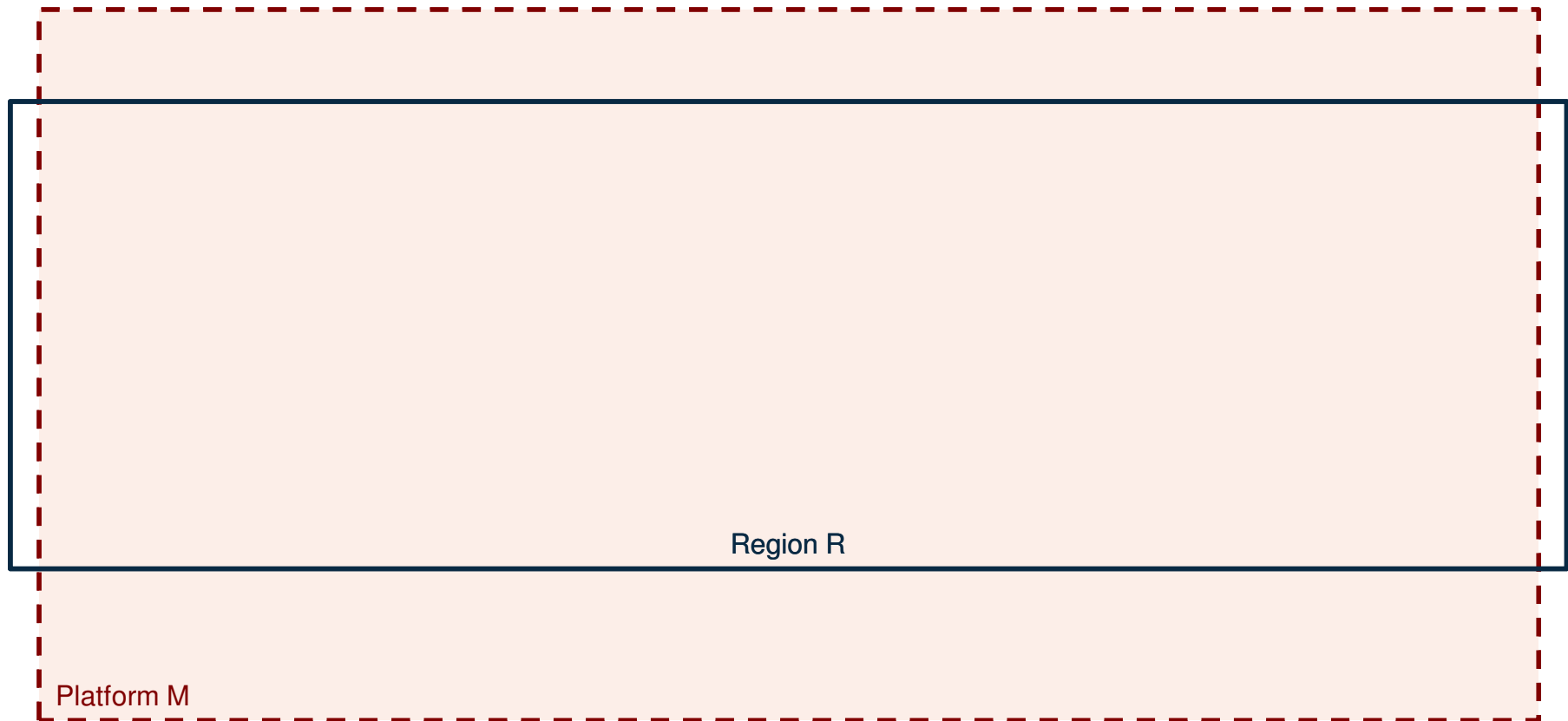
Stage 2: Create an application and application entry points

- Package CICS application in Application bundle
- Deploy > manage > monitor as single entity across multiple regions in platform
- Application entry points
  - identify resources as access points to Application
    - Program, URIMAP, Transaction*
  - control users' access to different Application versions
- Bind application to platform for additional characteristics

* In CICS TS V5.3 open beta
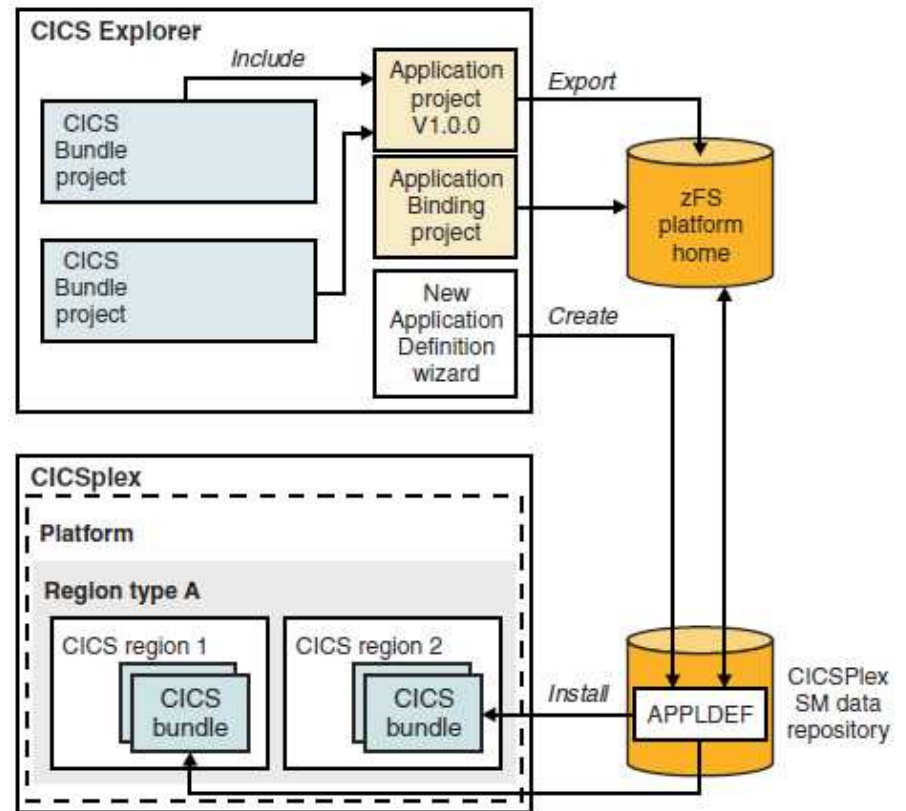
Stage 3: Add resources for the application

- Transfer responsibility for creating, installing, managing resources
- Don't modify resources individually (use CICS Bundle/Application operations)
- Application architects: carefully consider which resources to tie to CICS Bundle lifecycle
- Specify resource separately and declare as import (dependency) if resource
  - cannot be defined in a CICS bundle
  - has different lifecycle
  - should not be private (LIBRARY or PROGRAM)
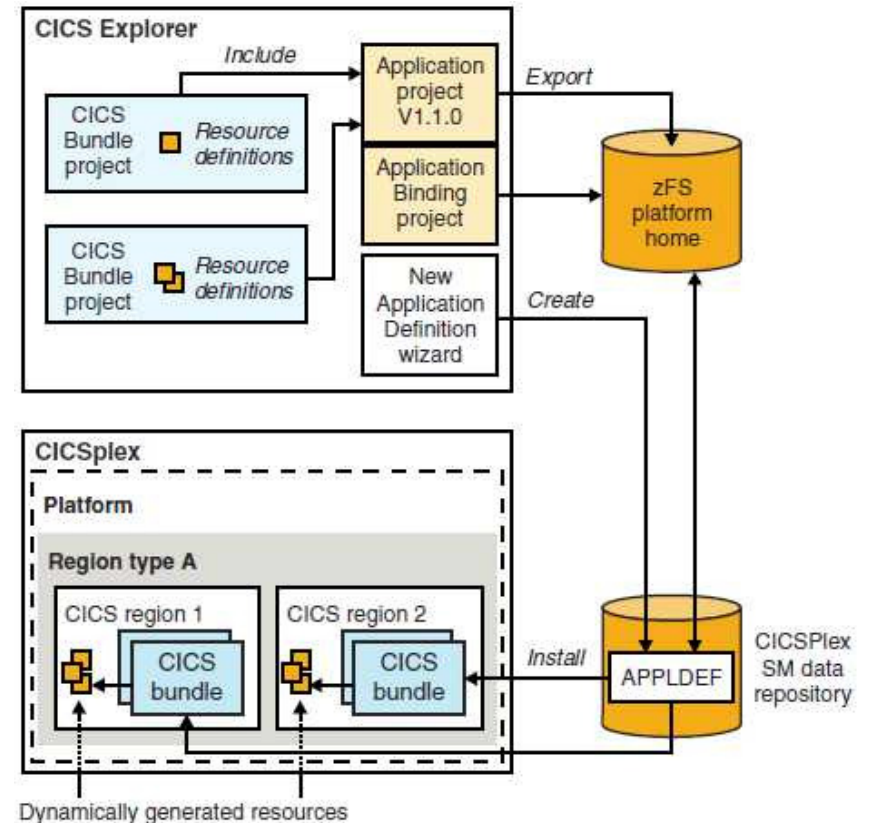
A CICS **Application**: name, version, entry point and (optionally) resources

"/M/A/1/0/queryBalance"

URIMAP U

PROGRAM P

Application A 1.0.0

Region R

Platform M
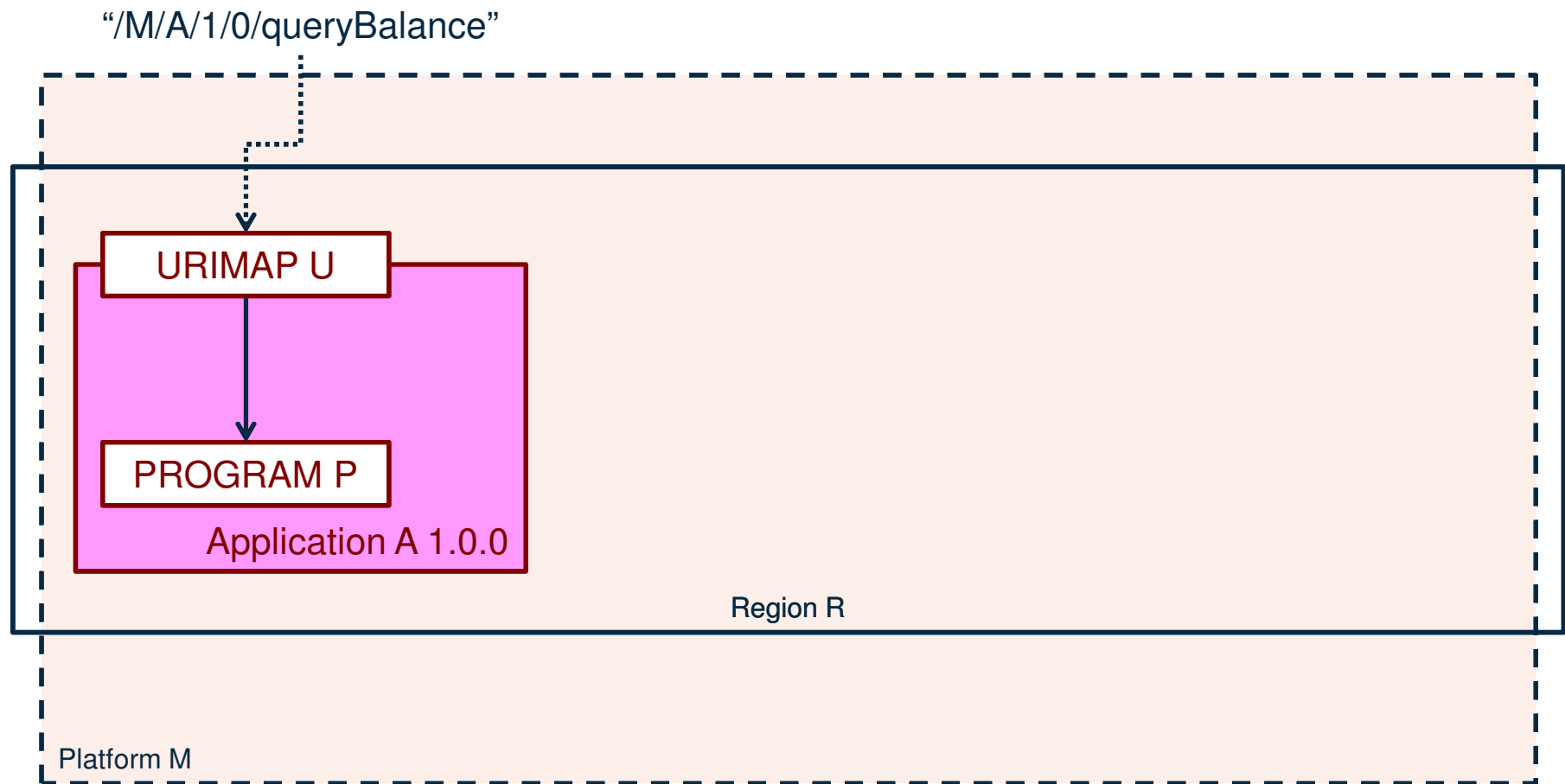
Stage 4: Add a policy

- XML definition
- Rules to describe controls or actions
- For one or more application tasks
- Threshold conditions to manage behaviour of user tasks
- e.g. define a threshold for the amount of storage allocated by a user task, and make CICS issue a message if the threshold is exceeded

- *"My systems work perfectly—it's the applications that are the problem!"*
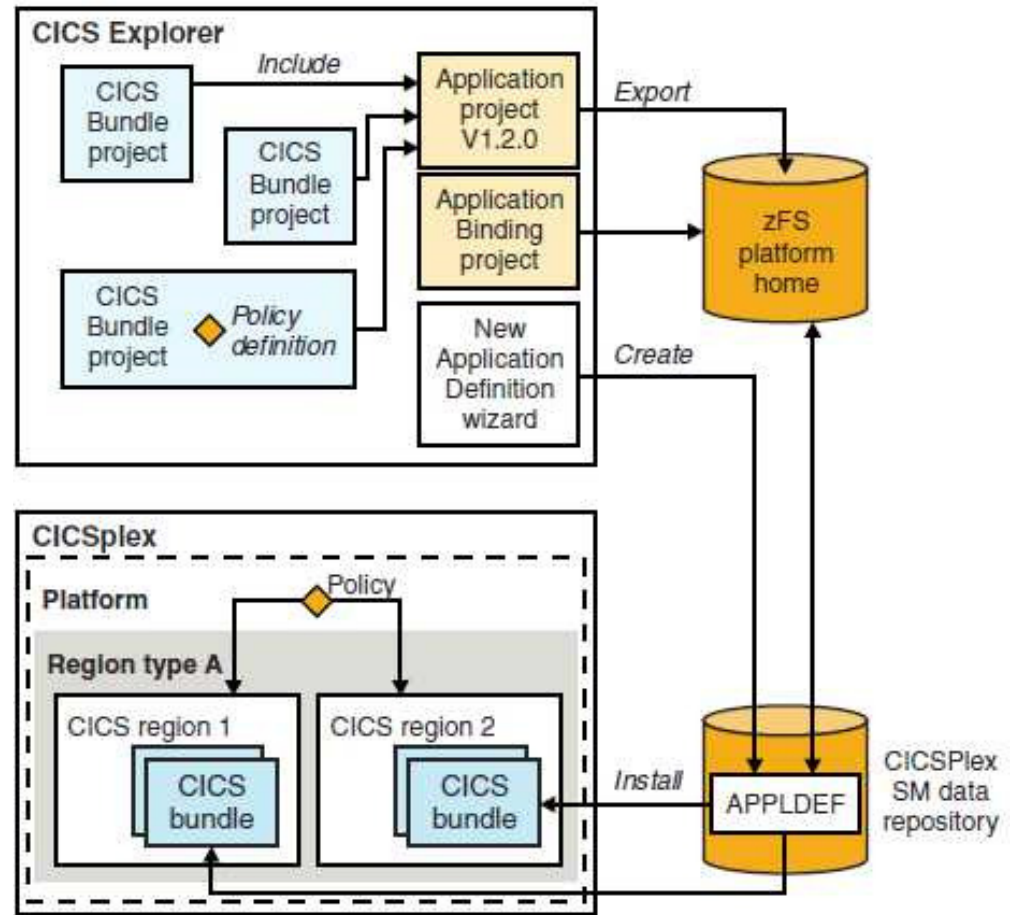
A CICS **Policy**: resource, threshold & action

"/M/A/1/0/queryBalance"   "/M/A/1/1/queryBalance"

queryBalance   queryBalance

Application A 1.0.0   Application A 1.1.0

Region R

POLICY PP
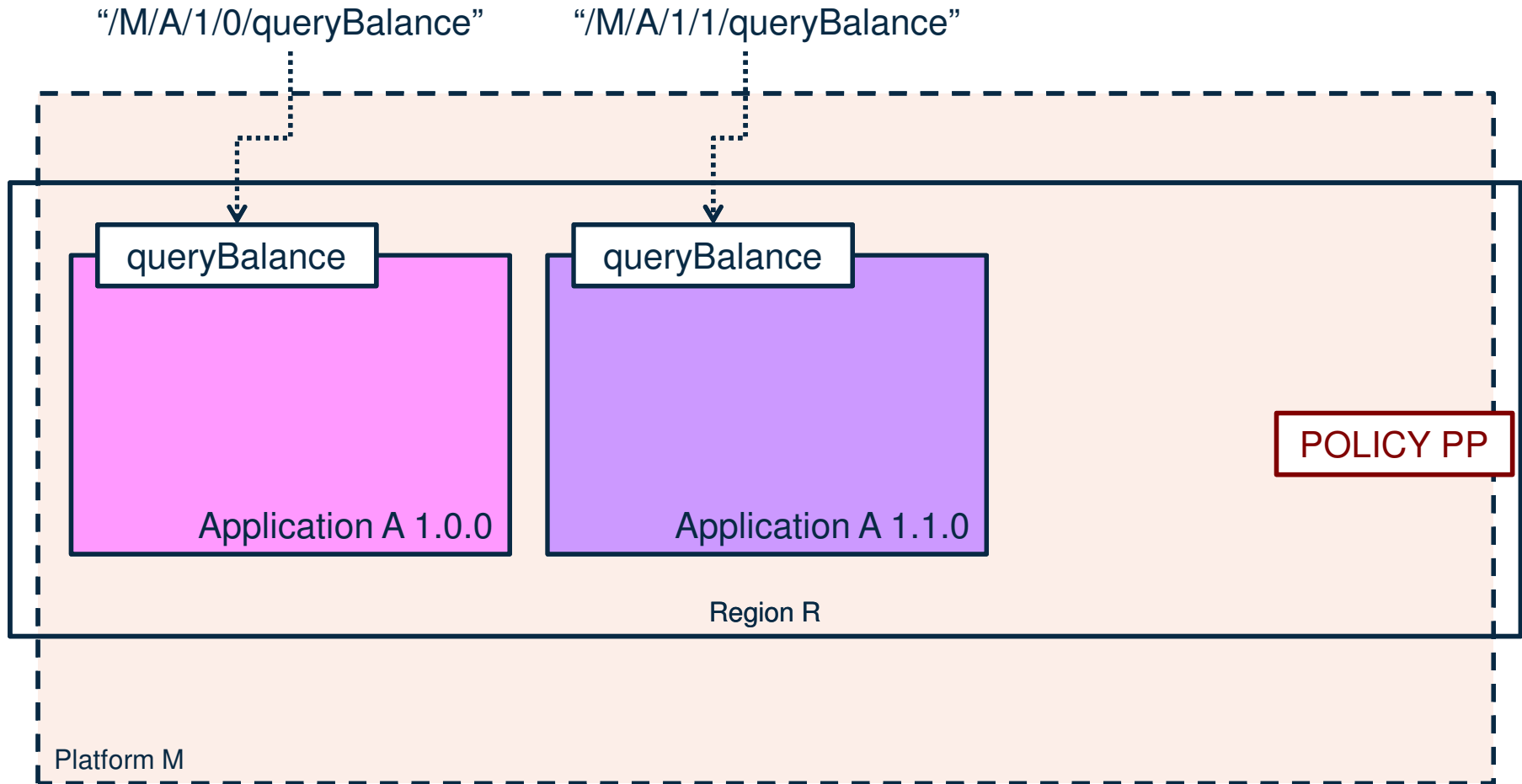
Platform M

A CICS **Policy**: resource, threshold & action scoped to platform

"/M/A/1/0/queryBalance"   "/M/A/1/1/queryBalance"

queryBalance

Application A 1.0.0

queryBalance

Application A 1.1.0

POLICY PP

Region R

Platform M
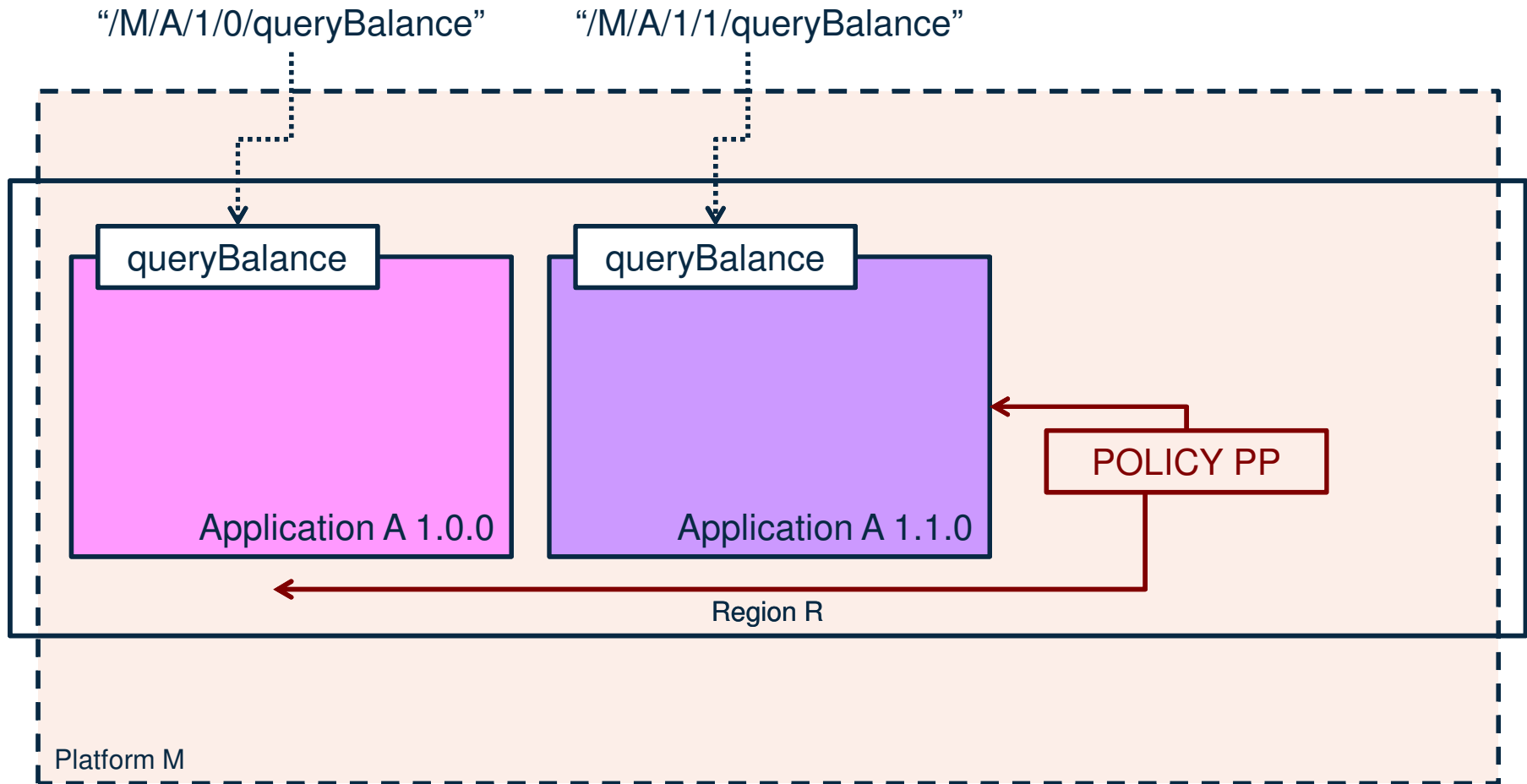
A CICS **Policy**: resource, threshold & action scoped to application

"/M/A/1/0/queryBalance"   "/M/A/1/1/queryBalance"

queryBalance

POLICY PA

Application A 1.0.0

queryBalance

Application A 1.1.0

Region R
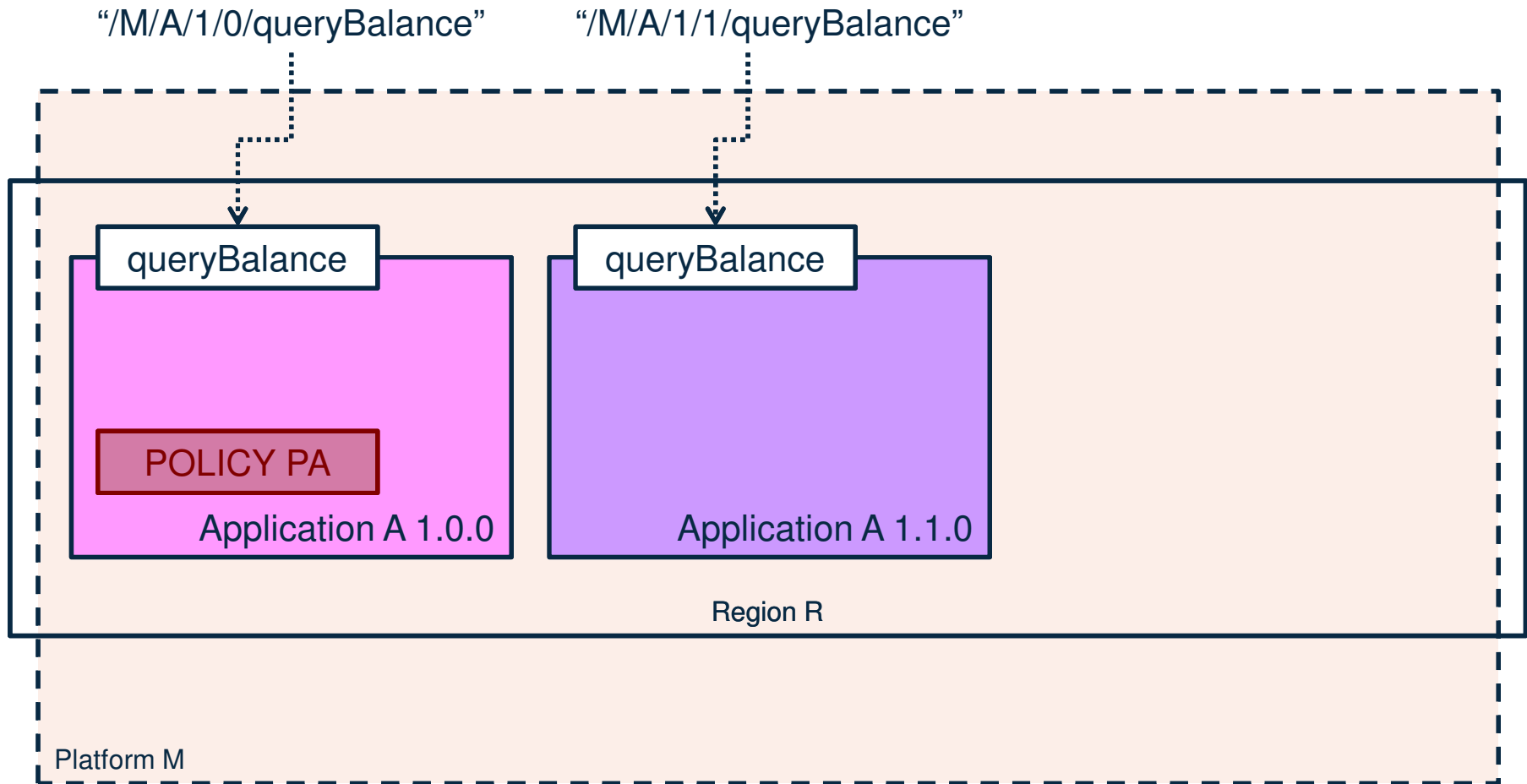
Platform M

A CICS **Policy**: resource, threshold & action scoped to specific operation

"/M/A/1/0/queryBalance"   "/M/A/1/1/queryBalance"

queryBalance

queryBalance

POLICY PO

Application A 1.0.0   Application A 1.1.0

Region R
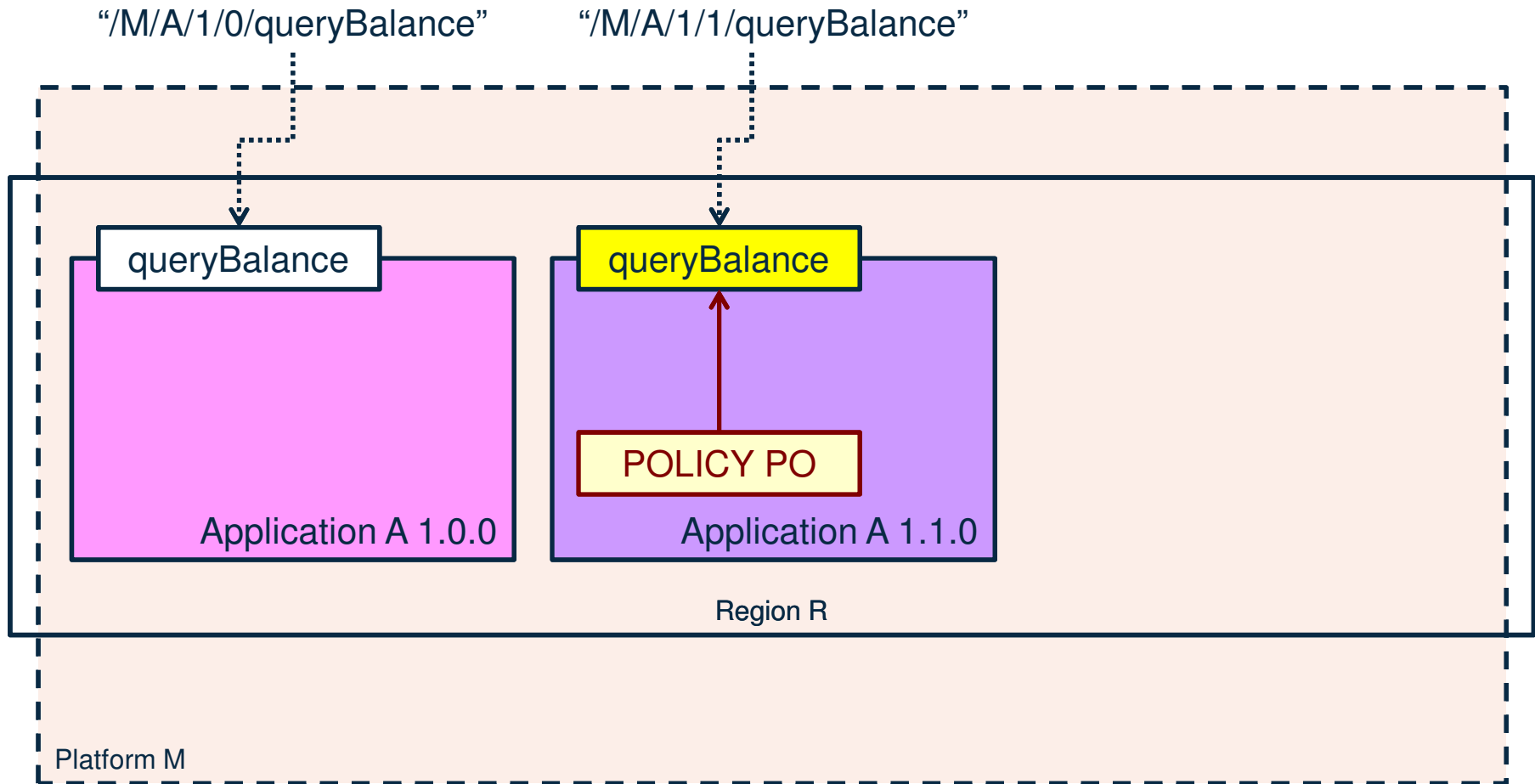
Platform M

What is Application Multi-Versioning?

- Provide end-user access to two or more versions of an application hosted on the same platform using private **PROGRAM** and **LIBRARY** (and **Transaction***) resources (and scoped policies)

- Quickly switch back and forth between two different versions of an application using the **AVAILABLE | UNAVAILABLE** state

- Route requests from users to different versions of an application using **INVOKE APPLICATION** API
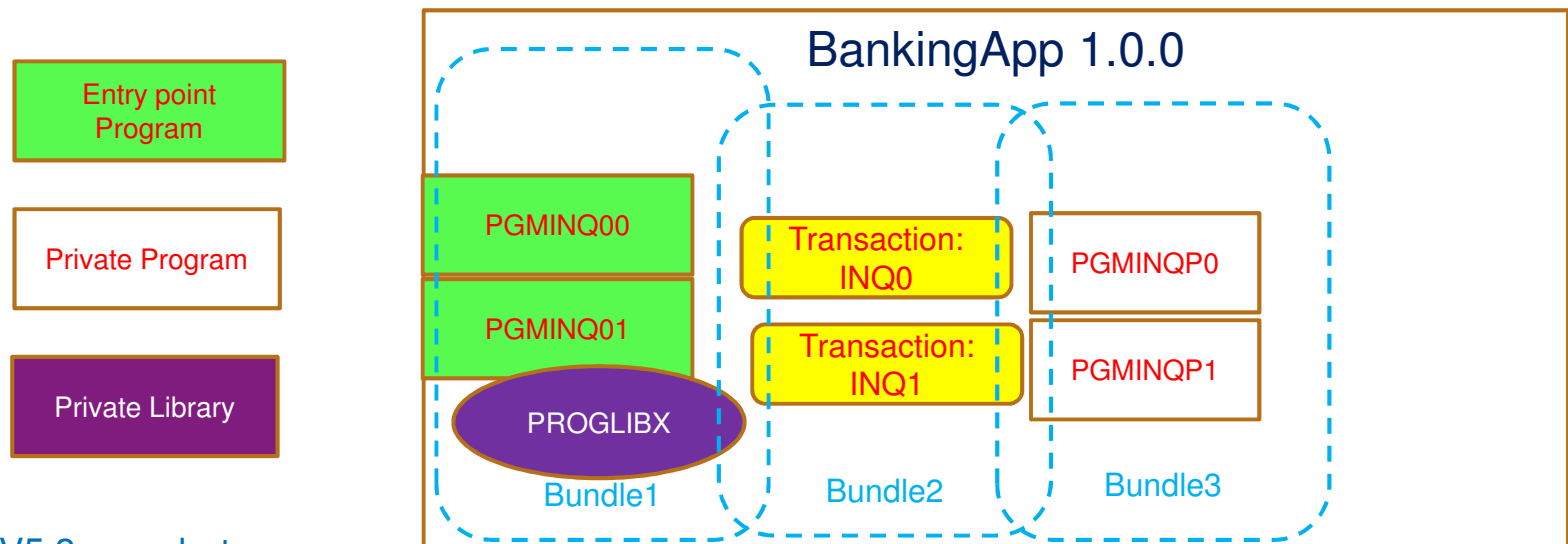
BankingApp 1.0.0

Entry point Program

Private Program

Private Library

PGMINQ00

PGMINQ01

PROGLIBX

Bundle1

Transaction: INQ0

Transaction: INQ1

Bundle2

PGMINQP0

PGMINQP1

Bundle3

* In CICS TS V5.3 open beta

Why do I need Application Multi-versioning?

Agile methodologies allow developers to increase the rate of change of applications in response to business needs

IT operations needs to respond by deploying applications into production more frequently while reducing cost and maintaining reliability

Multi-versioning allows you to deploy new applications, application features or bug fixes while minimizing any impact to existing users or requiring additional infrastructure

Five CICS Multi-Versioning Scenarios

1. Web Scenario: New Features

2. Traditional 3270 Scenario: Bug Fix

3. MQ Scenario: Application Roll-out

4. Server Consolidation

5. Application Modernization

6. Add your own scenarios here....

Web Scenario: New Features

"The mobile guys need a new feature but I'm concerned about the potential performance impact for the existing high volume web site. This is a pilot so I really don't want to spin up new regions just to support a few users. I'm also still trying to move the back office users off an old version of the application."

Application versions 1.0.0 & 1.1.0 are hosted on the same Region(s)

"/M/A/1/0/queryBalance"   "/M/A/1/1/queryBalance"

URIMAP U

PROGRAM P

Application A 1.0.0

URIMAP V

PROGRAM P'

Application A 1.1.0

Region R

Platform M
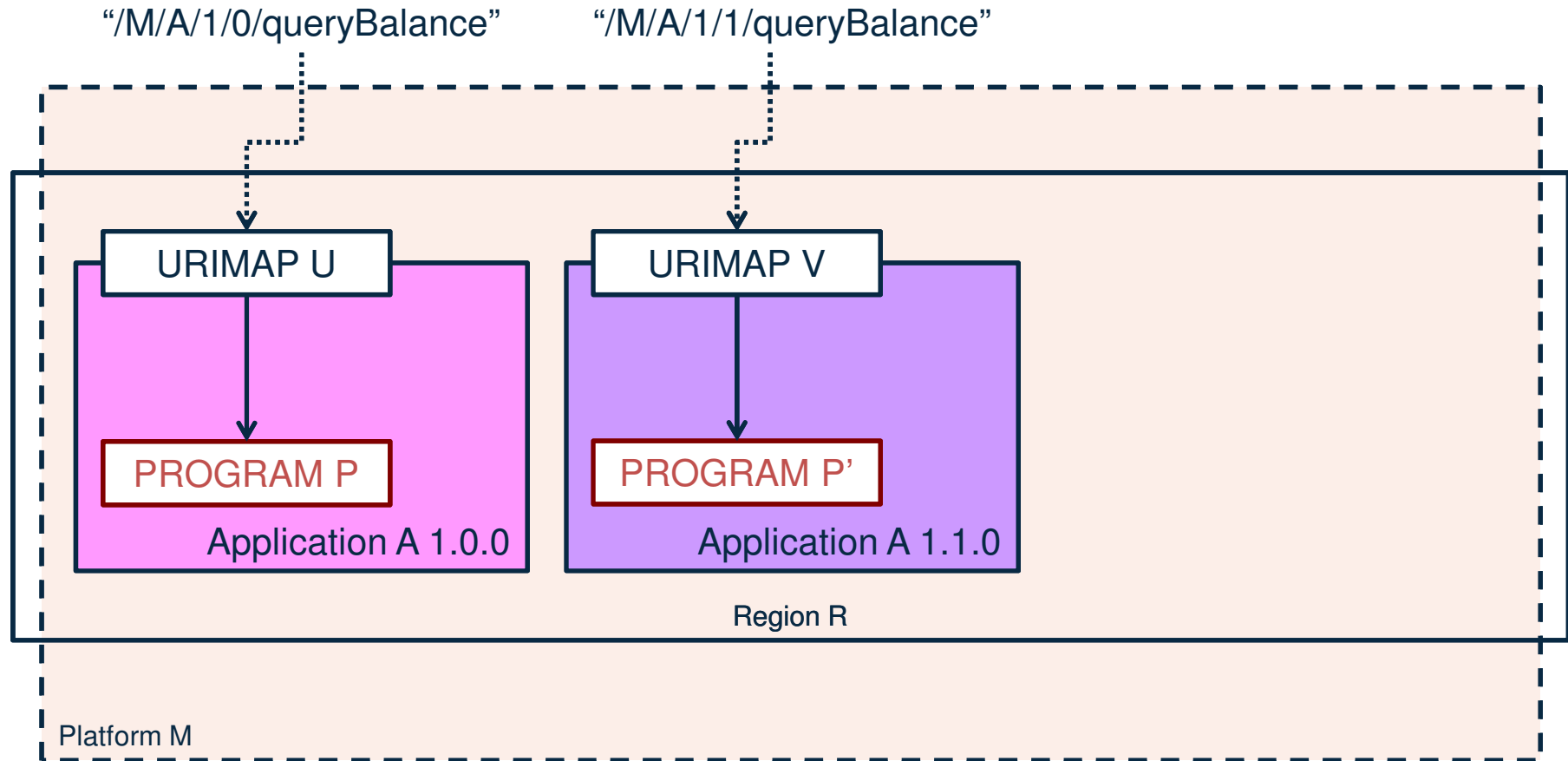
Can simply add version 1.2.0 without affecting the users of versions 1.0.0 and 1.1.0

"/M/A/1/0/queryBalance"   "/M/A/1/1/queryBalance"   "/M/A/1/2/queryBalance"

URIMAP U   URIMAP V   URIMAP W

PROGRAM P   PROGRAM P'   PROGRAM P''

Application A 1.0.0   Application A 1.1.0   Application A 1.2.0

Region R
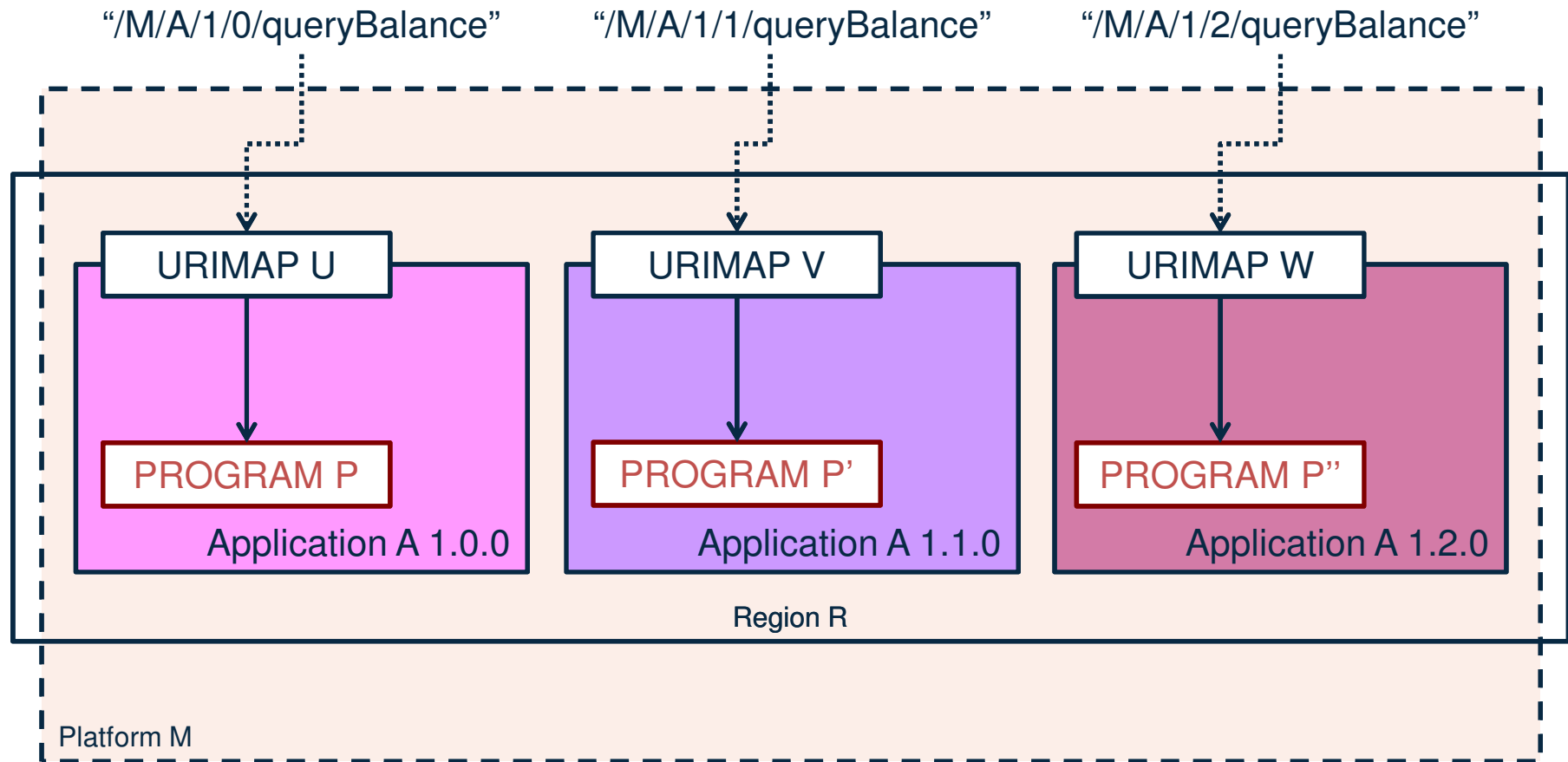
Platform M

Can eventually retire version 1.0.0 when users have moved to a higher version (see from Monitoring data)

"/M/A/1/1/queryBalance"   "/M/A/1/2/queryBalance"

URIMAP V   URIMAP W

PROGRAM P'   PROGRAM P''

Application A 1.1.0   Application A 1.2.0

Region R
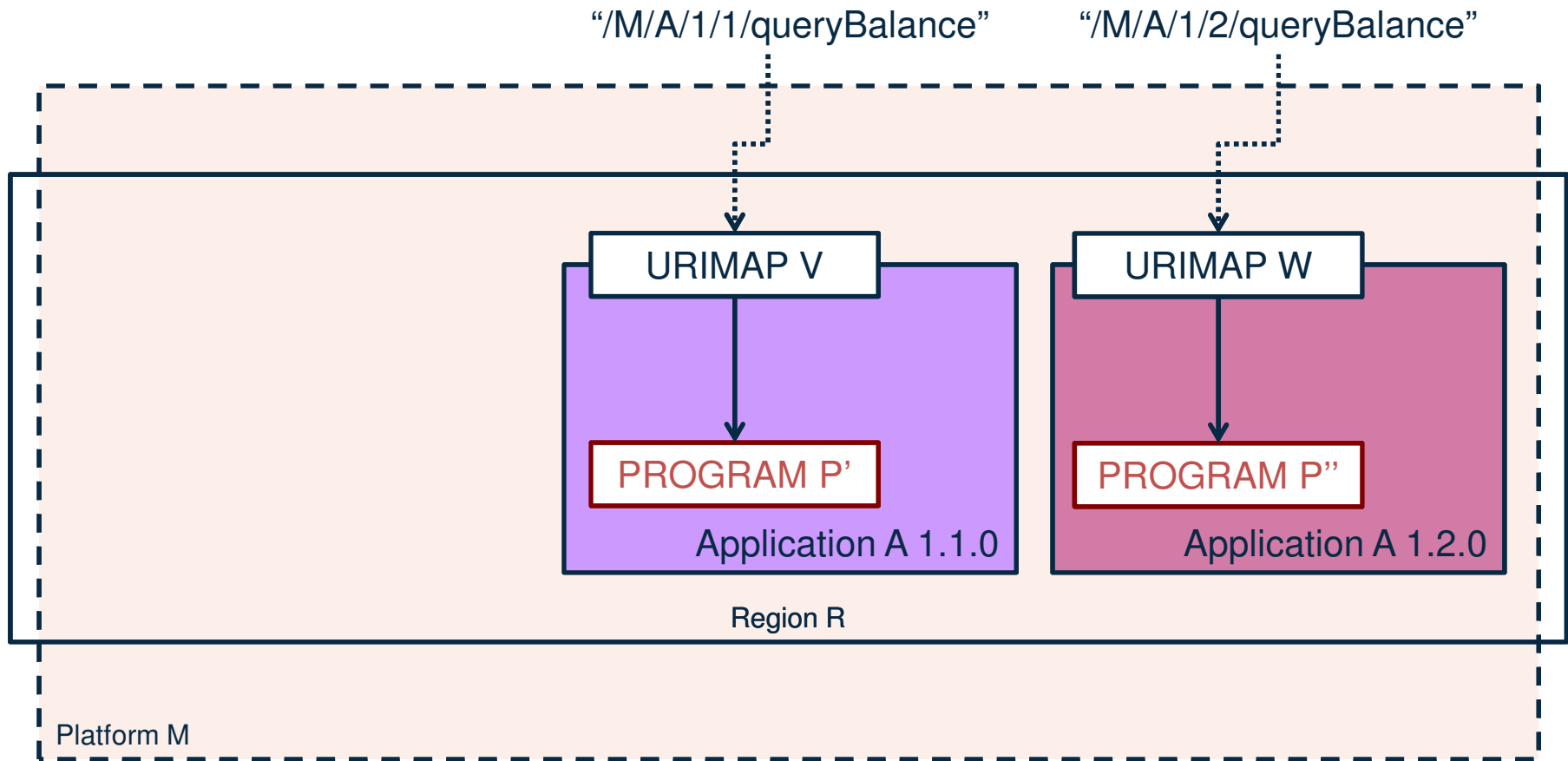
Platform M

Demo

Hosting two versions of a CICS application
concurrently on the same platform
using the
CICS Transaction Server for z/OS V5.2
and CICS Explorer V5.2

http://ibmtvdemo.edgesuite.net/software/htp/cics/Cloud_web_application_concurrent_versions.mp4

Traditional 3270 Scenario: Bug Fix

"I need to apply a hot fix to an application in production but I want to use the same process that I use for my weekly updates so I get an audit trail and correct monitoring data. I really want to make sure it's installed correctly before making it live while the existing version is still being used. Also if the update makes things worse I want to rollback the change as quickly as possible"

Application version 1.0.0 has a bug

PROGRAM S

EXEC CICS LINK PROGRAM(E1)

PROGRAM E1

AVAILABLE

PROGRAM P

Application A 1.0.0

Region R

Platform M
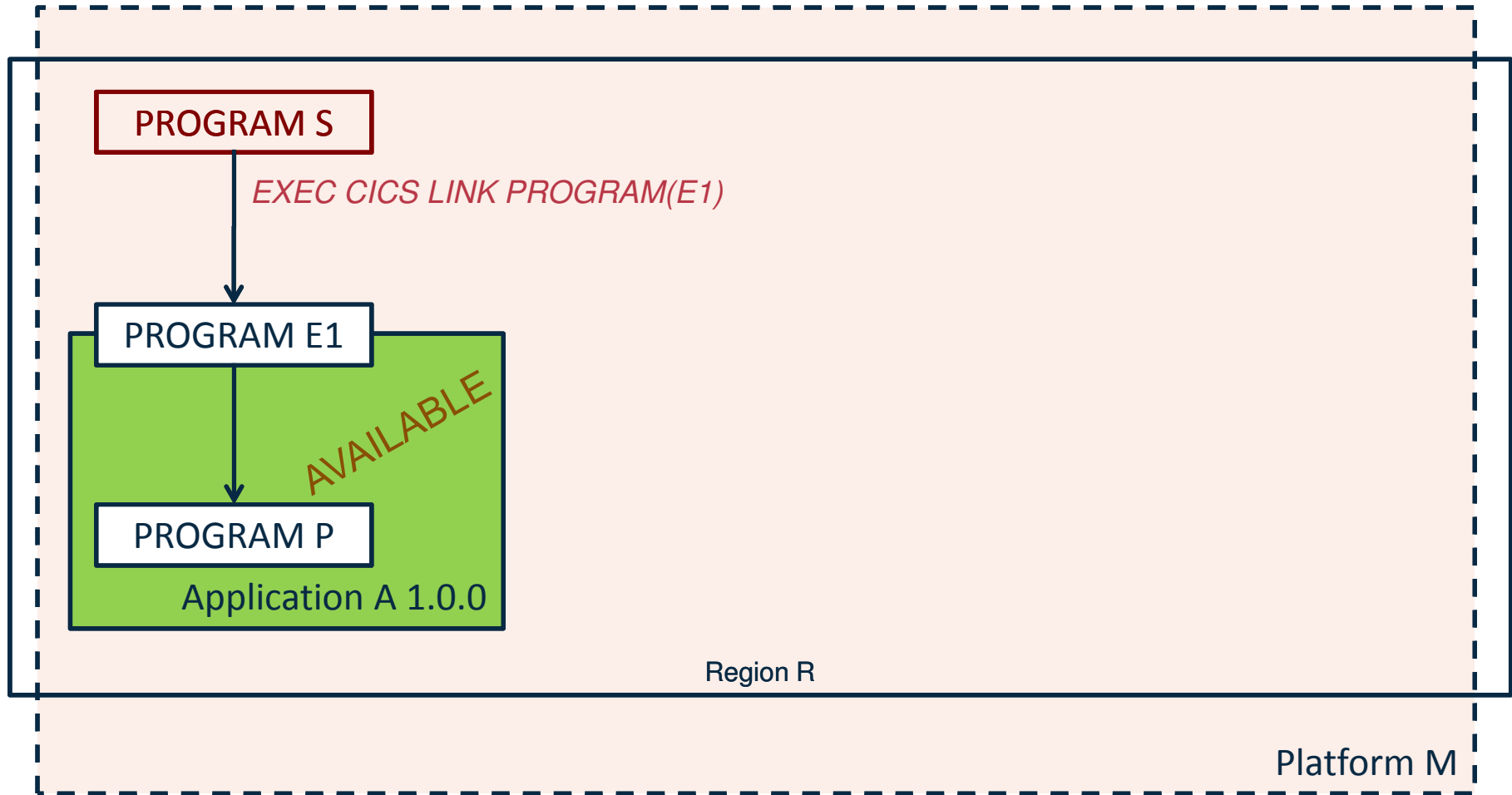
INSTALL and ENABLE version 1.0.1 but requests still go to version 1.0.0

PROGRAM S

EXEC CICS LINK PROGRAM(E1)

PROGRAM E1

AVAILABLE

PROGRAM P

Application A 1.0.0

PROGRAM E1

UNAVAILABLE

PROGRAM P'

Application A 1.0.1

Region R

Platform M
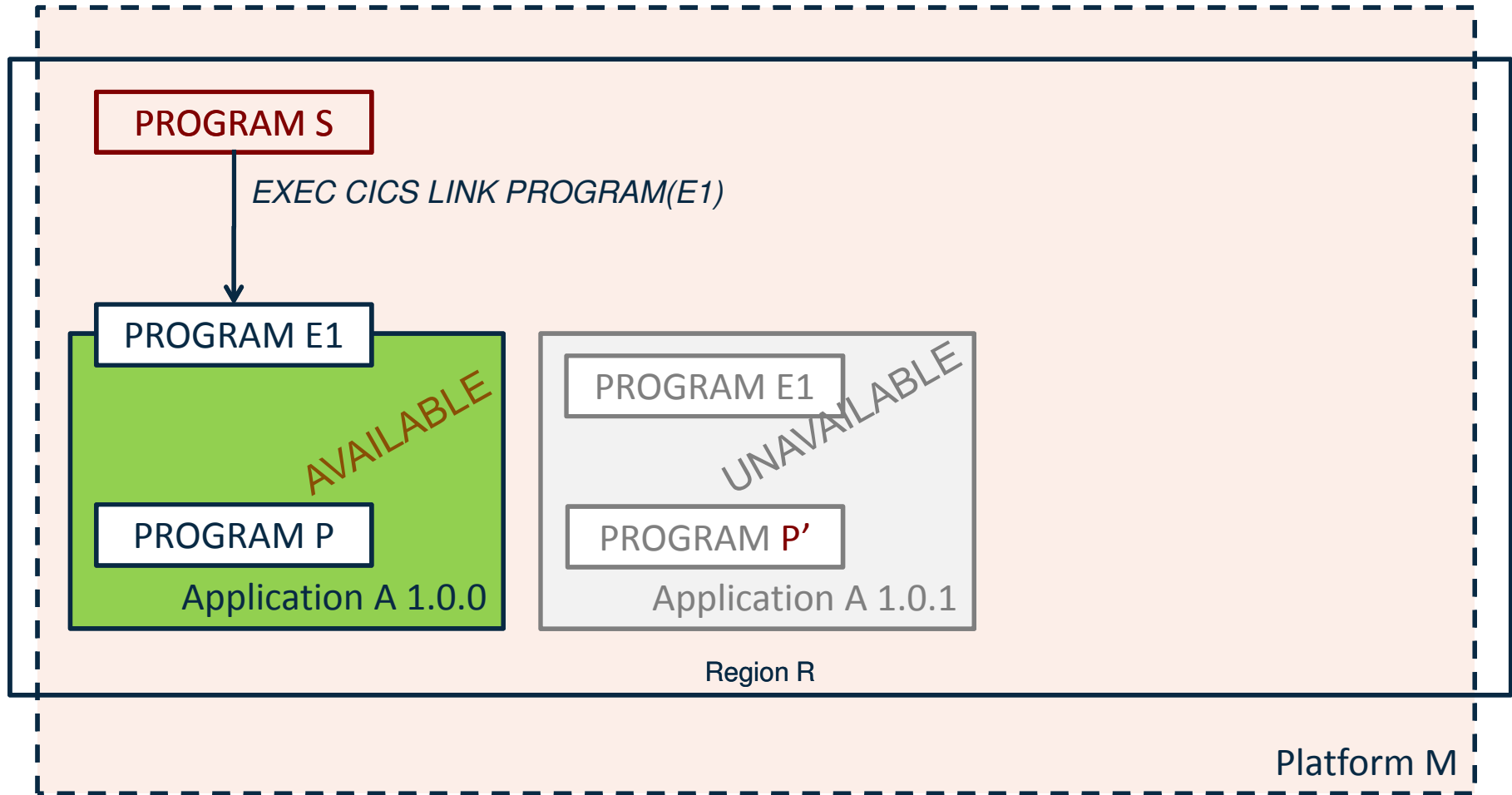
Make application version 1.0.1 AVAILABLE so it receives new requests

PROGRAM S

EXEC CICS LINK PROGRAM(E1)

PROGRAM E1

PROGRAM E1

AVAILABLE

AVAILABLE

PROGRAM P

PROGRAM P'

Application A 1.0.0

Application A 1.0.1

Region R

Platform M
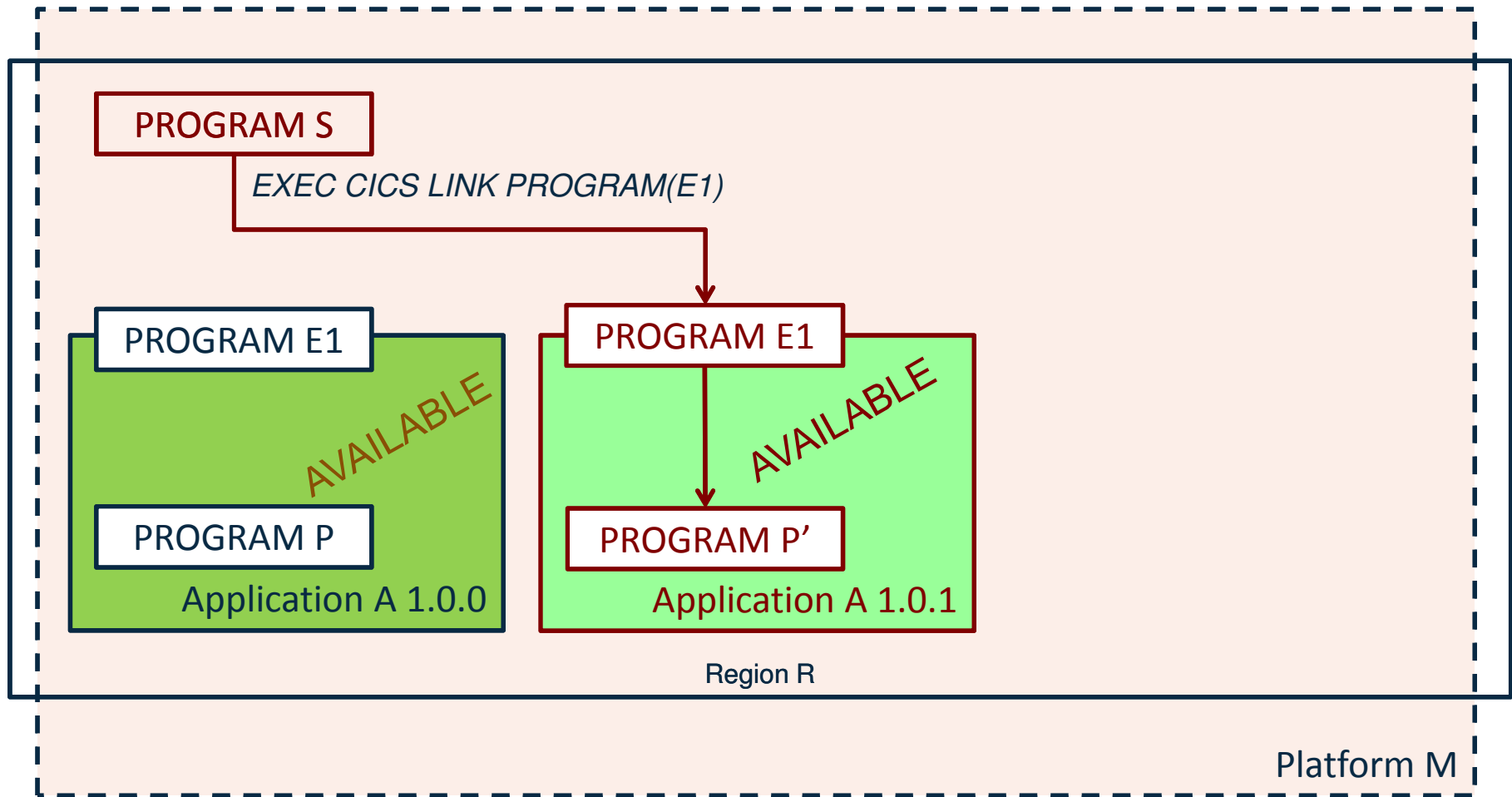
If there is a problem make version 1.0.1 UNAVAILABLE to rollback to version 1.0.0

PROGRAM S

EXEC CICS LINK PROGRAM(E1)

PROGRAM E1

PROGRAM P

AVAILABLE

Application A 1.0.0

PROGRAM E1

PROGRAM P'

UNAVAILABLE

Application A 1.0.1

Region R

Platform M
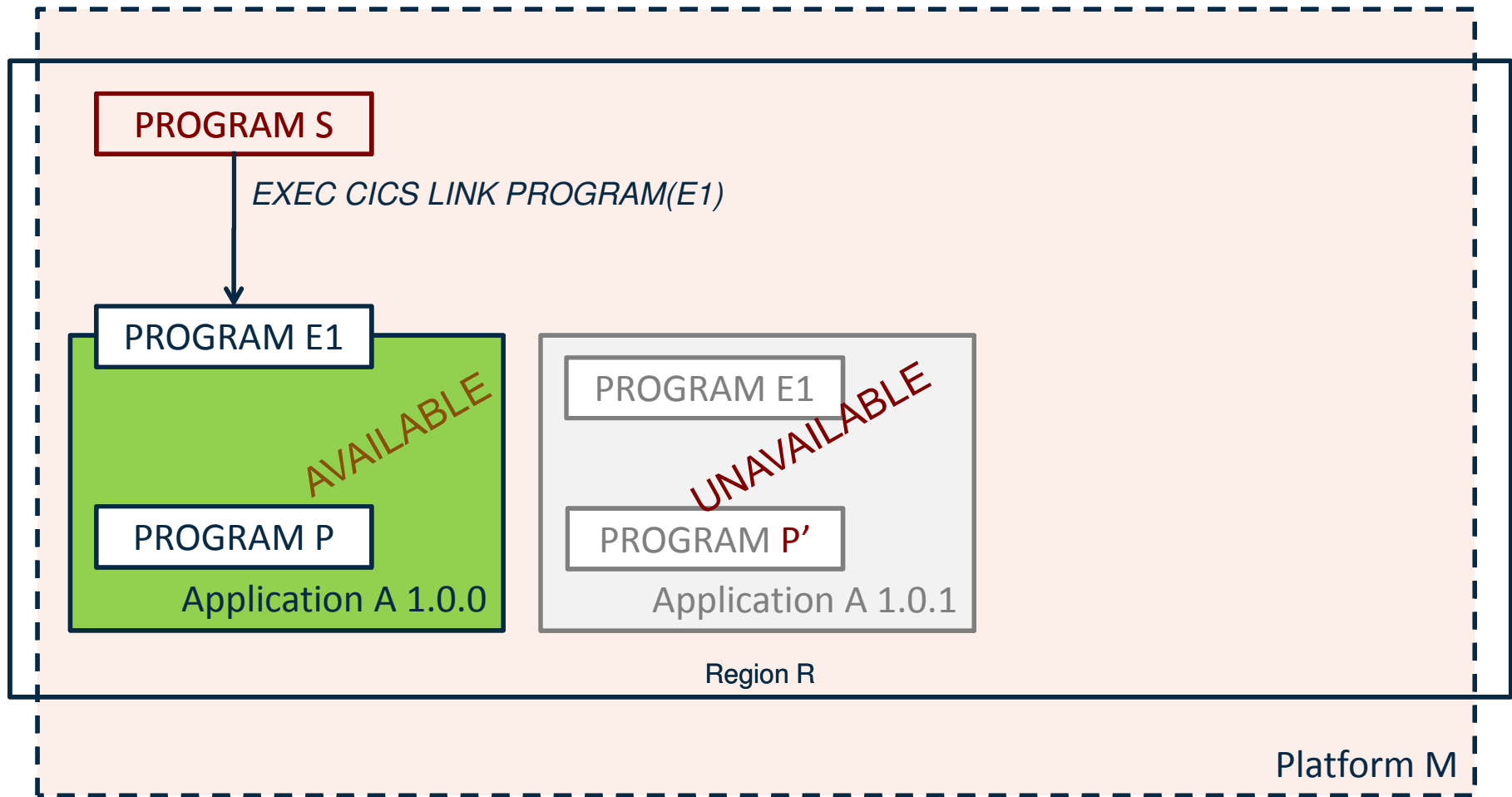
Demo

Provisioning application updates with
no loss of service using
CICS Transaction Server for z/OS V5.2
and CICS Explorer V5.2

http://ibmtvdemo.edgesuite.net/software/htp/cics/Cloud_application_update.mp4
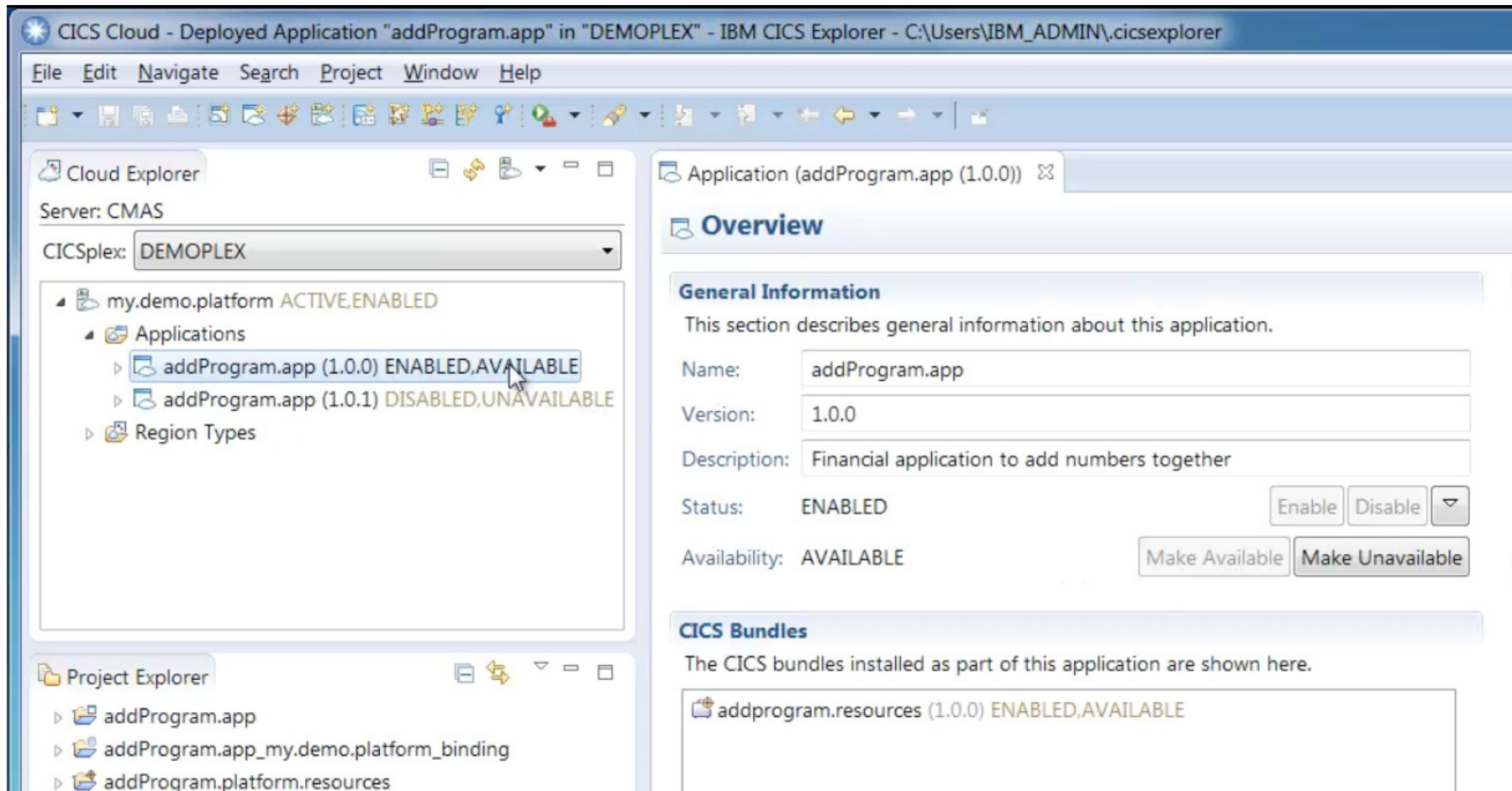
Demo: addProgram.app

TRAN ADDP

ADDPROG

LIB1

ADDPG1

AVAILABLE

Application A 1.0.0

ADDPROG

LIB1'

ADDPG1'

AVAILABLE

Application A 1.0.1

Region CICSMAS1
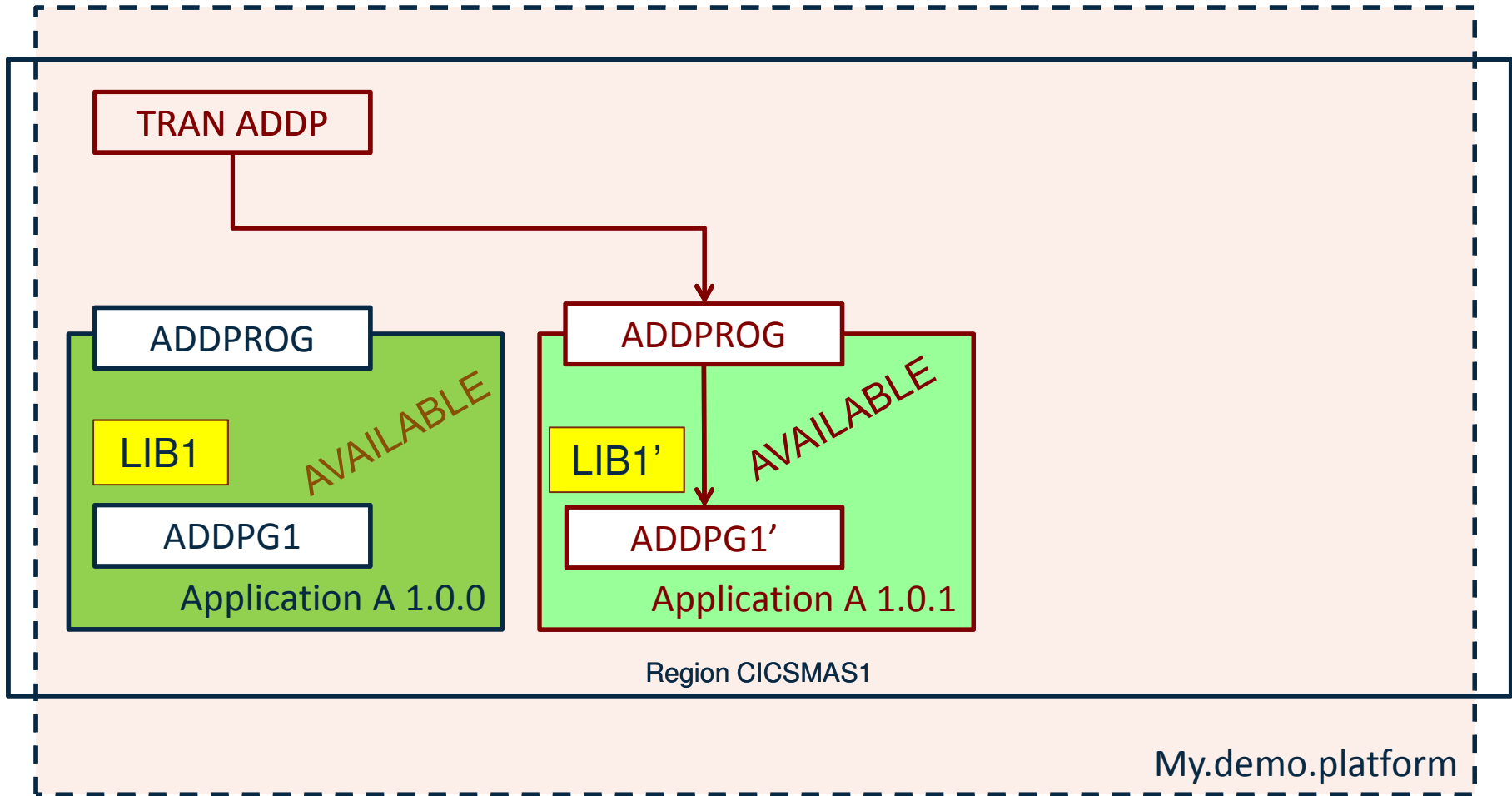
My.demo.platform

Application addProgram.app version 1.0.0 is enabled and available

However, it has a bug …

CICS Cloud - Deployed Application "addProgram.app" in "DEMOPLEX" - IBM CICS Explorer - C:\Users\IBM_ADMIN\.cicsexplorer

File   Edit   Navigate   Search   Project   Window   Help

Session A - [24 x 80]

ADDPG1 1 plus 1 equals 3

MA   A   01/002

To fix the bug we first enable version 1.0.1 of addProgram.app

To fix the bug we first enable version 1.0.1 of addProgram.app …

… ensuring it was deployed correctly and its dependencies are satisfied

But users still access addProgram.app version 1.0.0

We now make addProgram.app version 1.0.1 available

We now make addProgram.app version 1.0.1 available

and users now get access to addProgram.app version 1.0.1 with the bug fix
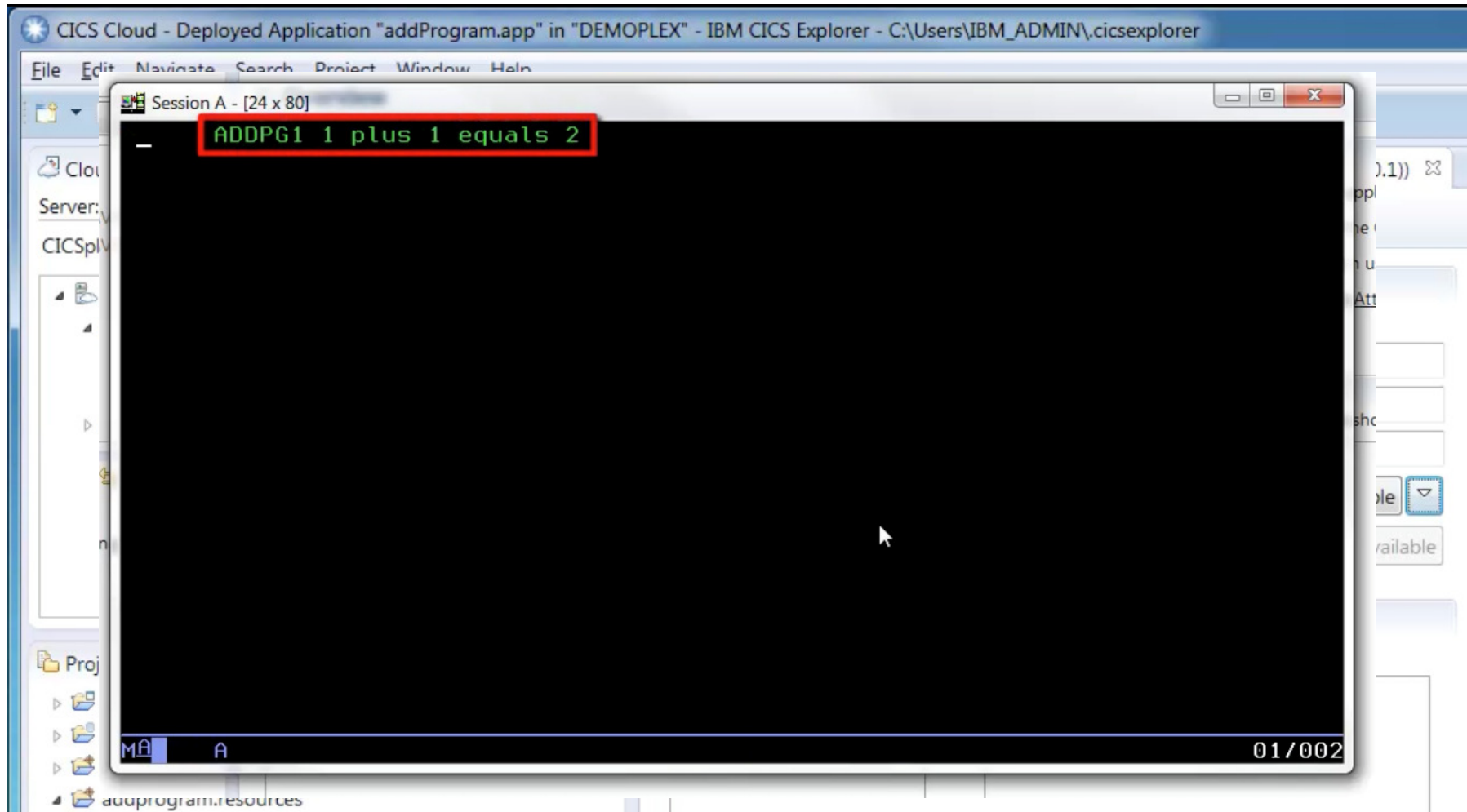
Both version 1.0.0 and 1.0.1 are available but CICS always choses the highest version

However, if there is a problem with version 1.0.1 …

… you can simply make it unavailable to backout the fix
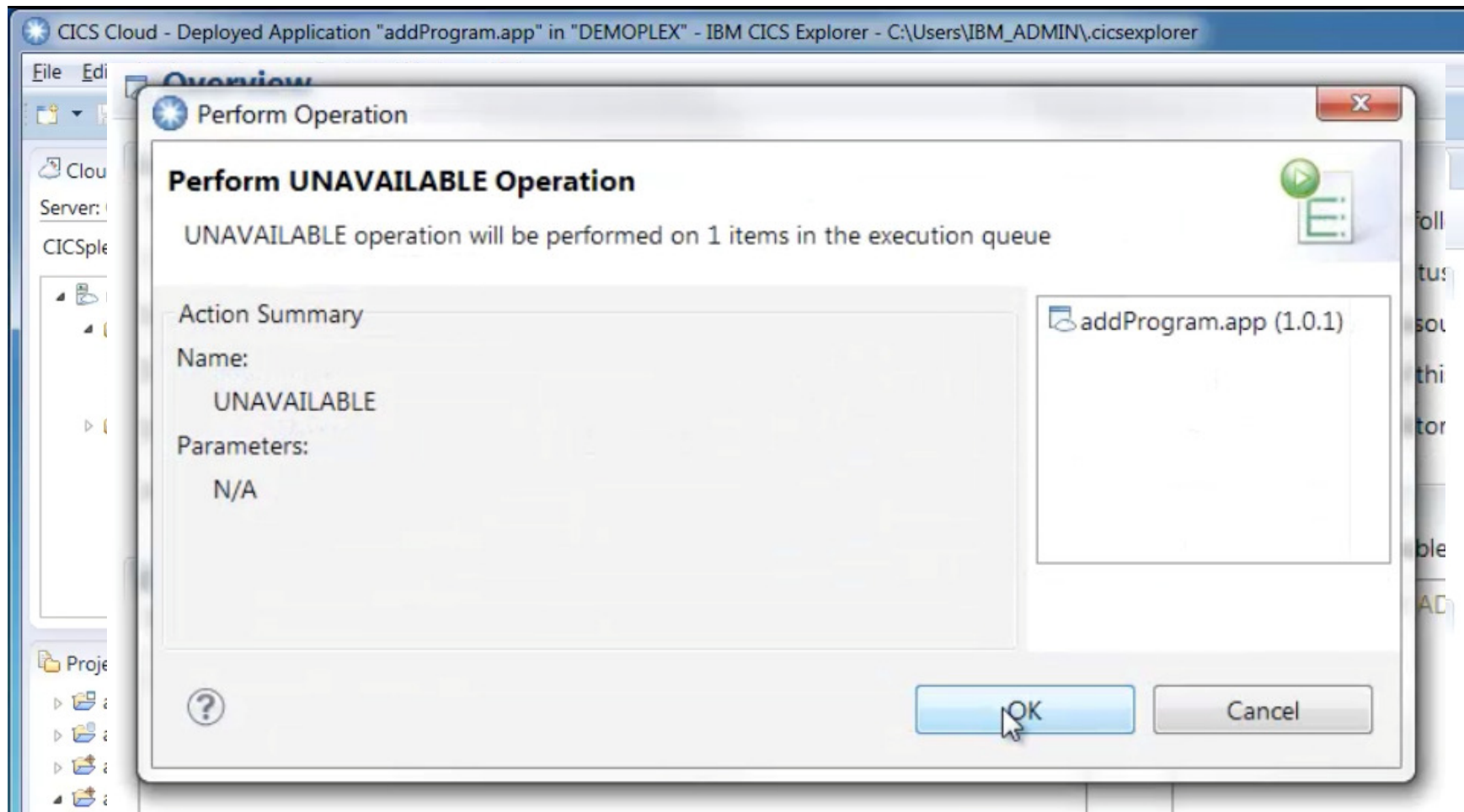
… and users will again have access to version 1.0.0
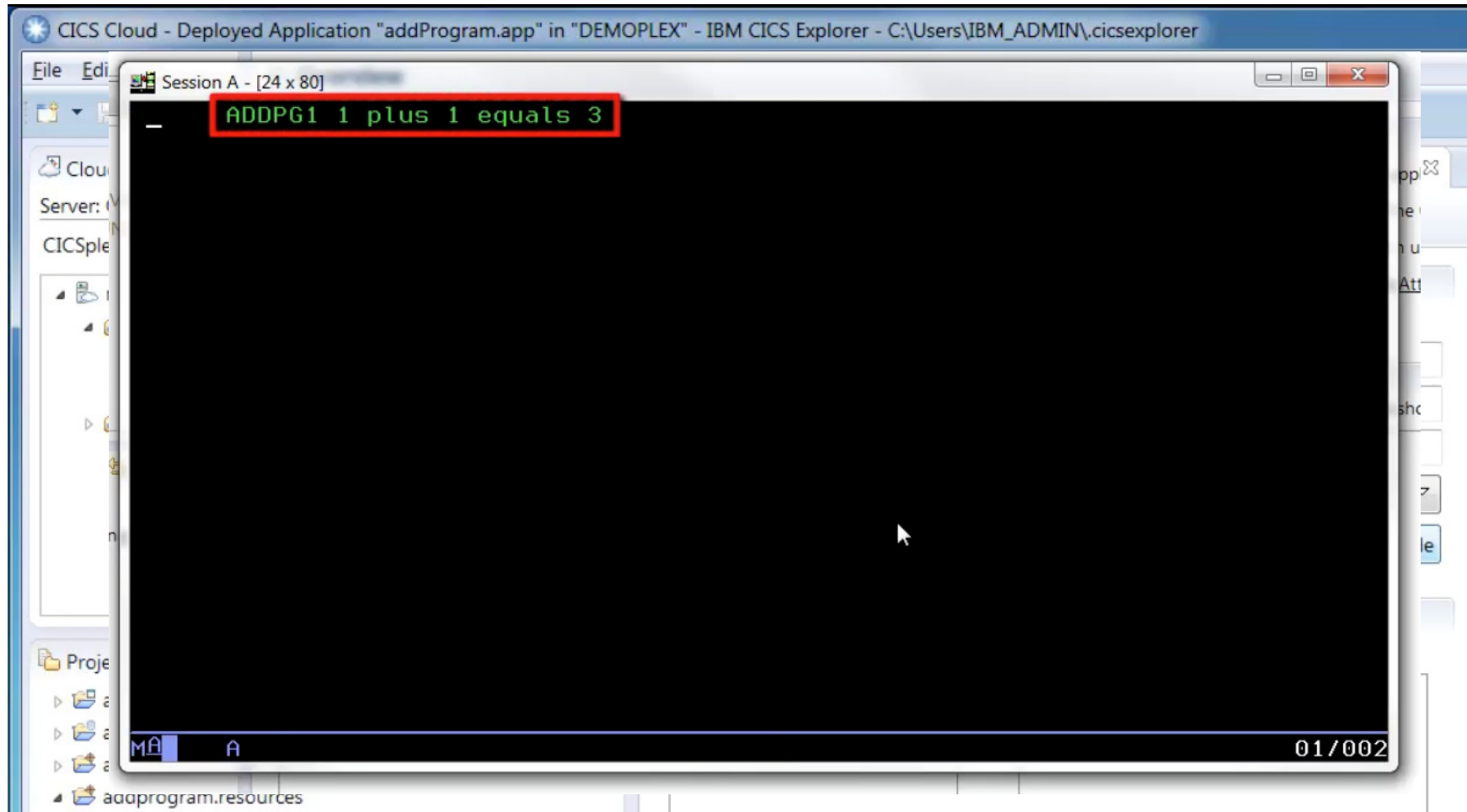
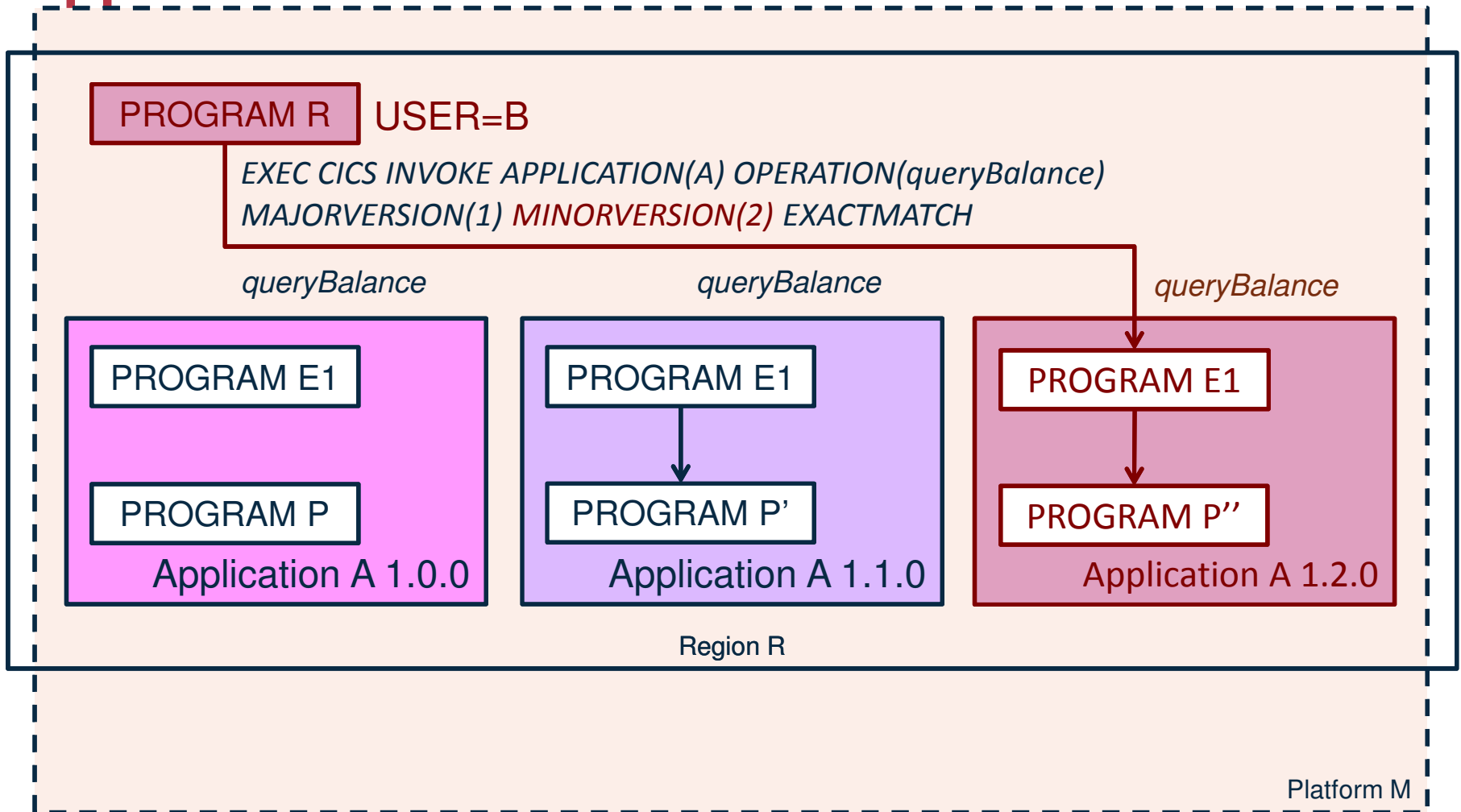# MQ Scenario: Application roll-out

"When rolling out a new version of an application I want to initially give access to just 10% of my users. That way I can reduce the impact of any potential problems related to either the new features or to the platform because of performance. The requests arrive over MQ so I want to use origin data to route each one to the appropriate application version"
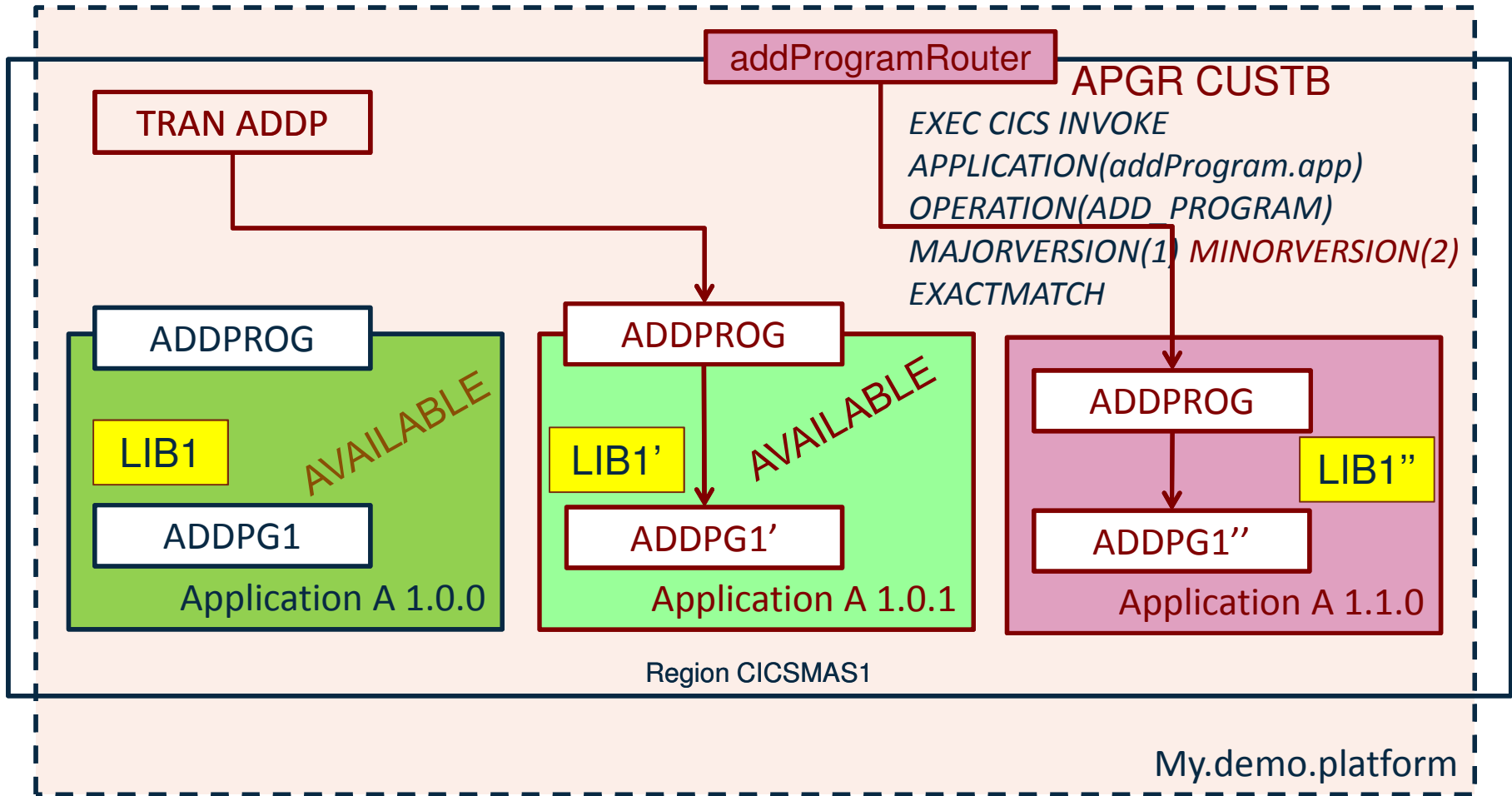
Most users get application version 1.1.0

PROGRAM R   USER=A

EXEC CICS INVOKE APPLICATION(A) OPERATION(queryBalance)
MAJORVERSION(1) MINORVERSION(1) EXACTMATCH

queryBalance   *queryBalance*   *queryBalance*

PROGRAM E1   PROGRAM E1   PROGRAM E1

PROGRAM P   PROGRAM P'   PROGRAM P''

Application A 1.0.0   Application A 1.1.0   Application A 1.2.0

Region R

Platform M
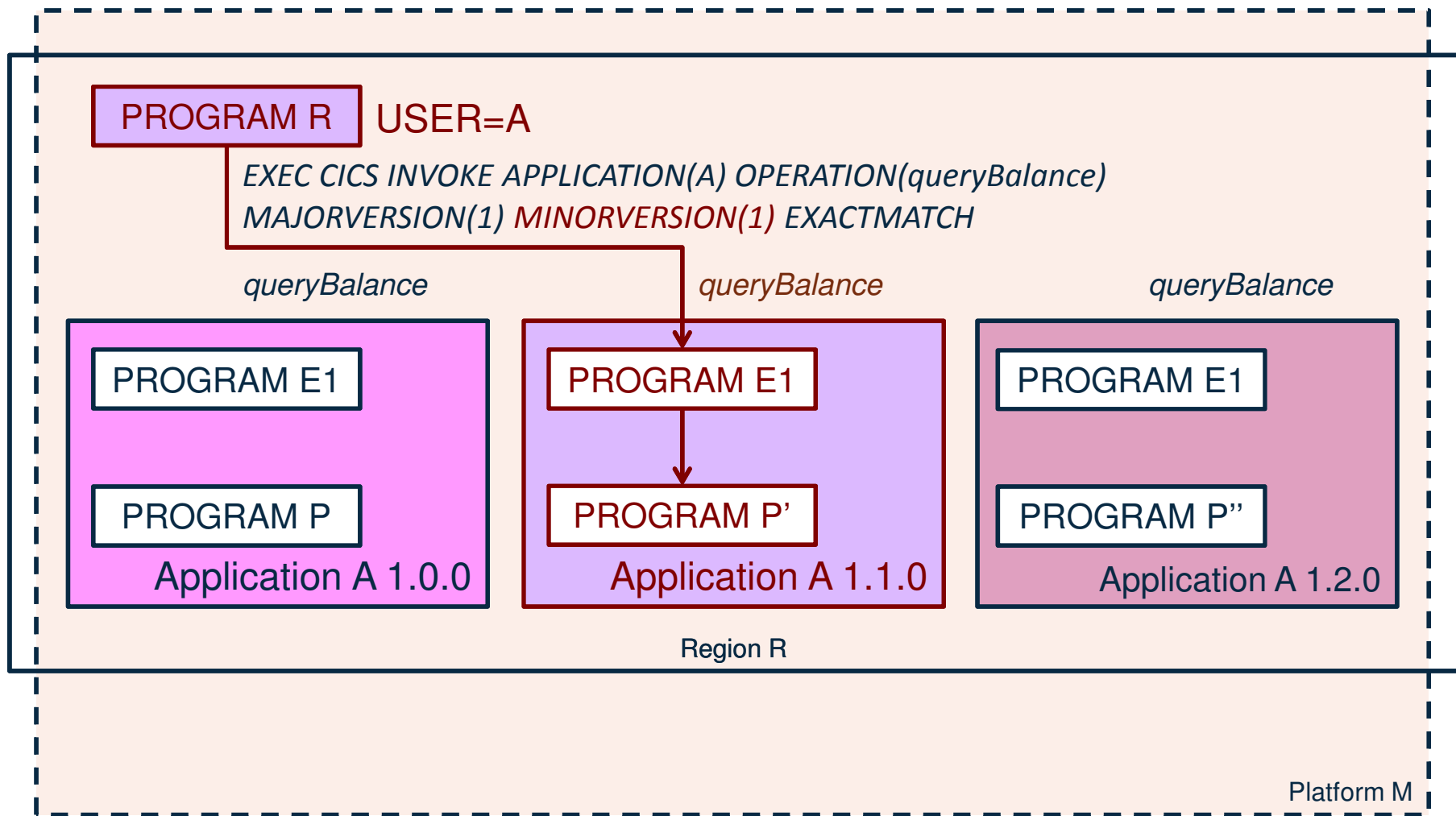
"Early access" users get the latest application version 1.2.0

PROGRAM R USER=B

EXEC CICS INVOKE APPLICATION(A) OPERATION(queryBalance)
MAJORVERSION(1) MINORVERSION(2) EXACTMATCH

queryBalance   *queryBalance*   *queryBalance*

PROGRAM E1   PROGRAM E1   PROGRAM E1

PROGRAM P   PROGRAM P'   PROGRAM P''

Application A 1.0.0   Application A 1.1.0   Application A 1.2.0

Region R

Platform M

Demo: addProgramRouter

addProgramRouter

TRAN ADDP

APGR CUSTB
EXEC CICS INVOKE
APPLICATION(addProgram.app)
OPERATION(ADD_PROGRAM)
MAJORVERSION(1) *MINORVERSION(2)*
EXACTMATCH

ADDPROG

LIB1

AVAILABLE

ADDPG1

Application A 1.0.0

ADDPROG

LIB1'

AVAILABLE

ADDPG1'

Application A 1.0.1

ADDPROG

LIB1"

ADDPG1''

Application A 1.1.0

Region CICSMAS1

My.demo.platform

Server Consolidation Scenario

"I have two applications (one of which was developed by a company we acquired) that currently run on different sets of CICS regions. I'd like to take advantage of the recent scalability improvements especially being able to increase MAXTASK. However, I know that their PROGRAM name clashes which prevent these applications from being hosted together."
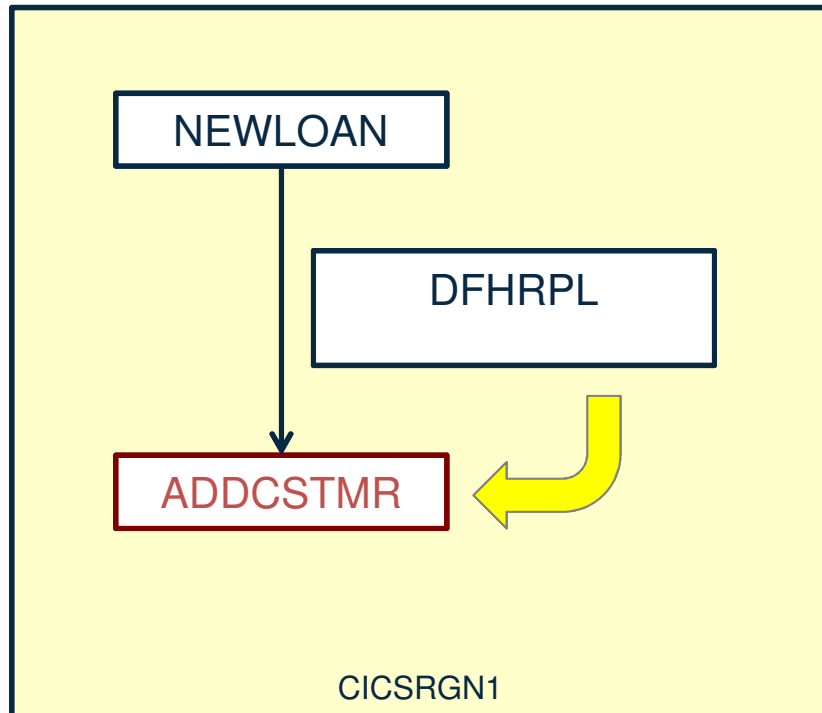
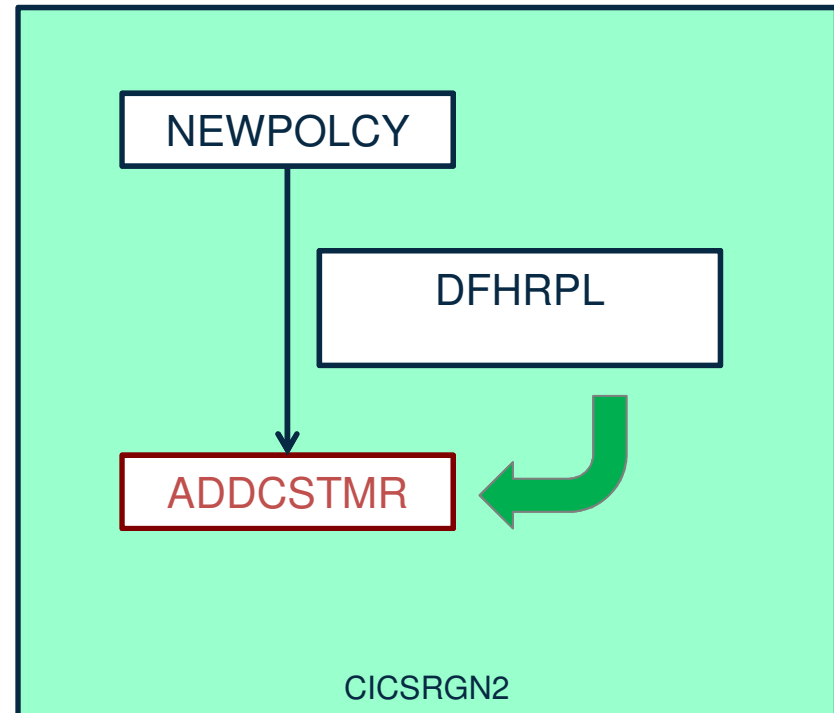# The Home Loan application has an ADDCSTMR program

Home Loan
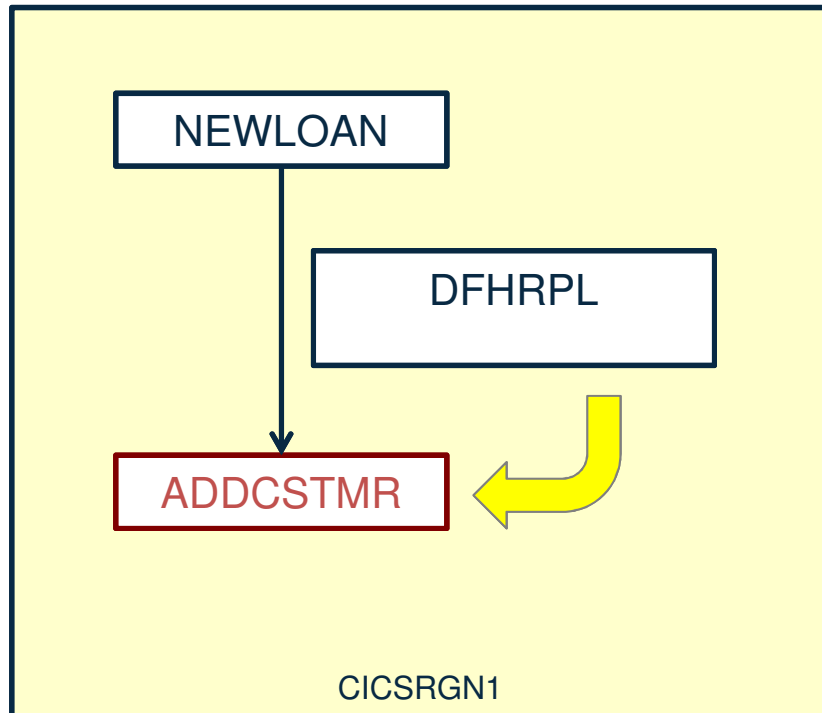
Unfortunately the Fire Insurance application also has an ADDCSTMR program so must be kept separate

Home Loan

NEWLOAN

DFHRPL

ADDCSTMR

CICSRGN1

Fire Insurance

NEWPOLCY

DFHRPL

ADDCSTMR

CICSRGN2

HomeLoan and FireInsurance both with ADDCSTMR installed into the same Region(s)
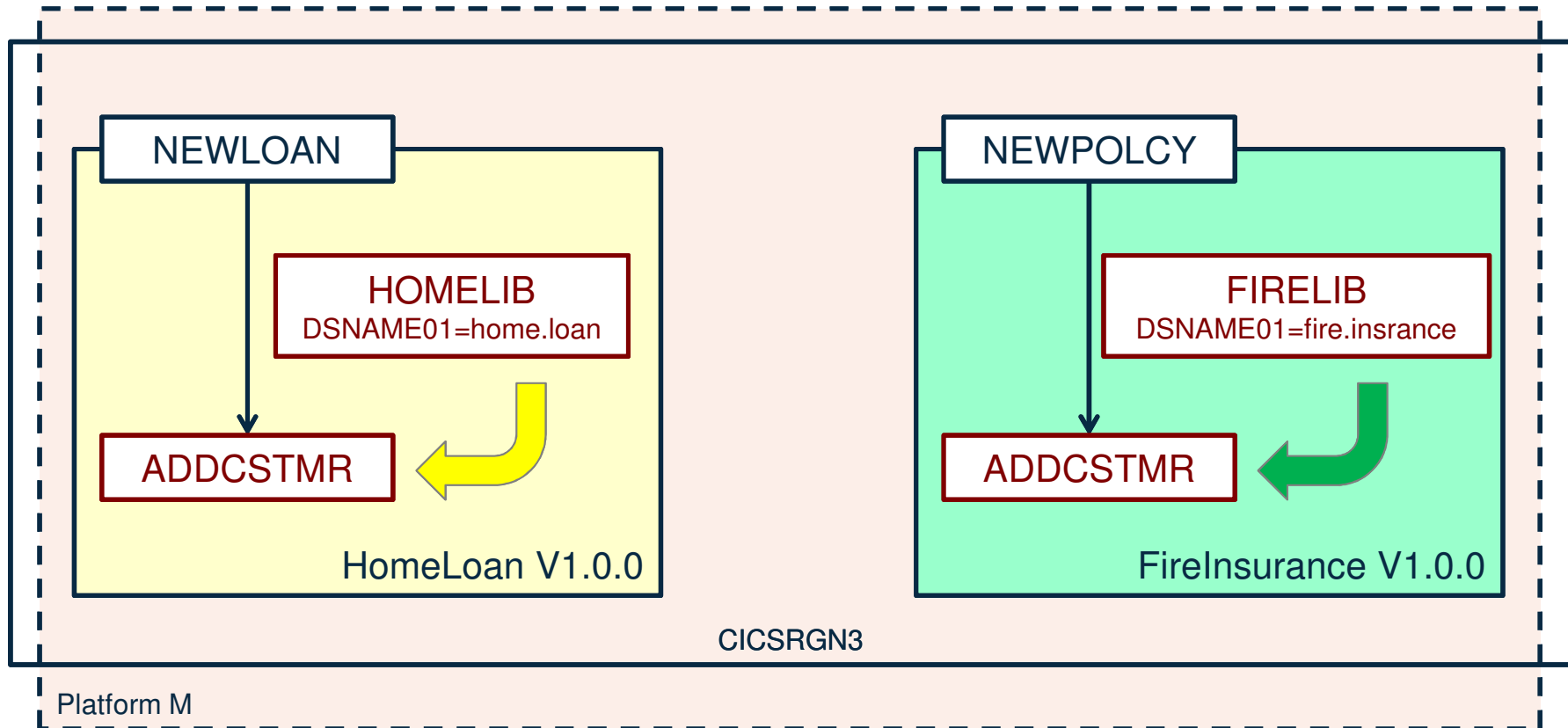
Application Modernization Scenario

"We have spent a lot of time using CICS Interdependency Analyzer (IA) to understand the call structure of one of our applications. This has enabled us to add more validation logic to avoid ABENDs when a copybook changes and someone hasn't recompiled all the right modules. But now we need to ensure no one bypasses these new checks."

Any PROGRAM in the Region can LINK to PROGRAM Q avoiding the checks in PROGRAM F
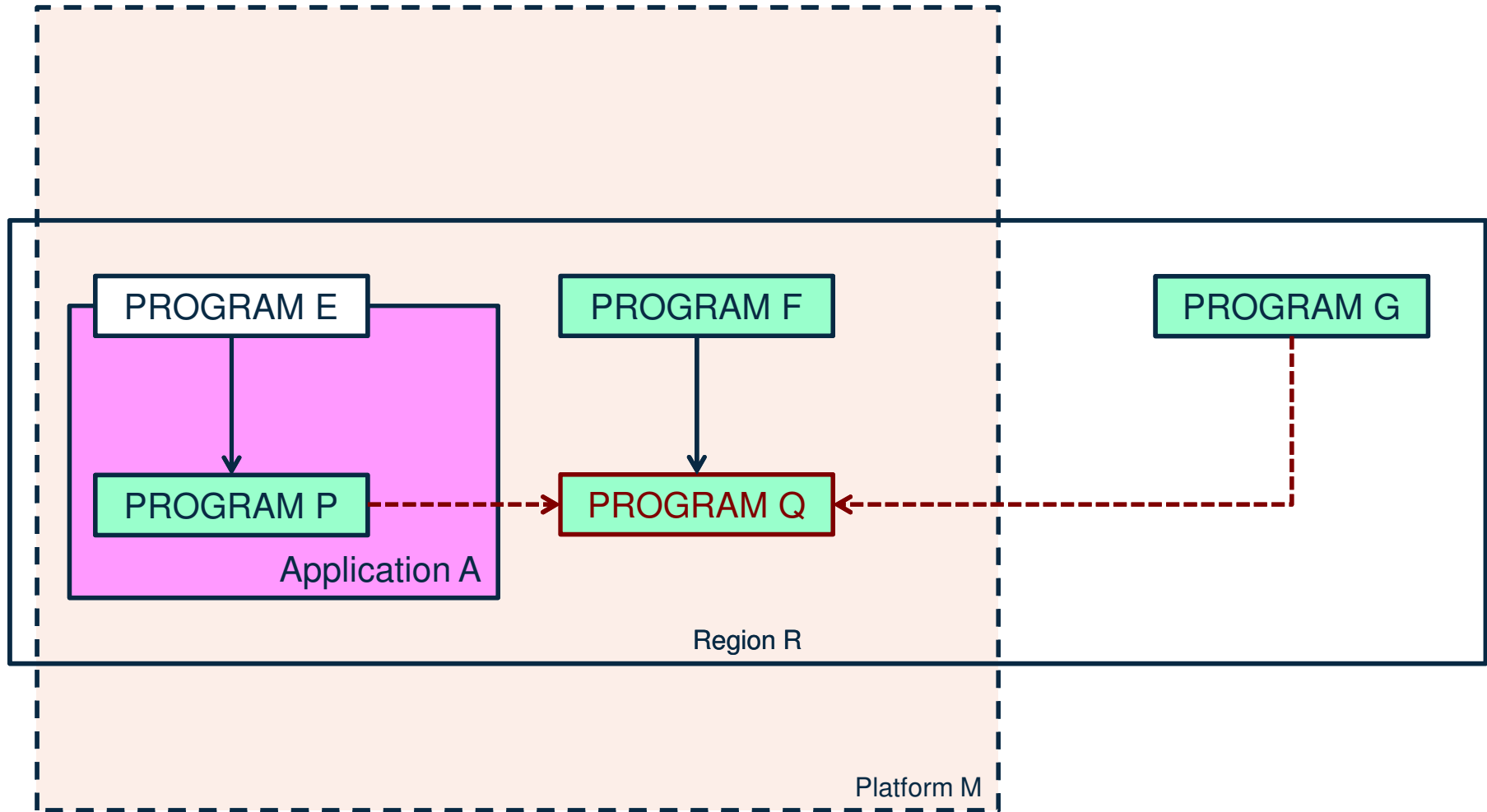
PROGRAM Q is now private to Application B
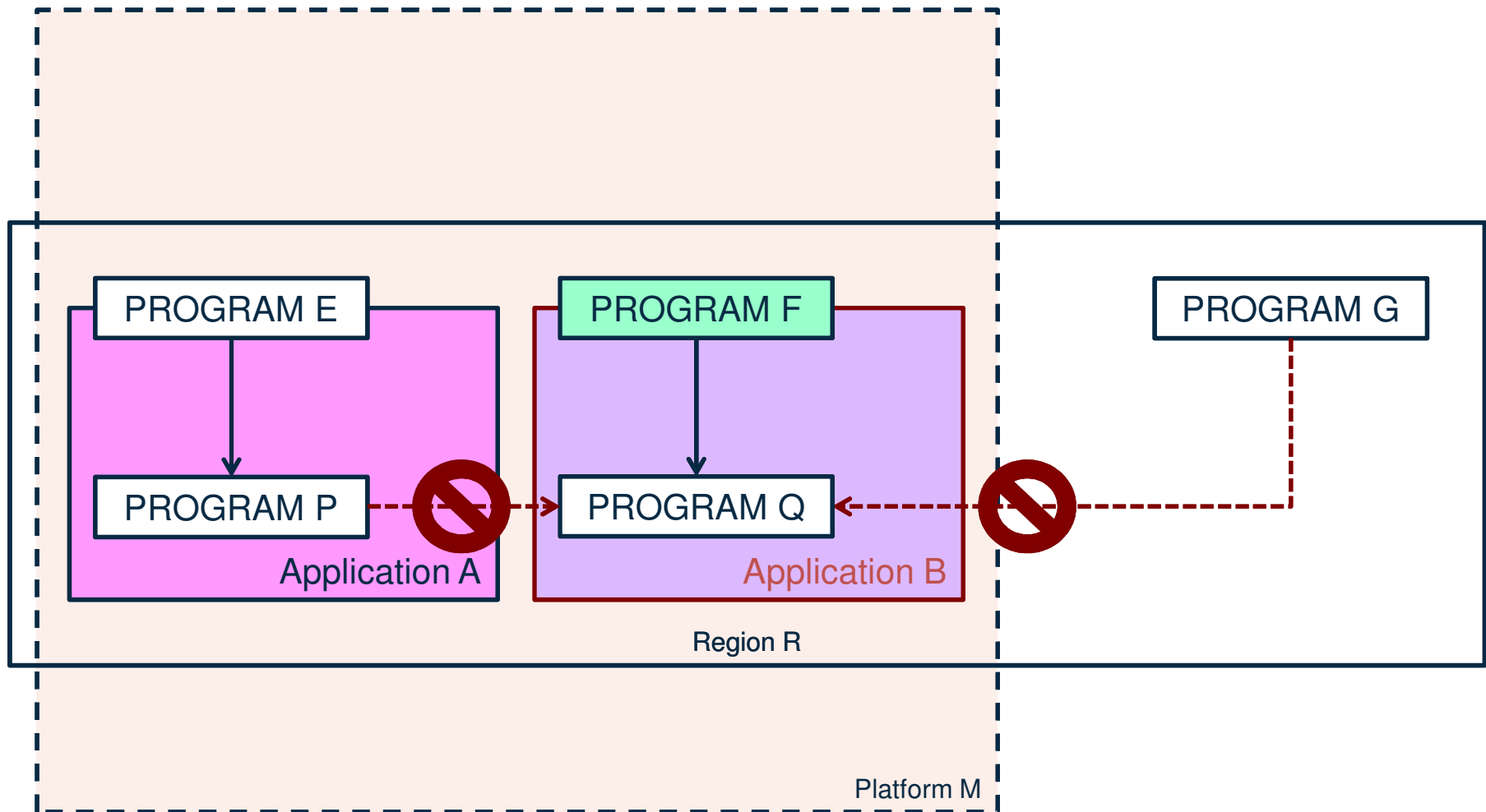
Must LINK through PROGRAM F entry point
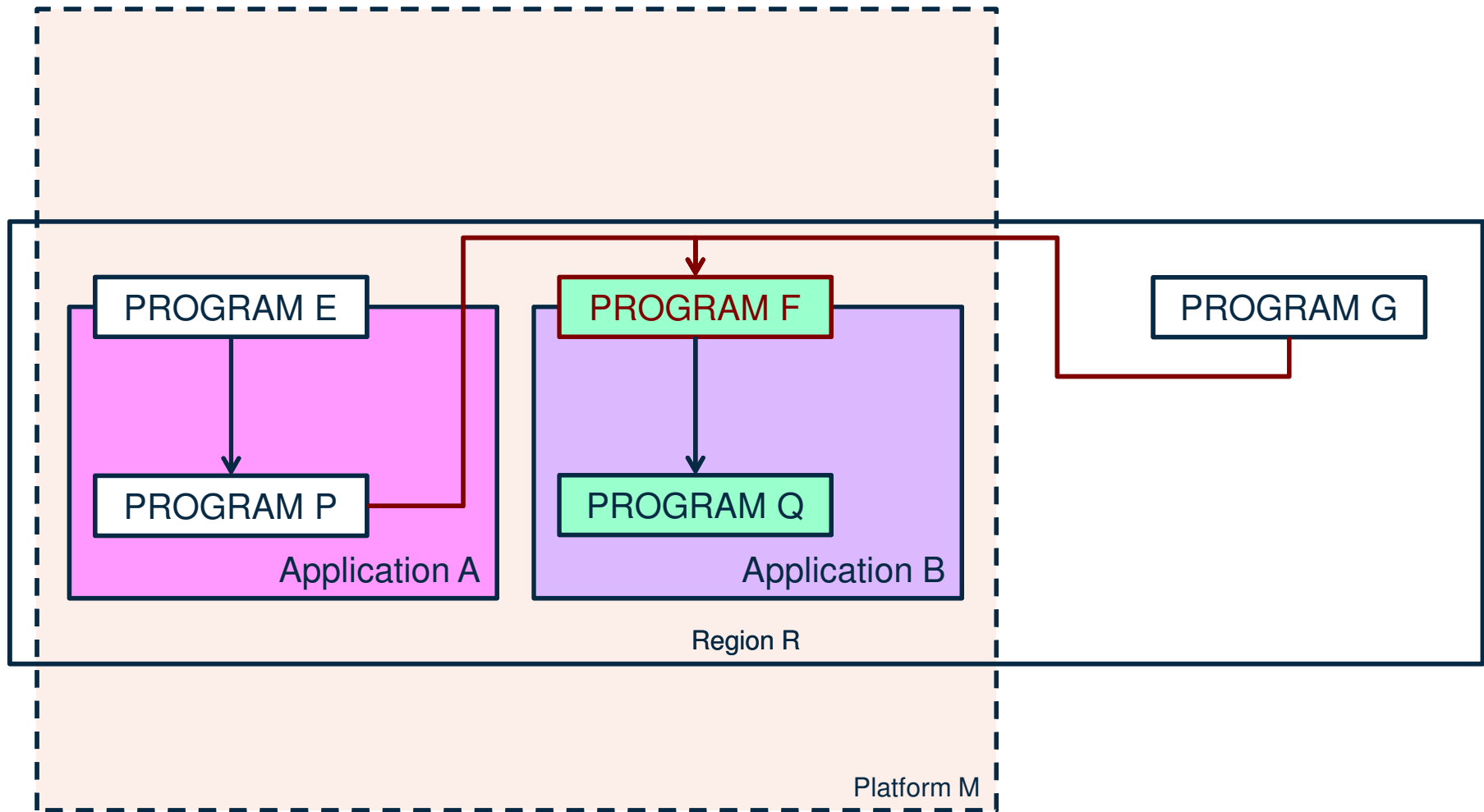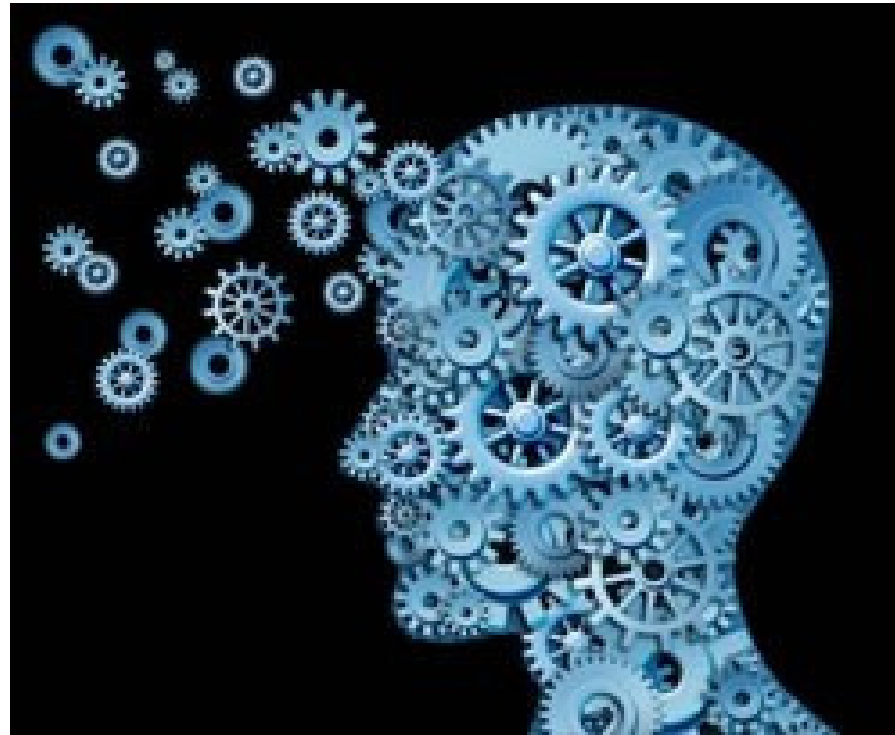
HOW DOES IT WORK?

Application Multi-versioning

Entry Points

PROGRAM, URIMAP, TRANSACTION (CICS TS V5.3 open beta)
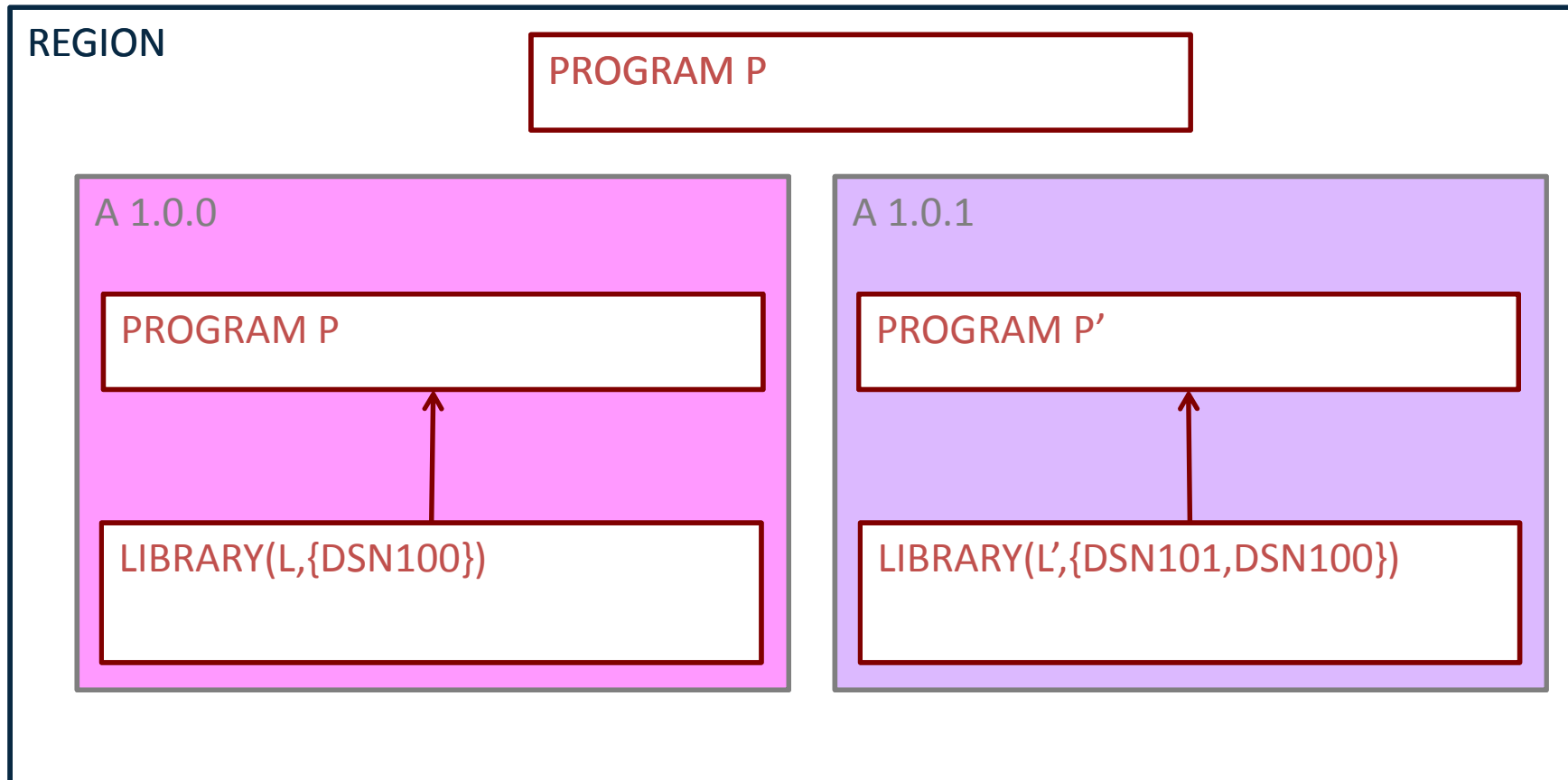
Resources

LIBRARY, PROGRAM, POLICY

Capability

Provide end user access to two or more versions of an application hosted on the same platform by using the new private **PROGRAM** and **LIBRARY** resources

Quickly switch back and forth between two different versions of an application using the **AVAILABLE | UNAVAILABLE** state

Route requests from users to different versions of an application using the new **INVOKE APPLICATION API**

SHARE
in Orlando 2015

LIBRARY Resources not added to global search order

REGION

PROGRAM P

A 1.0.0

PROGRAM P

↑

LIBRARY(L,{DSN100})

A 1.0.1

PROGRAM P'

↑

LIBRARY(L',{DSN101,DSN100})

AVAILABLE | UNAVAILABLE application status

- New AVAILABLE | UNAVAILABLE state
  - CICS application
  - CICS bundle
  - URIMAP entry point
- UNAVAILABLE
  - "Close the door"
  - Existing tasks complete normally
  - No new requests
- AVAILABLE
  - "Open the door"
  - Measure resource usage
  - Enforce policy
  - Control access (for packaged resources)

EXEC CICS INVOKE APPLICATION
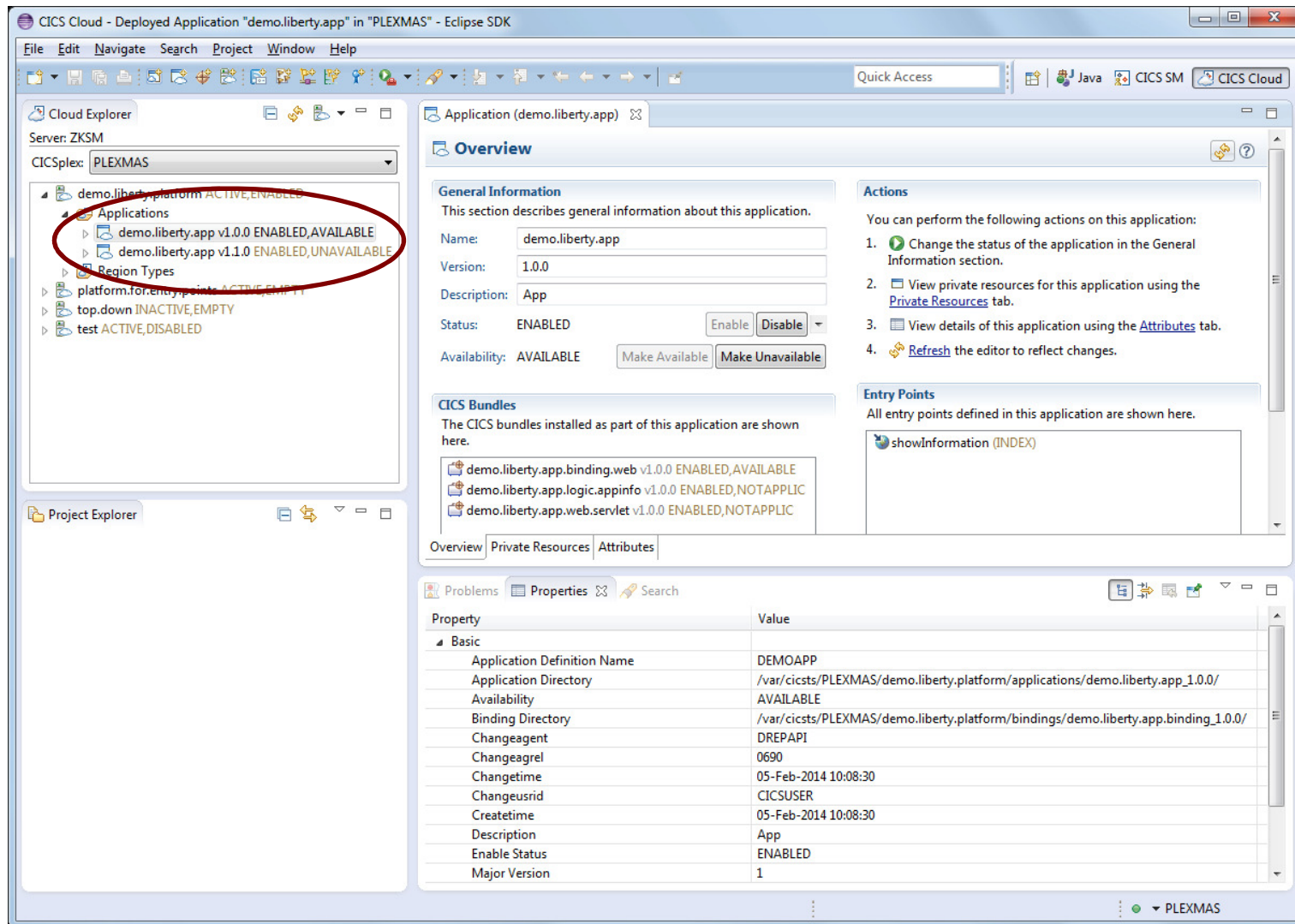
- EXEC CICS **LINK PROGRAM**()
- EXEC CICS **INVOKE APPLICATION**()
  - **OPERATION**()
  - OPERATION() **MAJORVERSION() MINORVERSION() MINIMUM**
  - OPERATION() MAJORVERSION() MINORVERSION() **EXACTMATCH PLATFORM**()
- JCICS **Application.invoke**()

CICS CLOUD EXPLORER

Managing Multi-Versioned Applications

Application Lifecycle

New *Online* Application Editor

Private Resources

Application demo.liberty.app 1.0.0 vs. 1.1.0: BUNDLE

Application demo.liberty.app 1.0.0 vs. 1.1.0: PROGRAM

Application (demo.liberty.app) ⊠

Private Resources

Structure

- ▲ demo.liberty.app v1.0.0
  - ▲ logic
    - IYK3ZKSW
  - ▲ web
    - IYK3ZKSW

Private Resources

Programs | LIBRARYs | LIBRARY DS Names

Name:

CNX0211I Context: IYK3ZKSW. Resource: PROGRAM. 1 records collected at 24-Feb-2014 15:32:36

Region	Name	Status	Concurrent ...	Language	Operation N...
IYK3ZKSW	BDCGETAI	ENABLED	0	C	

Application (demo.liberty.app) | **Application (demo.liberty.app)** ⊠

Private Resources

Structure

- ▷ demo.liberty.app v1.1.0

Private Resources

Programs | LIBRARYs | LIBRARY DS Names

Name:

CNX0211I Context: PLEXMAS. Resource: PROGRAM. 1 records collected at 24-Feb-2014 15:51:20

Region	Name	Status	Concurrent ...	Language	Operation N...
IYK3ZKSW	BDCGETAI	ENABLED	0	C	

SHARE
in Orlando 2015

Application demo.liberty.app 1.0.0 vs. 1.1.0: LIBRARY

Private Resources

Programs | LIBRARYs | LIBRARY DS Names

Name:

CNX0211I Context: IYK3ZKSW. Resource: LIBRARY. 1 records collected at 24-Feb-2014 15:30:01

Region	Name	Search Position	Ranking	Critical Status	Enable Sta...	Numdsnames
IYK3ZKSW	APPMV	1	50	NONCRITICAL	ENABLED	1

Programs | LIBRARYs | LIBRARY DS Names

Name:

CNX0211I Context: IYK3ZKSW. Resource: LIBDSN. 1 records collected at 24-Feb-2014 15:30:27

Region	Name	D..	DS Name	DS Name Search Position
IYK3ZKSW	APPMV	1	BENCOX.APP-MV.DEMO.LOAD	1001

Private Resources

Programs | LIBRARYs | LIBRARY DS Names

Name:

CNX0211I Context: PLEXMAS. Resource: LIBRARY. 1 records collected at 24-Feb-2014 16:04:01

Region	Name	Search Position	Ranking	Critical Status	Enable Sta...	Numdsnames
IYK3ZKSW	APPMV	1	50	NONCRITICAL	ENABLED	1

Programs | LIBRARYs | LIBRARY DS Names

Name:

CNX0211I Context: PLEXMAS. Resource: LIBDSN. 1 records collected at 24-Feb-2014 15:51:25

Region	Name	DS Number	DS Name	DS Name Search Position
IYK3ZKSW	APPMV	1	BENCOX.APP-MV.DEMO.LOAD2	1001

IBM CICS Transaction Server V5.3 open beta

enterprise grade mixed language application serving

Service Agility

Enhanced support for Java and the WebSphere Liberty Profile

- Additional Liberty features
- Enhanced interoperability
- Simplified management
- Enhanced Java SE support

Operational Efficiency

Performance optimizations, enhanced metrics and additional security

- Web service optimizations
- Performance improvements
- Enhanced metrics
- Additional security options

Cloud with DevOps

New cloud and DevOps support to automate CICS deployments

- Automated builds
- Scripted deployments
- UrbanCode Deploy support
- Enhanced cloud enablement

Updated July 2015

CICS TS V5.3 open beta : Cloud with DevOps

New cloud and DevOps support to automate CICS deployments

Automated builds

Scripted deployments

UrbanCode Deploy support

Enhanced cloud enablement

A built CICS project that resides in zFS, can now be programmatically deployed across CICS systems using a set of scripting commands.

DFHDPLOY is a new batch utility to support the automated provisioning of CICS bundles, OSGi bundles within CICS bundles, and CICS applications.

DFHDPLOY commands can be used to deploy CICS bundles and CICS applications into a desired state, such as 'enabled' or 'available' as well as undeploy and remove them.

Summary

Use multi-versioning to deploy new applications, application features or bug fixes while minimizing any impact to existing users or requiring additional infrastructure

Implement the different scenarios using private PROGRAM and LIBRARY resources, the AVAILABLE | UNAVAILABLE application status, and INVOKE APPLICATION API

Manage multi-versioned applications in Explorer with the new online editor

| PROGRAM E1 |
| PROGRAM P |
Application A 1.0.0

| PROGRAM E1 |
| PROGRAM P' |
Application A 1.1.0

| PROGRAM E1 |
| PROGRAM P'' |
Application A 1.2.0
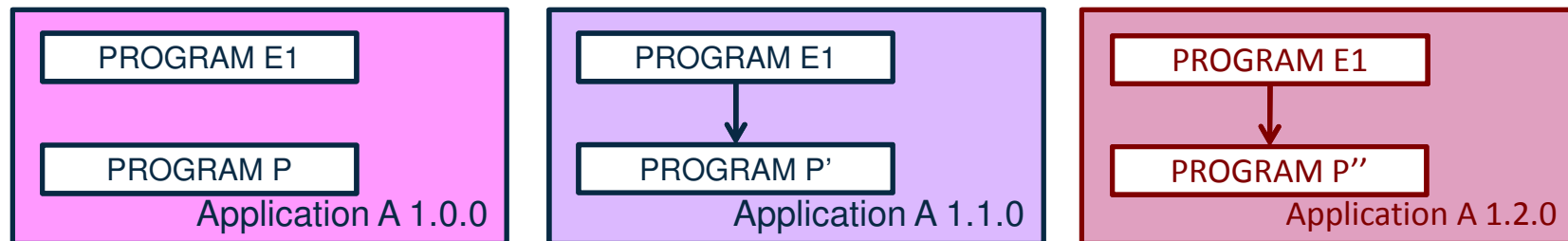
More Information

- **IBM Redbooks publication (** *"Cloud Enabling IBM CICS"* **):**
  http://www.redbooks.ibm.com/abstracts/sg248114.html?Open

- **Blog (CICSdev):**
  https://www.ibm.com/developerworks/mydeveloperworks/blogs/cicsdev/tags/blog
  - *What is CICS Application Multi-versioning?*
  - *How can I phase in the new version of a CICS Application?*
  - *Quick start CICS Explorer projects for "Cloud Enabling CICS"*

- **Demos:**
  http://www.ibm.com/software/htp/cics/tserver/v52/library/demos.html
  - *Provisioning application updates with no loss of service*
  - *Hosting two versions of a CICS application concurrently on the same platform*

- **Podcasts:**
  http://www.ibm.com/software/os/systemz/podcasts/websphereonz/
  - *CICS V5.2 - Multi-Versioning*

- **Scenarios:** https://www-01.ibm.com/support/knowledgecenter/SSGMCP_5.2.0/com.ibm.cics.ts.scenarios.doc/topics/Scenarios.html
  - *Updating an application on a platform*
  - *Hosting two versions of a CICS application concurrently on the same platform*

Cloud Enabling IBM CICS

Discover how to quickly cloud enable a traditional IBM 3270-COBOL-VSAM application

Use CICS Explorer to develop and deploy a multi-versioned application

Understand the benefits of threshold policy

Rufus Credle
Isabel Arnold
Andrew Bates
Michael Baylis
Pradeep Gohil
Christopher Hodgins
Daniel Millwood
Ian J Mitchell
Catherine Moxey
Geoffrey Pirie
Inderpal Singh
Stewart Smith
Matthew Webster

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Questions

Answers

I ♥ CICS

THANK YOU