Session 9732:
z/OS Software Deployment

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Agenda

- **Overview**
  - "Software Deployment"
  - "Software Instances"
  - Common "Software Deployment" Scenarios
  - Value of simplifying "Software Deployment"
- **IBM's New z/OSMF Software Deployment task**
- **Software Deployment "Demonstration"**
  - "Clone" existing software to prepare to upgrade a product
- **Summary**

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Overview

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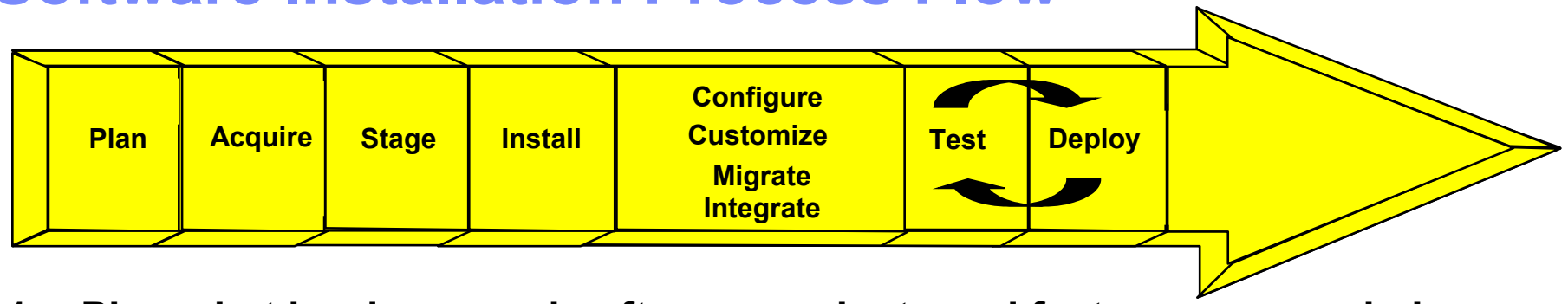
Software Installation Process Flow



1. **Plan what hardware and software products and features are needed or desired**
2. **Acquire the products and features**
   - Order IBM software using ShopzSeries
   - Order hardware and ISV products (as needed)
3. **Stage the software**
   - Combined with acquisition for electronic distribution
4. **Install the software**
   - ServerPac (or SystemPac) installation
   - SMP/E installation for CBPDO products or service
5. **Customize the software**
   - Configure features, override defaults (if necessary)
   - Migrate existing customization and perform required migration actions
   - Install/Connect middleware, ISV code, and applications
6. **Test the system**
7. **Deploy the system**
   - To other test systems, then to production systems

Note: Steps can involve multiple people with different responsibilities (roles)

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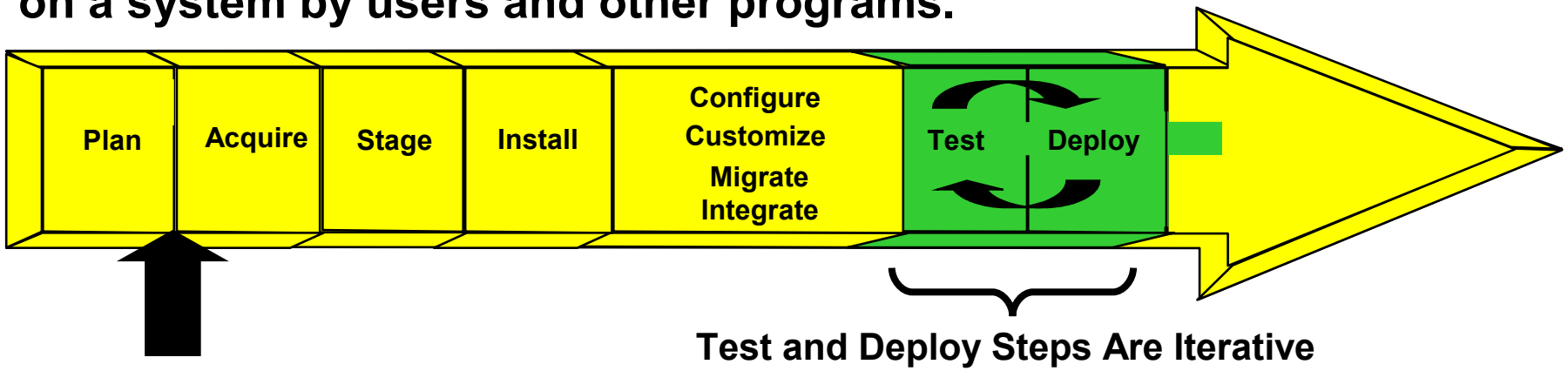
What Is Meant By Software Deployment*

- Software deployment is one step in the end-to-end software installation flow.
- Software deployment is itself a workflow consisting of a number of steps to copy a software instance to another physical location such as another DASD volume.
- The purpose of software deployment is to make software (executable code, configuration files and operational data sets) available for use on a system by users and other programs.



Prior to installing you copy ("clone") your software and update the copy (not the running software

Test and Deploy Steps Are Iterative

- May need to deploy before you can test
- May need to test before deploying to a new environment
- May repeat tests and deployment several times

*As defined in this presentation by me, and used by the IBM z/OSMF Software Deployment function

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What Is Meant By Software Deployment*

- Can involve
  - Copying a software instance to different volumes or to data sets (or paths) with different names.
    - "Source" software instance -- identifies the software that you want to deploy
    - "Target" software instance -- identifies where you want the software deployed
  - Performing customization tasks to create or update configuration files and operational data sets.
    - Can be performed:
      - prior to software deployment for common configurations,
      - after software deployment for instance specific configuration, or
      - a combination of both
    - When upgrading from a prior level, some of these tasks may be identified as "migration actions".

*As defined in this presentation by me, and used by the IBM z/OSMF Software Deployment function

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Current State of Software Deployment

- **For years IBM has left software deployment as an exercise for the user.**
- **Over time, innovative approaches were developed by our users to deploy a fix, maintenance upgrades, or new releases.**
  - Errors occurred, because all the affected parts were not copied; such as
    - Load module aliases, HFS or PDS/PDSE files/members
    - Entire libraries or file systems
- **Some users have been reluctant to exploit new technology (for example: zFS) due to required changes to cloning procedures.**
- **Many users choose not to copy the SMP/E Consolidated Software Inventory (CSI), which makes it hard to have a software inventory of the running system.**
  - The absence of a CSI (and other SMP/E data sets) makes it impossible to install maintenance in an emergency.

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Desired State of Software Deployment

- **Clone z/OS images and deploy software more easily and consistently, using a new z/OSMF software deployment task.**
- **Manage the deployment of ALL SMP/E packaged software (IBM, ISV, and user)**
- **Codify IBM recommended best practices for software deployment**
  - Copy all affected parts of a software update.
  - Check requisites prior to deployment.
    - Check existing software instances for missing coexistence service
    - Check products that will interact with the deployed target software instance for missing requisites which enable them to run on the new software level
    - Check if the source software instance is missing any SYSMODs for the target environment
  - Check for possible regression of maintenance or USERMODs.
    - Check that the new release has the equivalent service that the software instance being replaced contained.
  - Identify any SYSTEM HOLDs that may need to be resolved in the target environment PRIOR to deployment.
  - Deploy the SMP/E zones with the libraries.

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Software Instance

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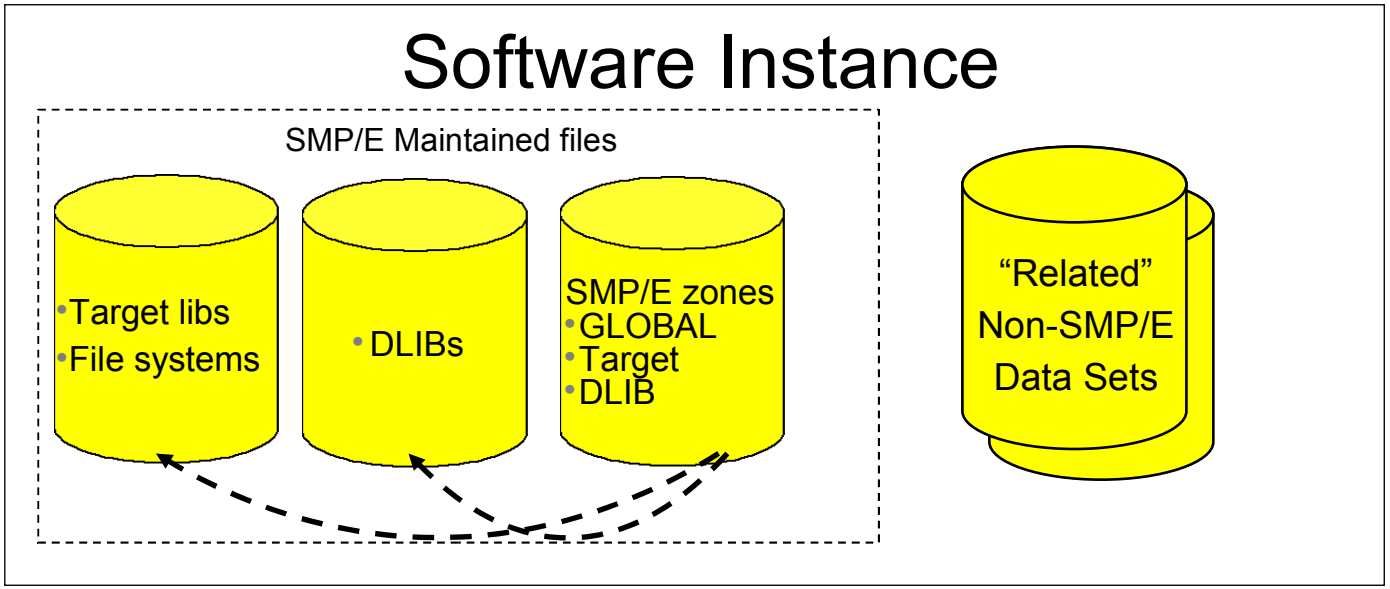
Software Instance



- **Definition: For z/OS platform software, the SMP/E target and distribution zones that are associated with a product set and the target and distribution libraries described by those zones.**
  - –The SMP/E zones point to the target and distribution libraries
    - DLIB data sets and DLIB zones are optional
  - –Non-SMP/E data sets can include:
    - Other runtime libraries
    - Configuration files and operational data sets
    - Non-SMP/E maintained ISV or user libraries

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Software Instance …

- Recommendation: Each software instance should contain one or more software products that you install, maintain, backup, recover and deploy as a group.
  - The "*z/OS Planning for Installation*" book uses the term "product set" for this group of products.
- A number of software instances can be accessible on a z/OS system.
  - When used as a driving system, the target system software instances that will be updated during installation are accessible.
  - A running system contains one or more software instances that are used during software execution.
- Software instances can be shared among one or more z/OS systems in a sysplex, for example:
  - Two z/OS LPARs can be IPLed from the same SYSRES.
  - Two DB2 instances can use the same DB2 libraries.

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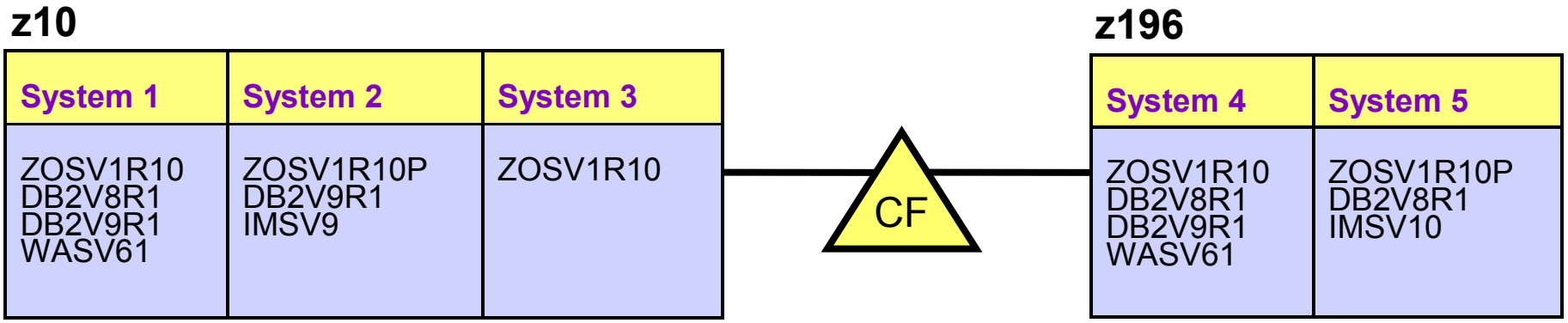
Software Instances in a Parallel Sysplex (1 of 2)



Environment

- 2 Servers (CPCs)
- 5 z/OS Images (LPARs)
  - Systems 1 – 5

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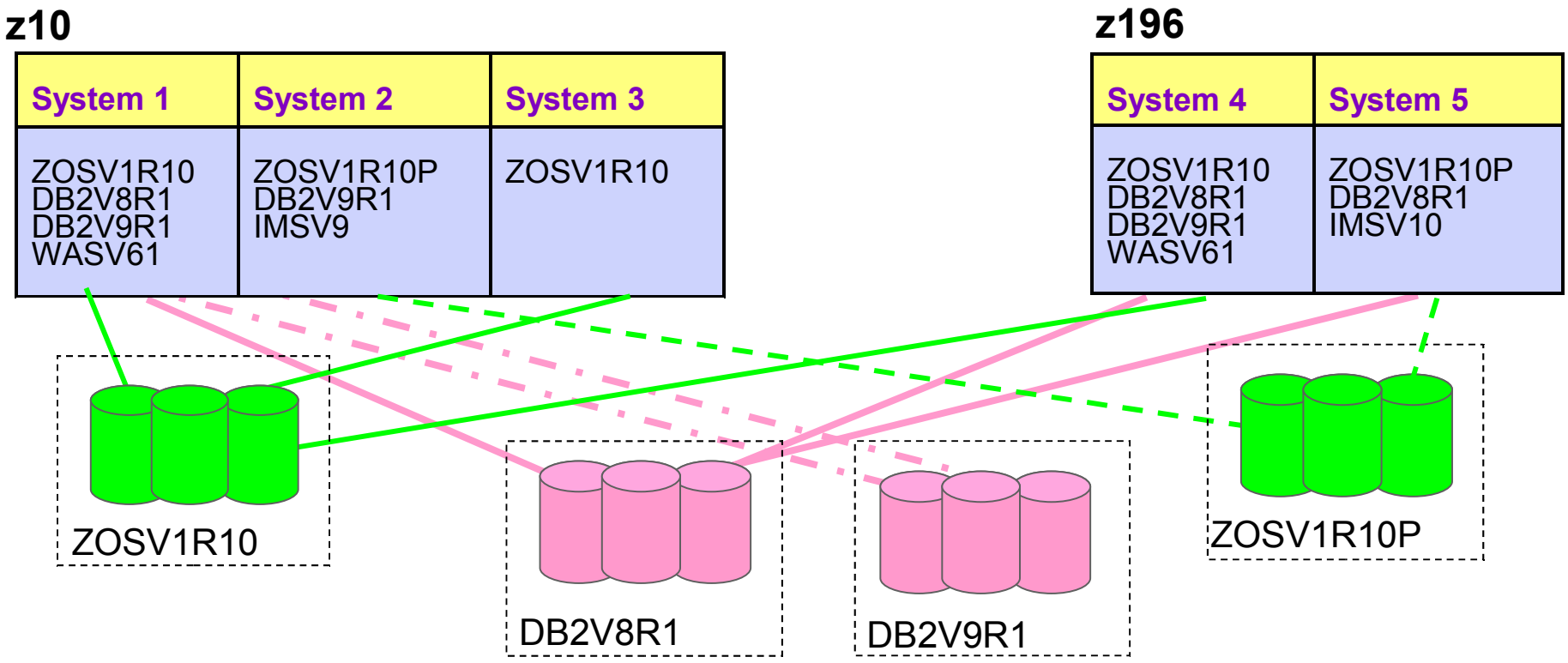
Software Instances in a Parallel Sysplex (2 of 2)



Environment

- **5 z/OS images share 2 z/OS software instances (ZOSV1R10, ZOSV1R10P)**
- **4 z/OS images share 2 DB2 software instances (DB2V8R1, DB2V9R1)**
  - Both DB2 instances are used on system System 1

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Common Deployment Scenarios

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Common Software Deployment Scenarios

1. **"Clone" existing software to prepare to upgrade a product**
2. **Deploy a new software level of one or more product sets, either**
   - A new release
   - A new maintenance level
3. **Create an executable image from software installed into "work" data sets**
   - The "work" data sets are usually SMS managed, or uniquely named

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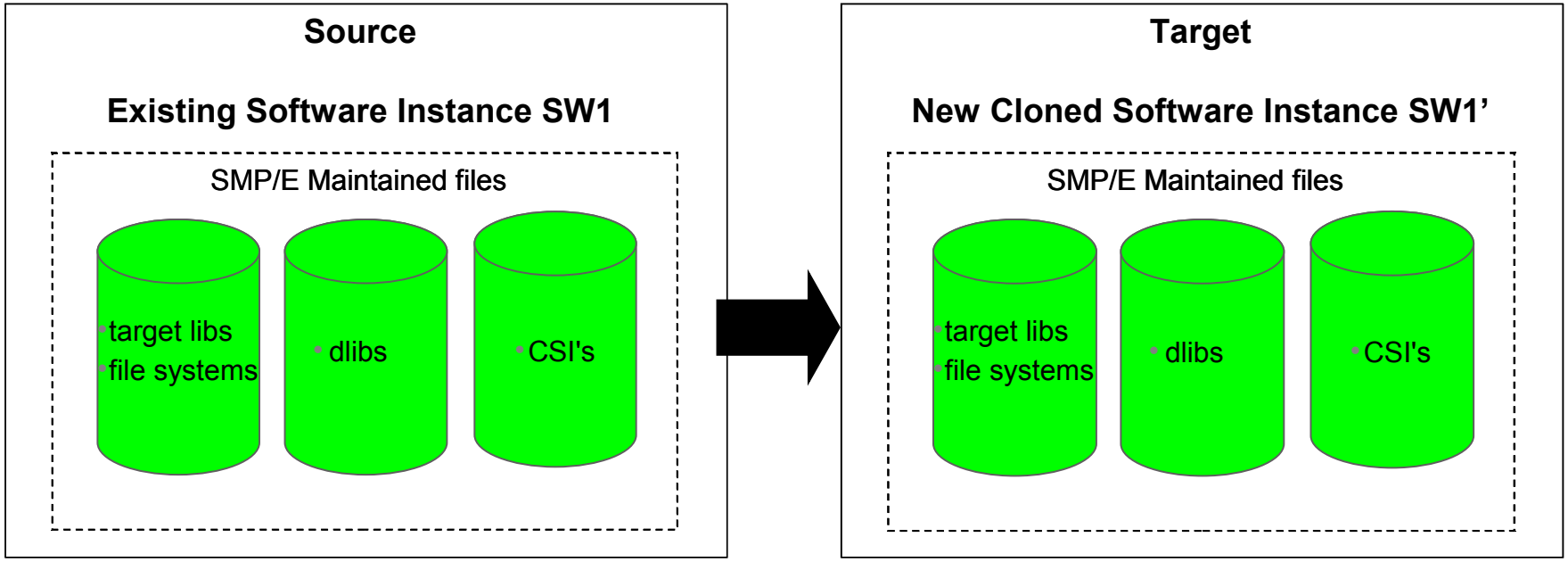
"Clone" Existing Software to Prepare to Upgrade a Product



1. **Start with existing product installed in Existing Software Instance SW1 – the source.**
2. **Create new cloned software instance SW1' -- the target.**
   - **Copy libraries**
   - **Copy SMP/E zone(s)**
   - **Create/Update GLOBAL ZONEINDEX records**
   - **Update DDDEF entries**
   - **Catalog data sets (if necessary)**

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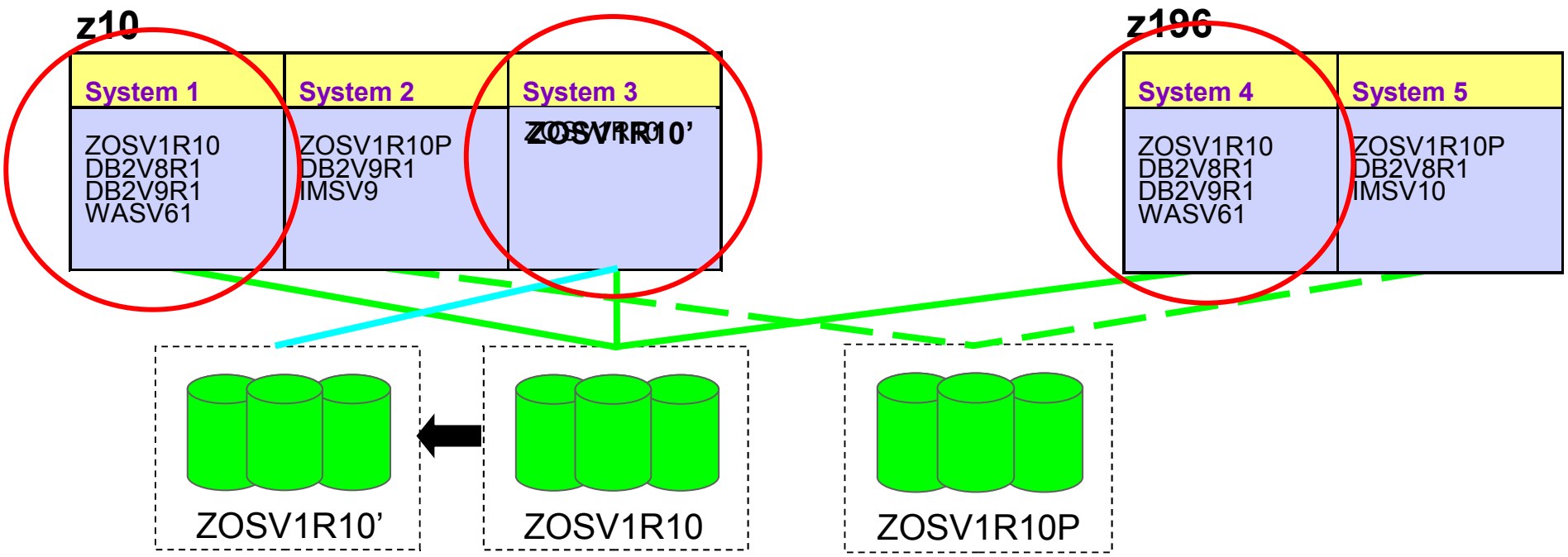
Deploy Maintenance Upgrade Software Instances in a Parallel Sysplex



When changing software levels

1. Create a new sw instance, or if the instance is not in use replace an existing one
   - Copy/rename libraries & file systems
   - Create/Update GLOBAL ZONEINDEX records
   - Copy SMP/E zone(s)
   - Update DDDEFs accordingly
   - Catalog data sets (if necessary)
2. Upgrade ZOSV1R10' to a new software level
3. Perform System ++HOLDs for ZOSV1R10' on System 3
4. Check for missing requisites & regressions
   - Preconditioning PTFs on Systems 1, 2, 4, & 5
     - Fallback maintenance (if any) for System 3
   - Regressed corrective service or USERMODs on ZOSV1R10 and not on ZOSV1R10'
   - z196 service for when ZOSV1R10' is used on System 4
5. Quiesce existing instance
6. Start a new instance by performing rolling IPLs (or activations) to introduce new software level
   - Perform delta System ++HOLDs on System 1 & 4

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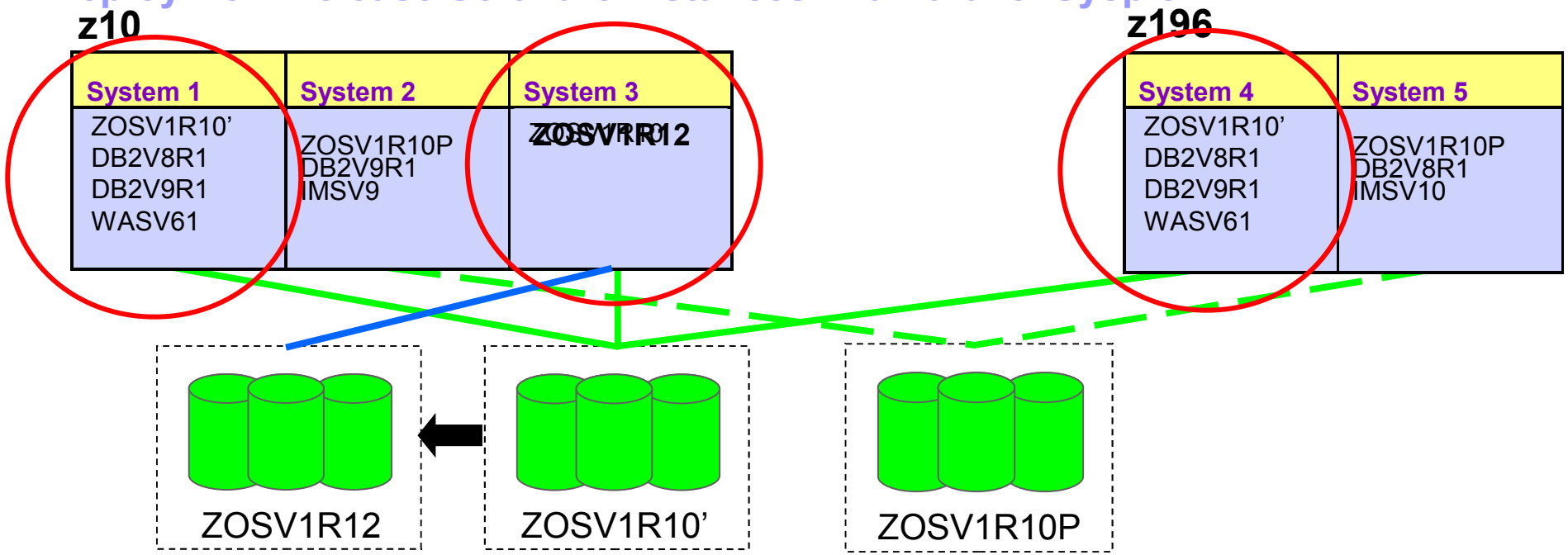
Deploy New Release Software Instances in a Parallel Sysplex



When changing software levels

1. Create a new sw instance or if the instance is not in use, replace an existing one
   - Copy/rename libraries & file systems
   - Create/Update GLOBAL ZONEINDEX records
   - Copy SMP/E zone(s)
   - Update DDDEFs accordingly
   - Catalog data sets (if necessary)
2. Upgrade ZOSV1R10' to ZOSV1R12 (a new software level)
3. Perform z/OS V1.12 migration actions and System ++HOLDs for ZOSV1R12 on System 3
4. Check for missing requisites & regressions
   - Coexistence PTFs on Systems 1, 2, 4, & 5
   - Target system PTFs on System 3
   - Regressed corrective service or USERMODs on ZOSV1R10 and not on ZOSV1R12
   - z196 service for when ZOSV1R12 is used on System 4
5. Quiesce existing instance
6. Start a new instance by performing rolling IPLs (or activations) to introduce new software level
   - Perform z/OS V1.12 migration actions and delta system ++HOLDs on Systems 1 & 4
   - Check target system reqs on Systems 1 & 4

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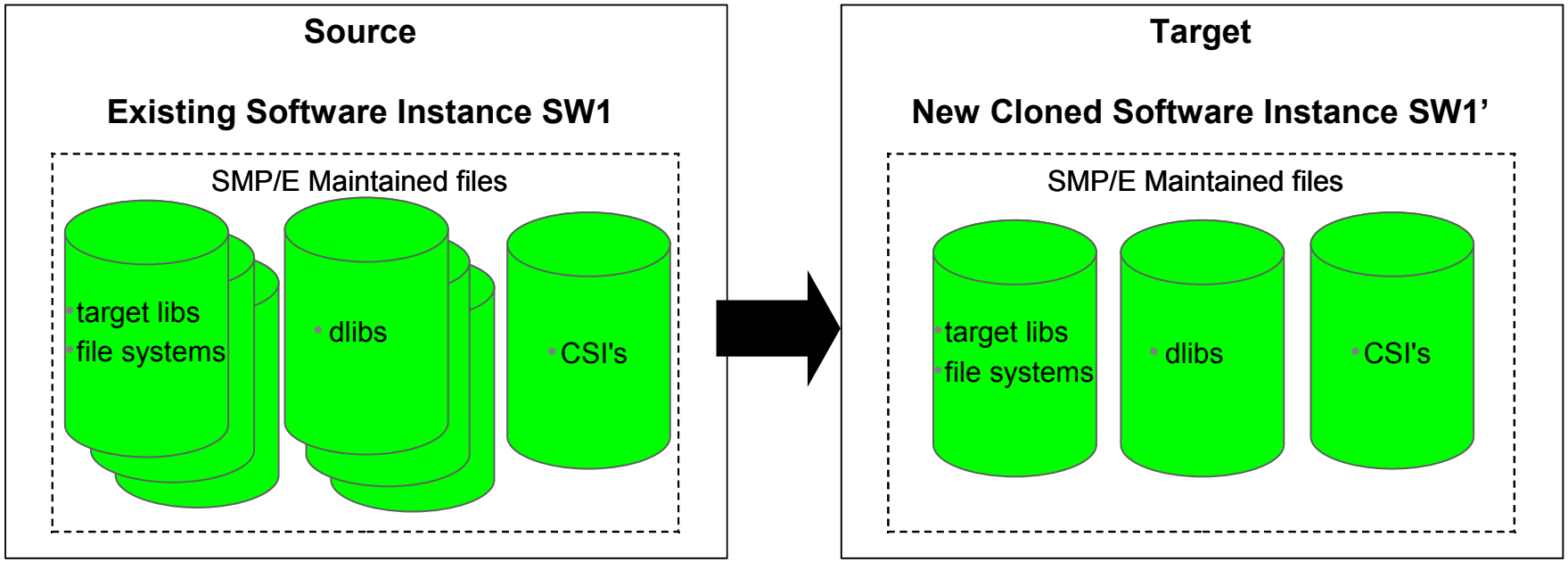
Create an Executable Image from Software Installed into "Work" Data Sets



1. Start with existing "work" software instance SW1 with data sets spread across volumes, possibly with unique names – the source
2. Create new cloned software instance SW1' -- the target
   - Copy and rename libraries and file systems
   - Copy SMP/E zones
   - Create/Update GLOBAL ZONEINDEX records
   - Update DDDEF entries
   - Catalog data sets (if necessary)
3. Before using new cloned software instance
   - Perform migration actions (or System ++HOLDs)
   - Check for missing requisites and regressions

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z/OSMF Software Deployment

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z/OSMF Software Deployment

- **In the z/OSMF V1.13 announcement**

The Software Deployment task is designed to provide the functions needed to create and deploy a copy, or clone, of any existing SMP/E-installed software image, including IBM software installed using ServerPac, CBPDO, or fee-based installation offerings, as well as other vendors' software. The function is intended to help you create and distribute copies of system software, including target libraries, distribution libraries, SMP/E zones, and related data sets you identify.

Software Deployment is designed as a z/OSMF application and is intended to make it easier to manage your software images by simplifying and standardizing these deployment processes. z/OSMF Software Deployment is simple and easy to use, and provides an IBM developed and supported process for deploying software on z/OS.

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Software Deployment

- **Software Deployment is a z/OS Management Facility (z/OSMF) plug-in**
  - Web-based application.
  - User interaction is via a browser on a workstation.
  - z/OSMF and Software Deployment will be active on one system in a sysplex, allowing access to shared DASD.
  - Software Deployment can deploy software
    - Locally, on a single system or system-to-system within a sysplex.
    - Remotely, system-to-system across a network and multiple sysplexes.

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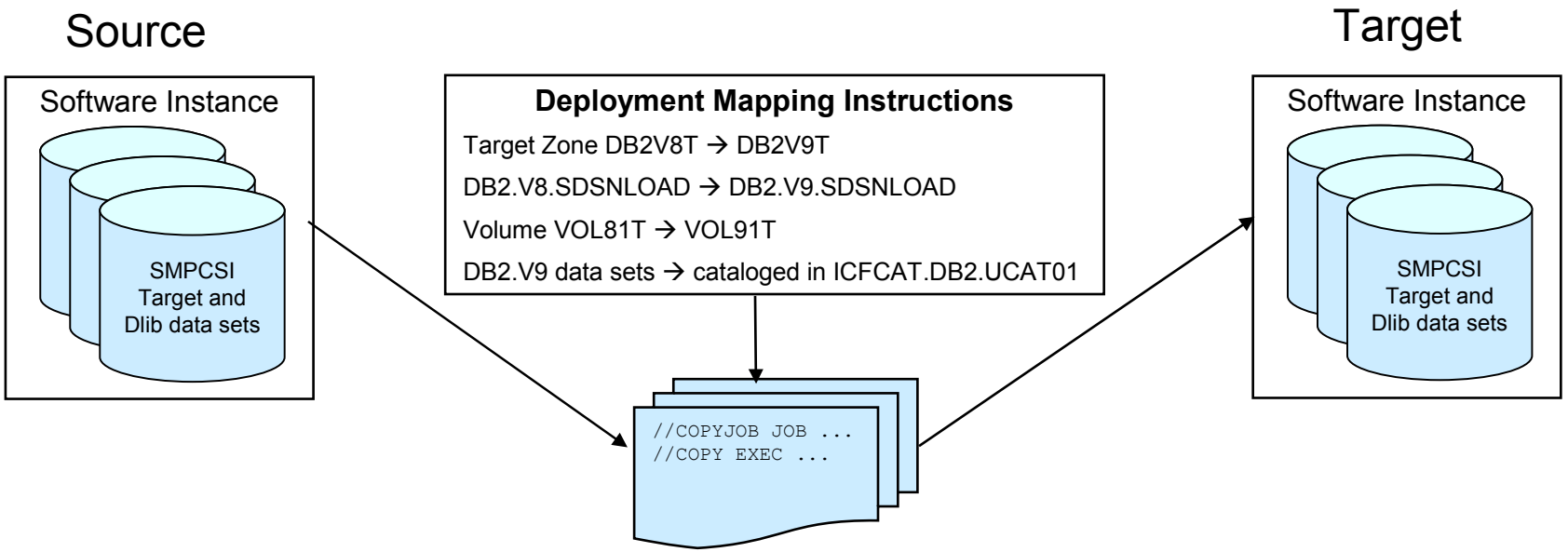
Basic Deployment Operation Flow

1. Identify a Source Software Instance.
2. Select the deployment objective
3. Check for missing requisites and possible regressions
4. Create a deployment configuration that describes where the source data sets will be copied.
5. Generate deployment jobs.
6. Execute generated jobs to copy the source and create (or replace) a target Software Instance.



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Check Requisites

- ***Software Deployment will identify missing requisite SYSMODs to ensure the deployed software can safely run in the target environment.***
  - *The target environment is composed of different types of software instances:*

Instance Type	Description	Examples	
Source	The source instance (the eventual copy will be the target software instance)	IMS V10	z/OS V1R12 2011 Mar
Share Resources	Instances that will share resources with the target instance	IMS V8 Prod2 IMS V9 Prod2	z/OS V1R11 2010 Nov z/OS V1R11 2011 Jan
Same Target System	Instances that will run on the same target system with the target instance	IMS Database Recovery Facility V3R1 IRLM V3R1 z/OS V1R12	DB2 V9 Tivoli OMEGAMON XE WAS V7
Prior Level	The instance that contains the prior level of the software in the target instance	IMS V8 Prod1	z/OS V1R11 2010 Nov

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Check Requisites …

- ***Several different types of requisite SYSMODs are identified:***

Requisite Type	Missing SYSMOD Description	Instances to Analyze	Source of Requisite Data
Functional and Hardware	PTFs required for the instance to use a particular function or run on a hardware device	The **source** instance (the eventual copy will be the target instance)	FIXCAT HOLDDATA
Coexistence and Fallback	PTFs required to allow earlier software release levels to share resources (coexist) with and fallback from later release levels.	Instances that will **share resources** with the eventual target instance	FIXCAT HOLDDATA
Target System	PTFs required for the instance to run on the target system	Instances that will run on the **same target system** with the target instance	FIXCAT HOLDDATA
Conditional Software	Conditional requisite PTFs needed in one instance because of a function installed in another instance	Instances that will **share resources** with or run on the **same target system** with the target instance	++IF REQ Statements
		Prior level instances	++IF REQ Statements

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Check Requisites …

- ***Fix Category HOLDDATA used to identify missing requisite SYSMODs:***

Instance Type	Requisite Type	Fix Categories	Fix Category Description
Source	Hardware	IBM.Device.*	Required for the instance to run on or use a particular hardware device
	Functional	IBM.Function.*	Required for the instance to use or exploit selected functions
	Target System	IBM.TargetSystem-Required Service.*	Required for the instance to run on the target system
Shares Resources	Coexistence and Fallback	IBM.Coexistence.* IBM.Migrate-Fallback.*	Required to allow earlier software release levels to share resources (coexist) with and fallback from later release levels.
Run on Same Target System	Target System	IBM.TargetSystem-Required Service.*	Required for the instance to run on the target system

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Check Requisites …

- ***++IF REQ statements are used to identify missing requisite SYSMODs***
  - ++IF REQ statements in other software instances identify requisites needed in the source instance because of Functions installed in the source instance.
  - ++IF REQ statements in the source software instance identify requisites needed in other instances because of Functions installed in those other instances.
    - Instances that will share resources with the target instance
    - Instances that will run on the same target system with the target instance
    - The prior level instance
- ***Two kinds of missing conditional requisite SYSMODs:***
  - Cross product requisites
    - Ex. The Function for DB2 V9 might contain a ++IF REQ:
      - If z/OS V1R10 then require PTF UK12345
  - Same product, release to release requisites
    - Ex. A PTF for z/OS V1R11 might contain a ++IF REQ:
      - If z/OS V1R12 then require PTF UA54321

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Check Regressions and HOLDDATA Deltas

- **When a prior level software instance will be replaced by the target instance, software deployment will:**
  - Identify SYSMODs that will be regressed.
    - Compare the prior level instance with the source instance.
    - SYSMODs in the prior level instance that are not in the source instance will be regressed.
  - Identify HOLDDATA that needs review.
    - Compare the source instance with the prior level instance.
    - SYSTEM and USER Holds for SYSMODs in the source instance that are not in the prior level instance need review.

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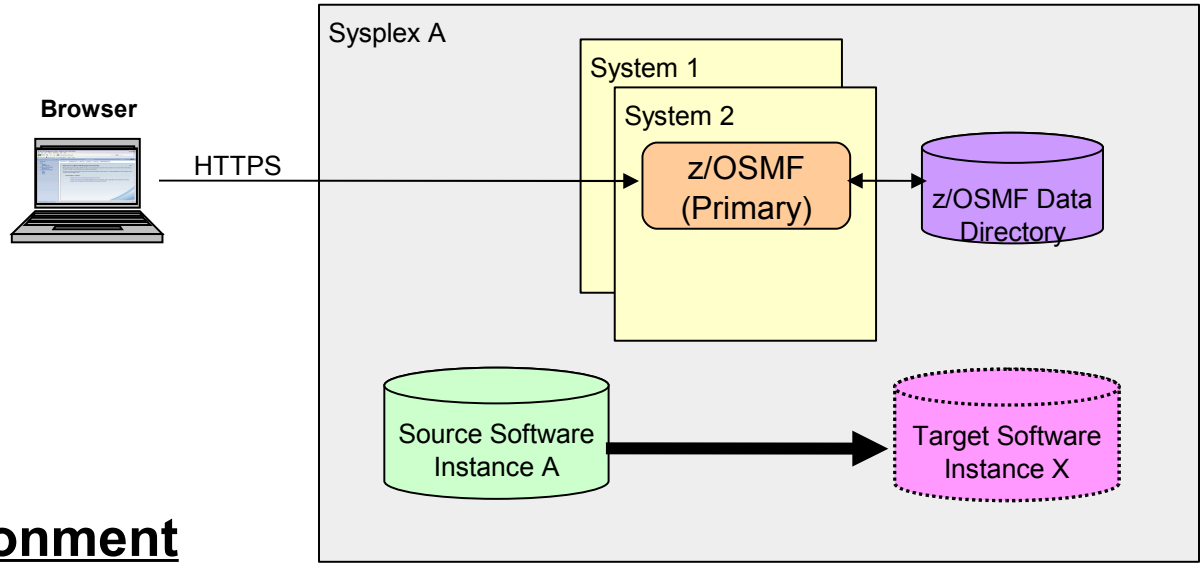
z/OSMF Topology for Software Deployment



Environment

- **Only 1 system in a sysplex can run z/OSMF at a time**
- **ALL DASD shared across the sysplex**
- **System 2 is the z/OSMF Primary system**
  - z/OSMF data directory (repository) is local to System 2
- **All software instances will be defined and deployed from the primary z/OSMF system (System 2)**
  - From the primary, you can deploy any source software instance accessible from the primary z/OSMF instance to a target software instance accessible from the primary z/OSMF instance.
    - For example, source software instance A to target software instance X.
    - This is a local software deployment.

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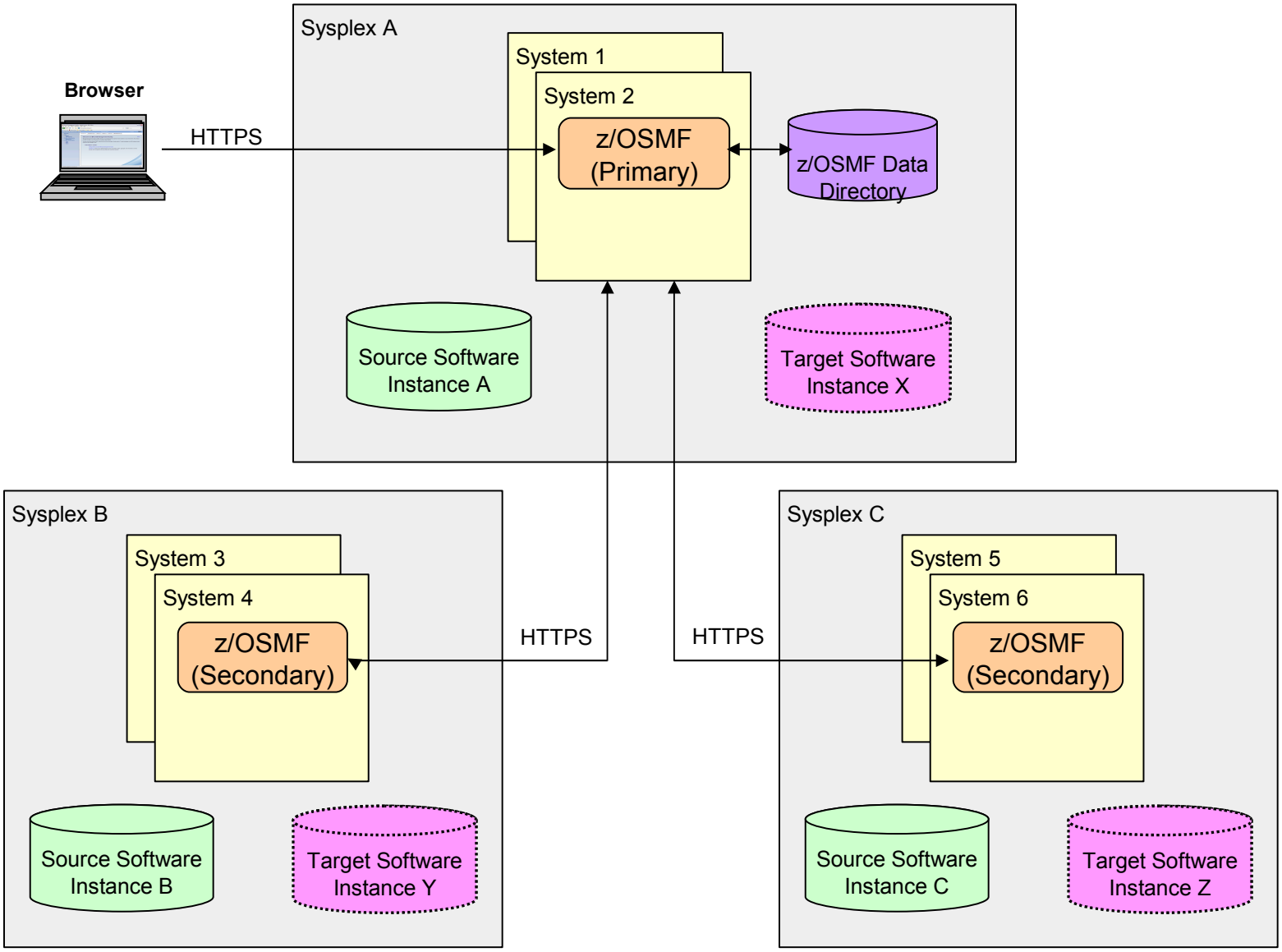

NO DASD is shared between SYSPLEX A, SYSPLEX B, and SYSPLEX C

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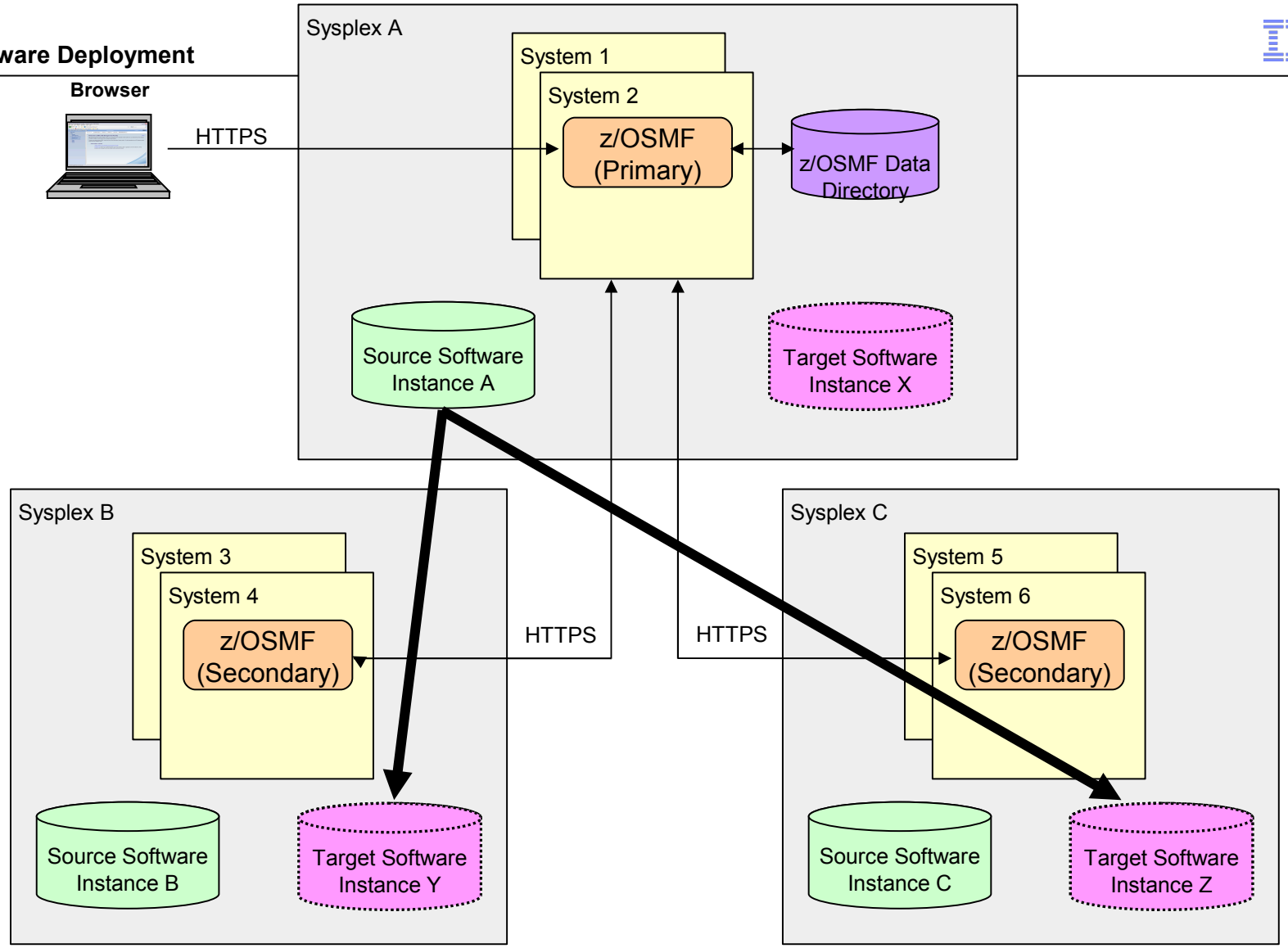

- You can deploy any source software instance accessible from the primary z/OSMF instance to a target software instance accessible from a secondary z/OSMF instance.
  - For example, source software instance A to target software instance Y in sysplex B, or to target software instance Z in sysplex C.
  - These are remote software deployments.

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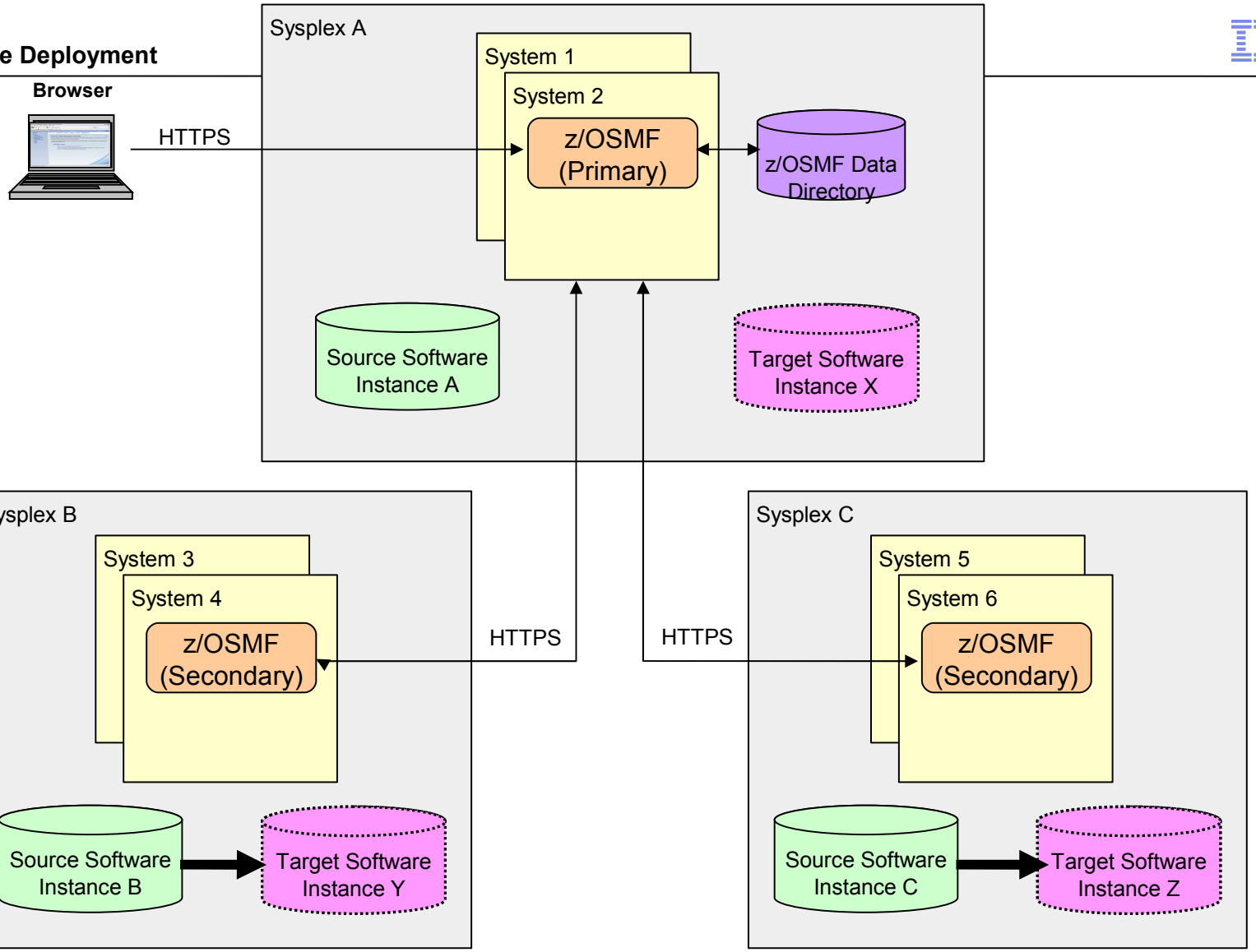

- You can deploy a source software instance accessible from a secondary z/OSMF instance to a target software instance accessible from the same secondary z/OSMF instance.
  - For example, source software instance B to target software instance Y in sysplex B, or source software instance C to target software instance Z in sysplex C.
  - These are local software deployments.

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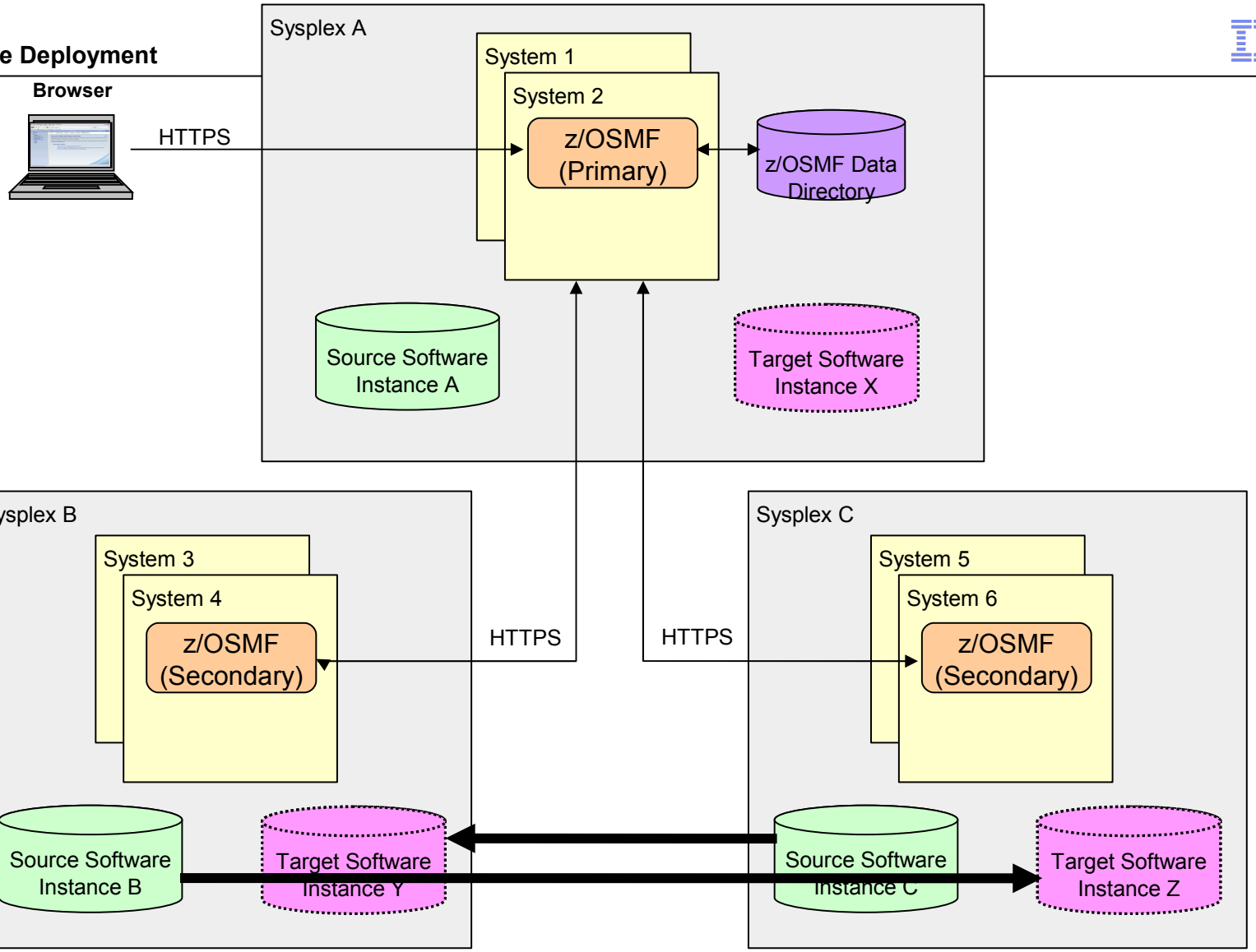

- Deploy a source software instance accessible from a secondary z/OSMF instance to a target software instance accessible from a different secondary z/OSMF instance.
  - For example, source software instance B in sysplex B to target software instance Z in sysplex C, or source software instance C in sysplex C to target software instance Y in sysplex B.
  - These are a remote software deployments.

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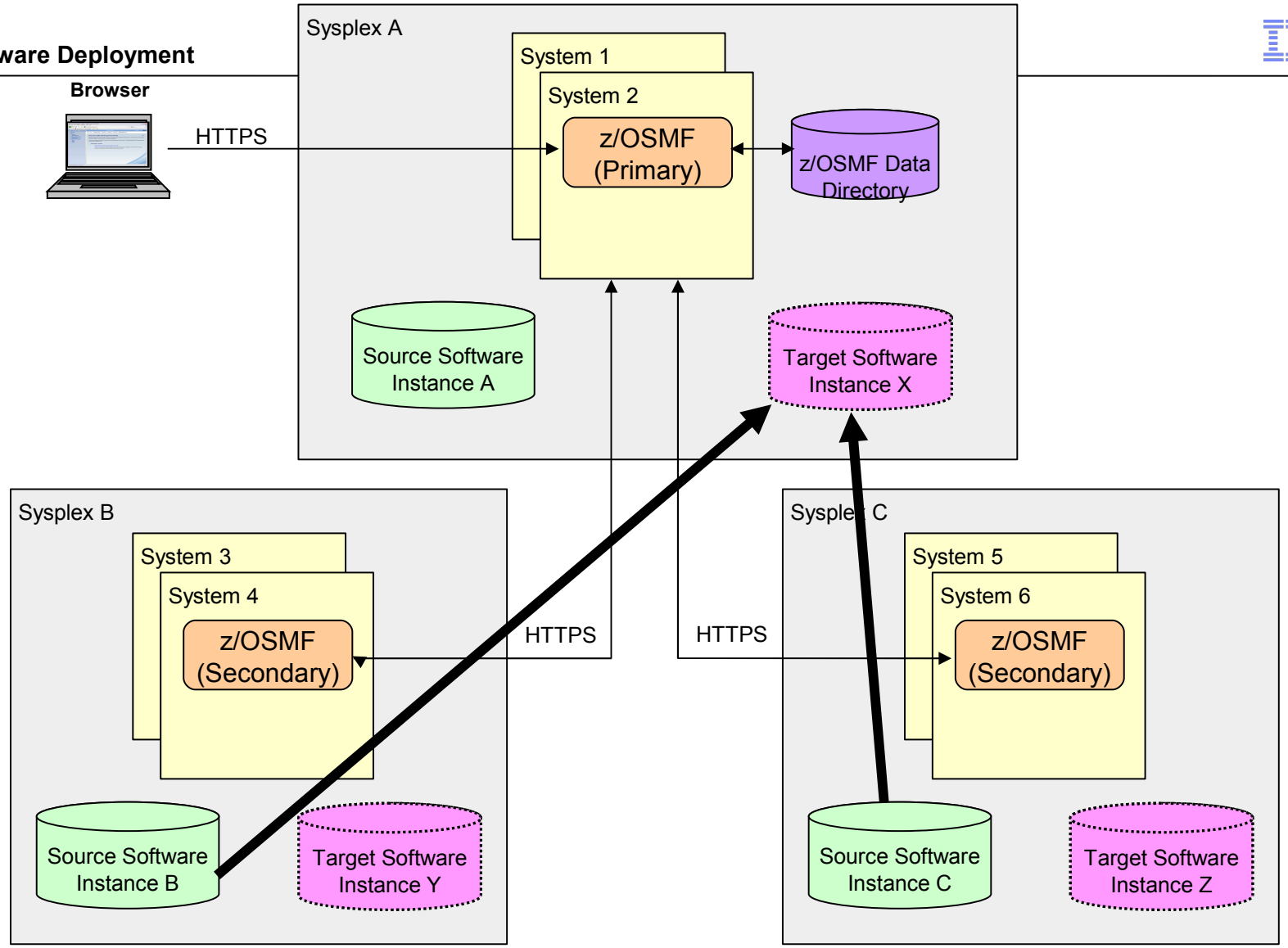

- Deploy a source software instance accessible from a secondary z/OSMF instance to a target software instance accessible from the primary z/OSMF instance.
  - For example, source software instance B in sysplex B to target software instance X in sysplex A, or source software instance C in sysplex C to target software instance X in sysplex A.
  - These are remote software deployments.

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z/OSMF Software Deployment "Demo"

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Software Deployment Demo

“Clone” existing software to prepare for a product upgrade.

- Copy libraries and filesystems
- Change data set names of catalogued data sets (file systems and CSI data sets)
- Update DDDEFs to reflect copied libraries and pathnames

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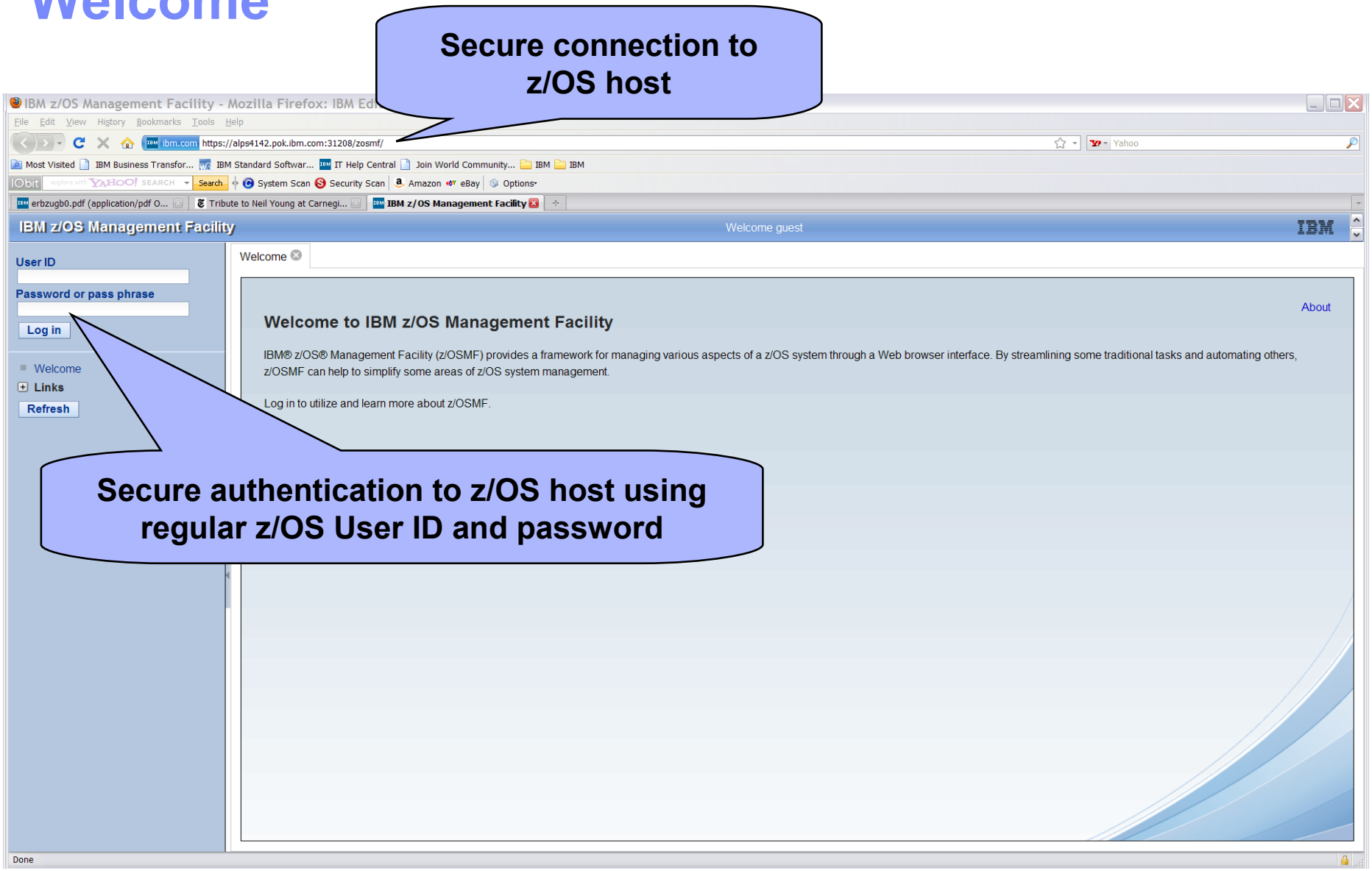
Welcome



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Welcome for logged on user

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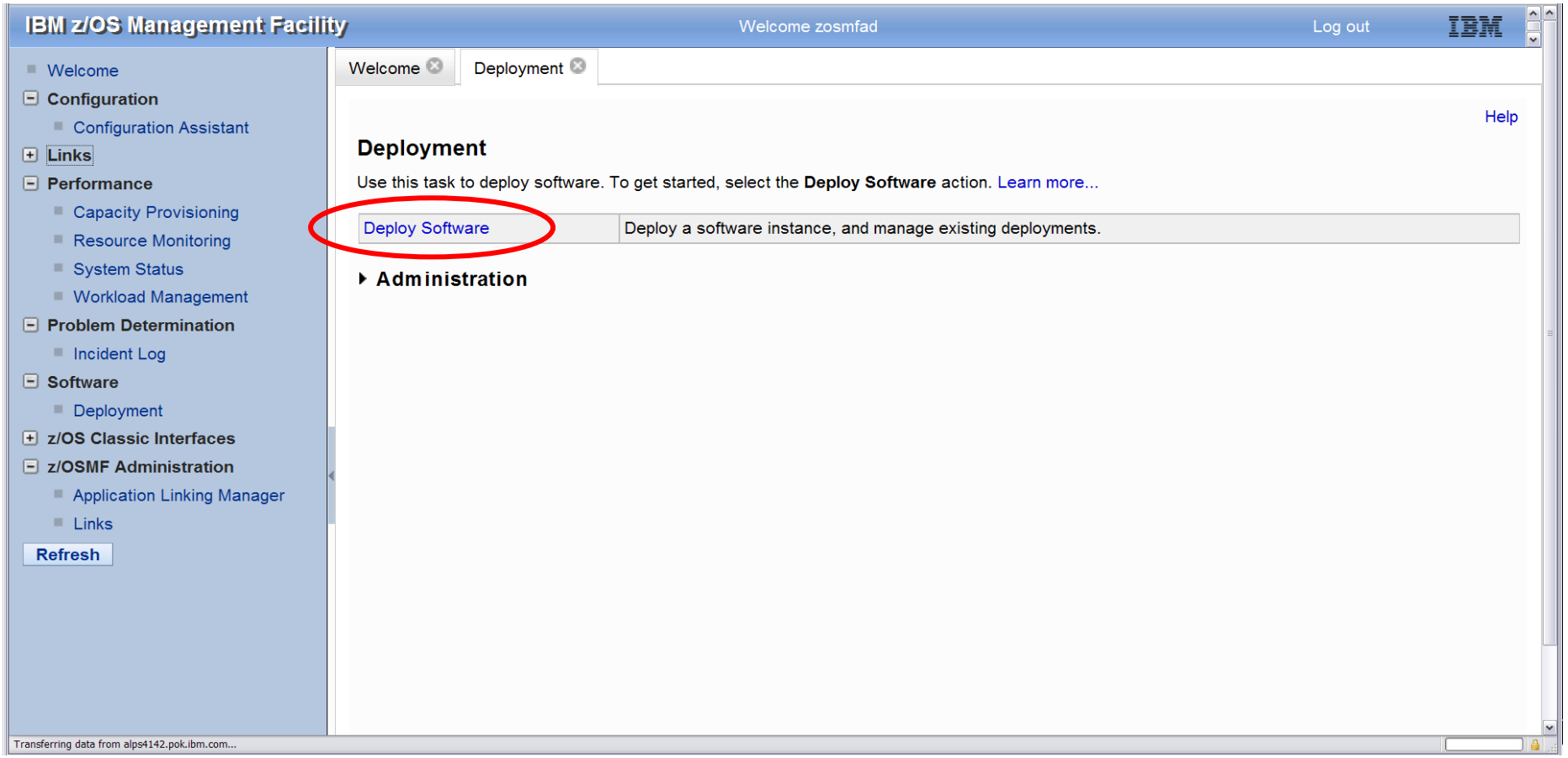
Software Deployment



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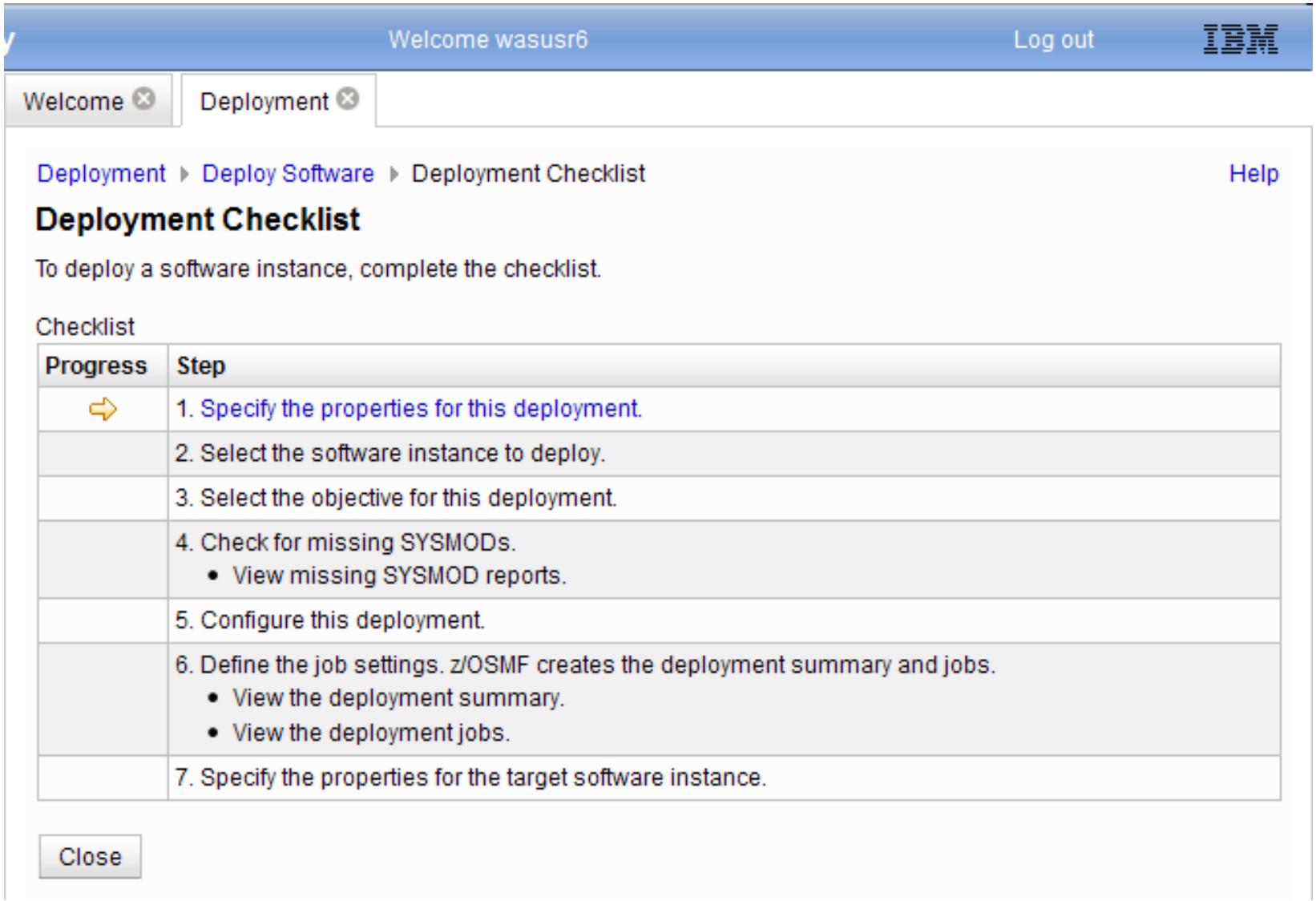
Deploy Software Wizard



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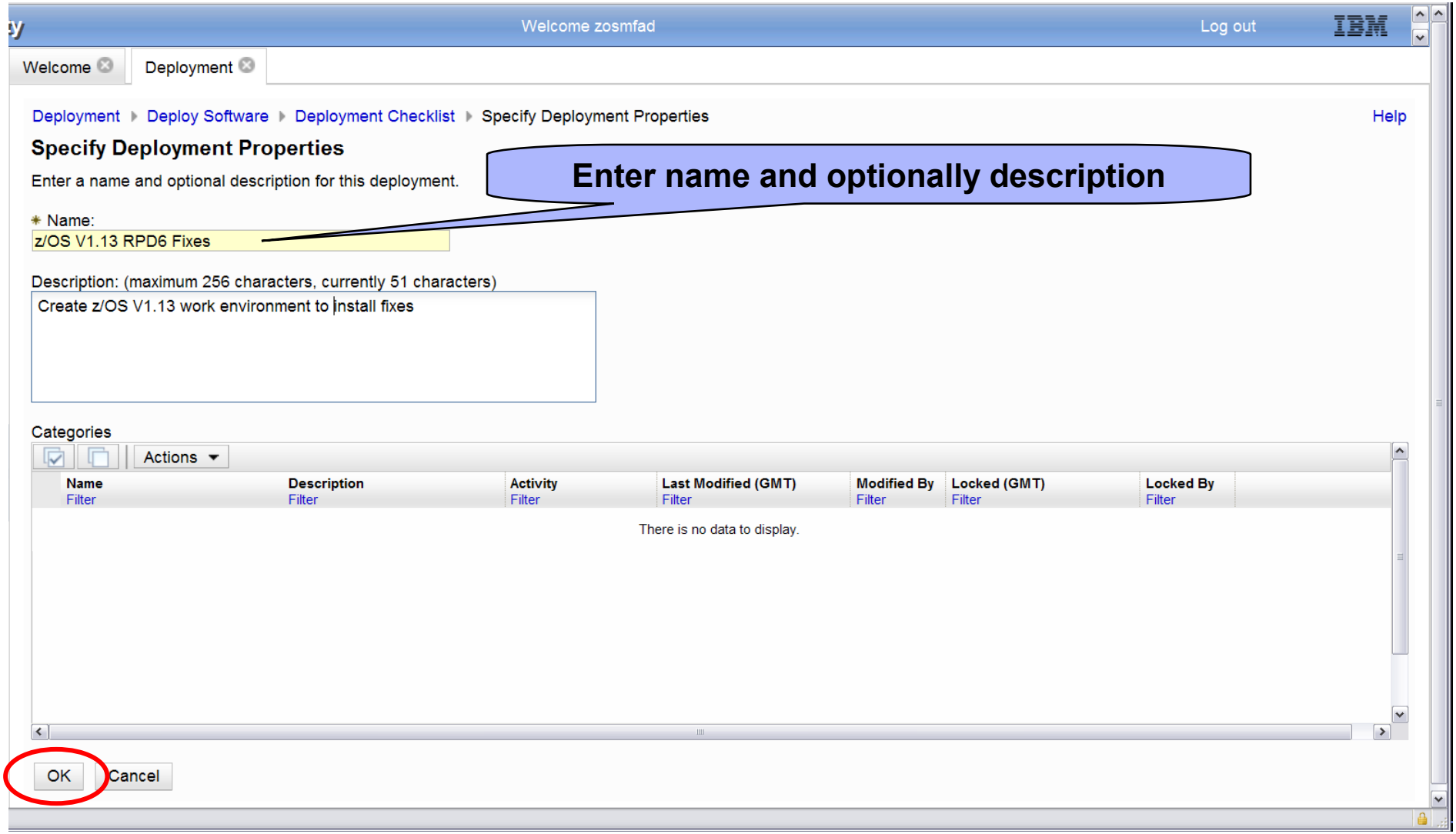
Specify Deployment Properties



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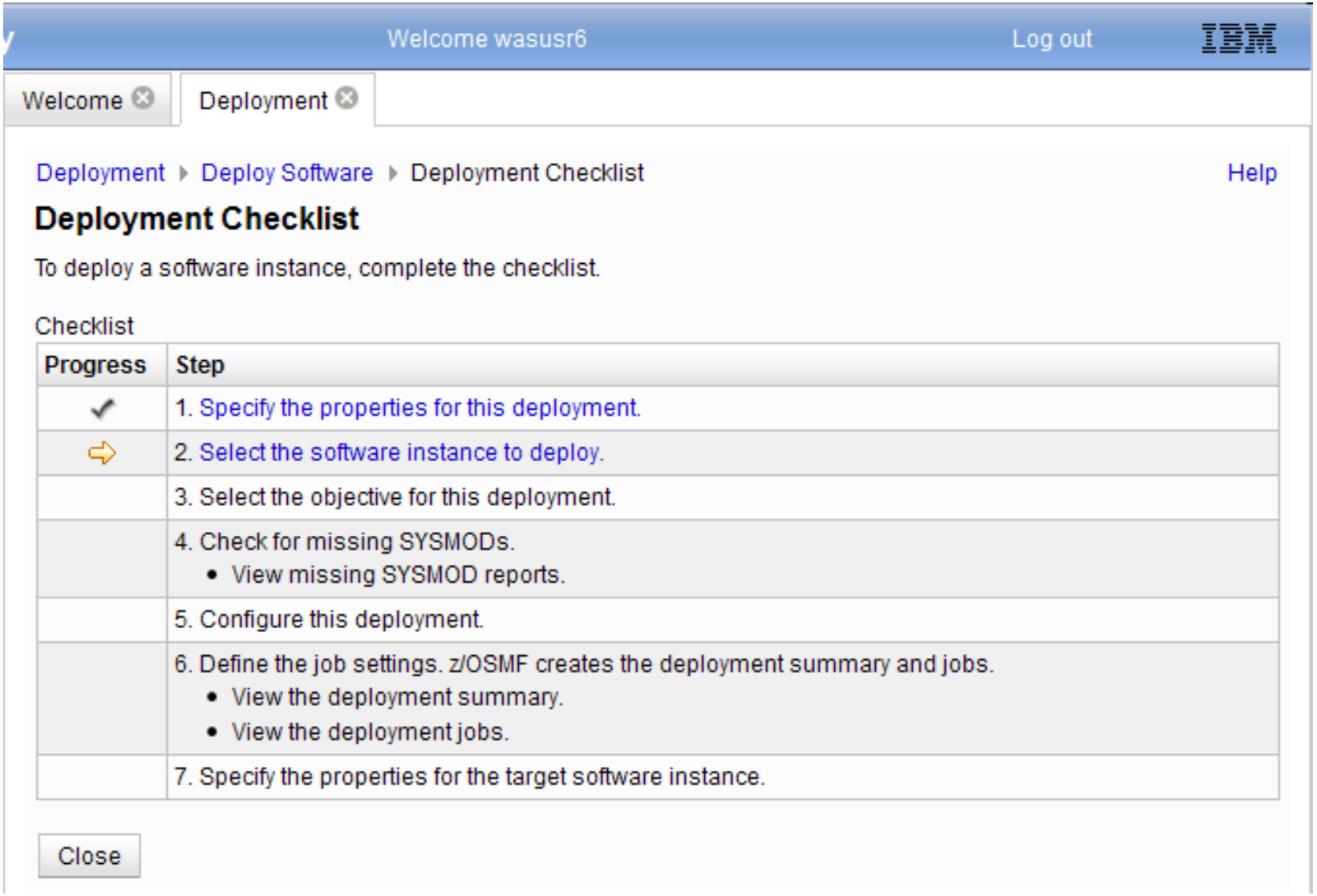
Deployment Checklist Progression



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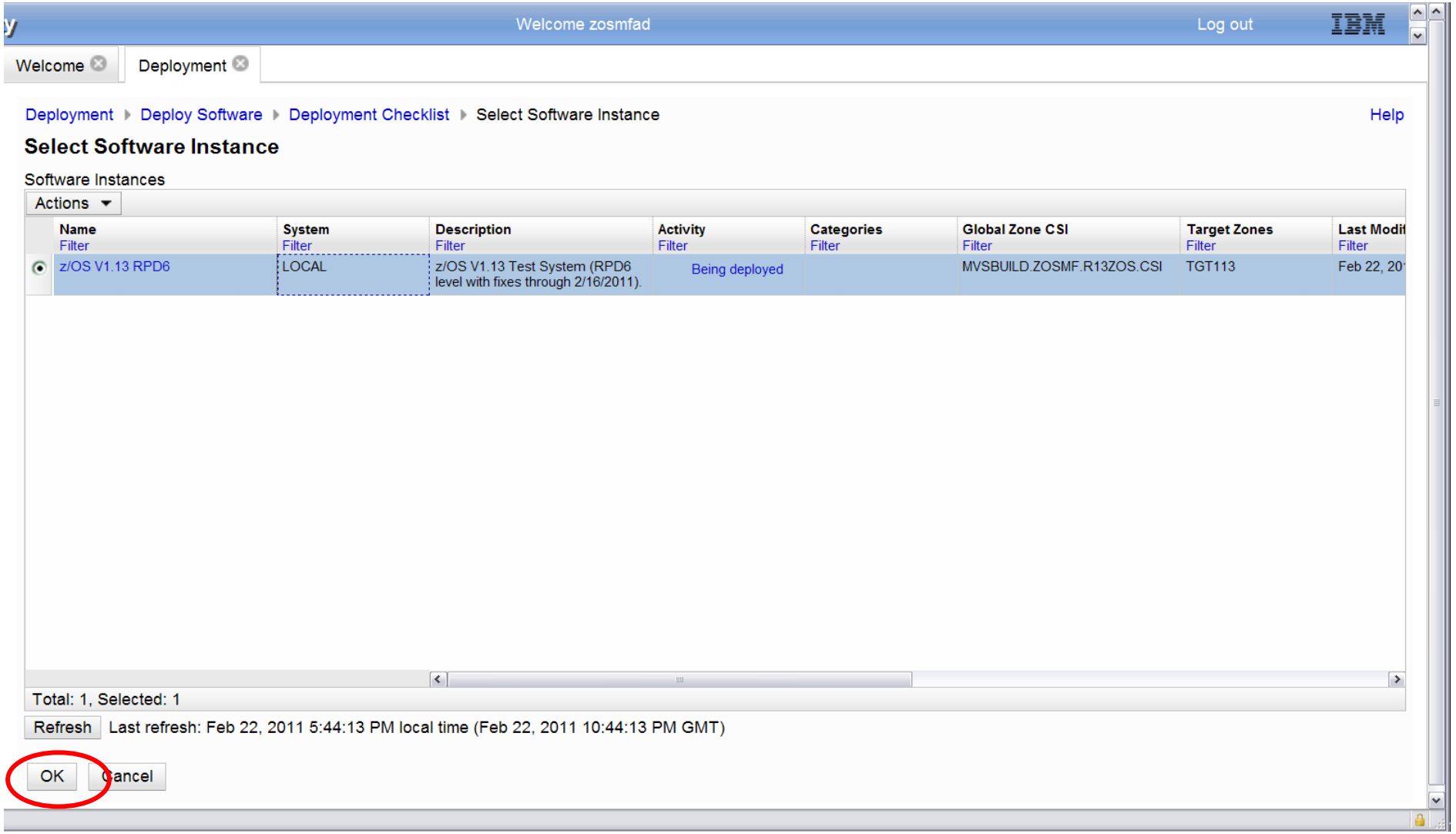
Select Software Instance



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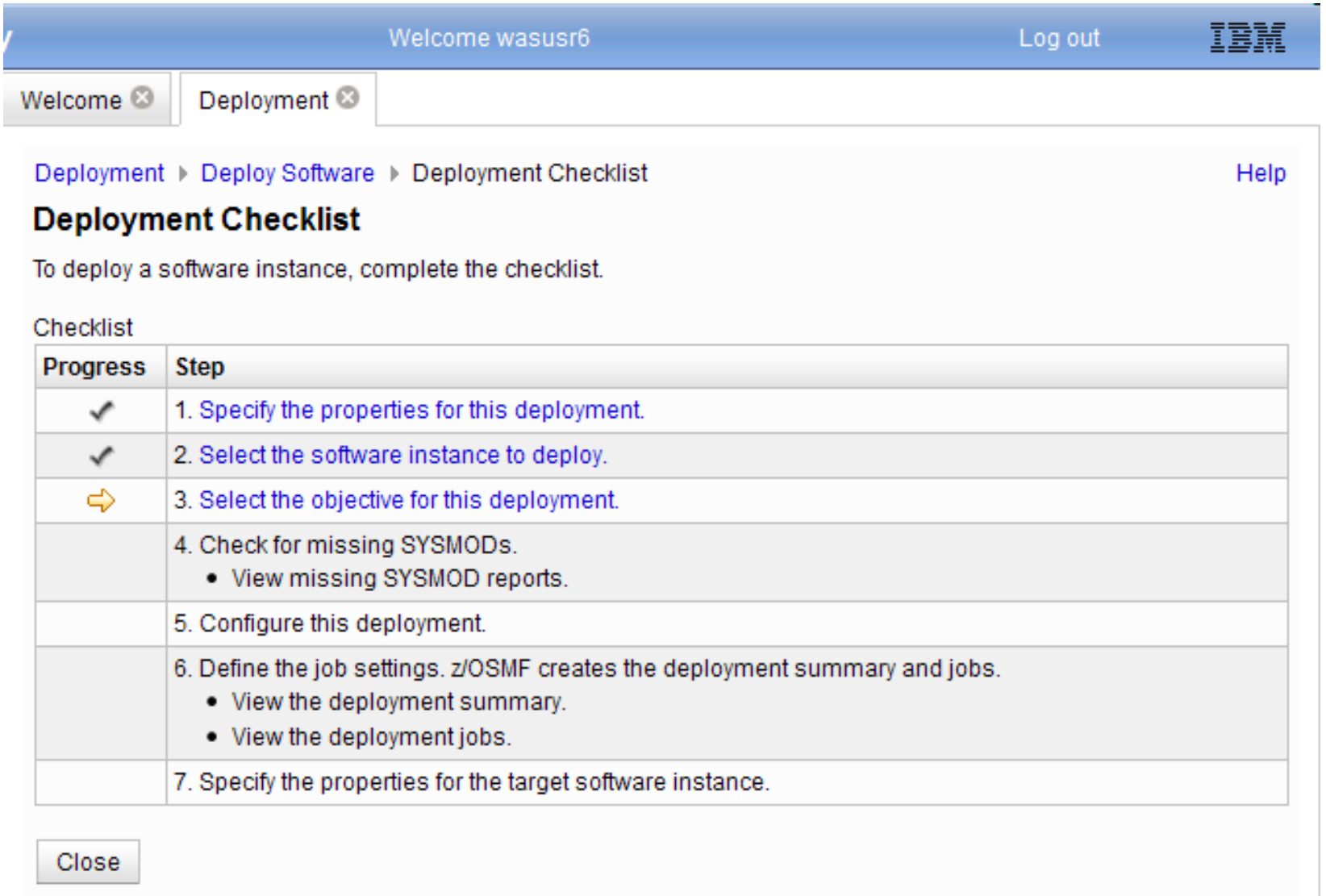
Deployment Checklist Progression



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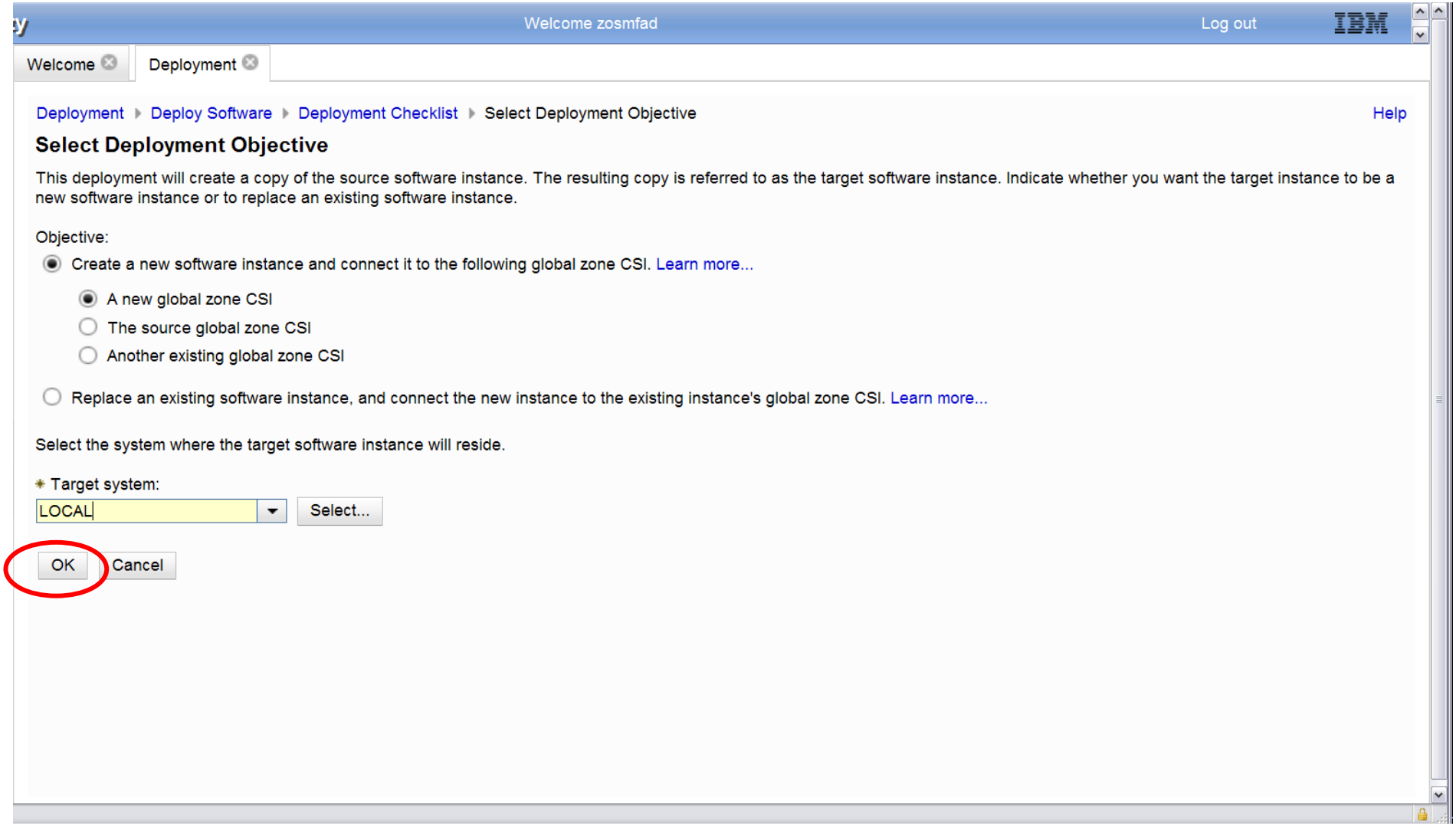
Select Deployment Objective



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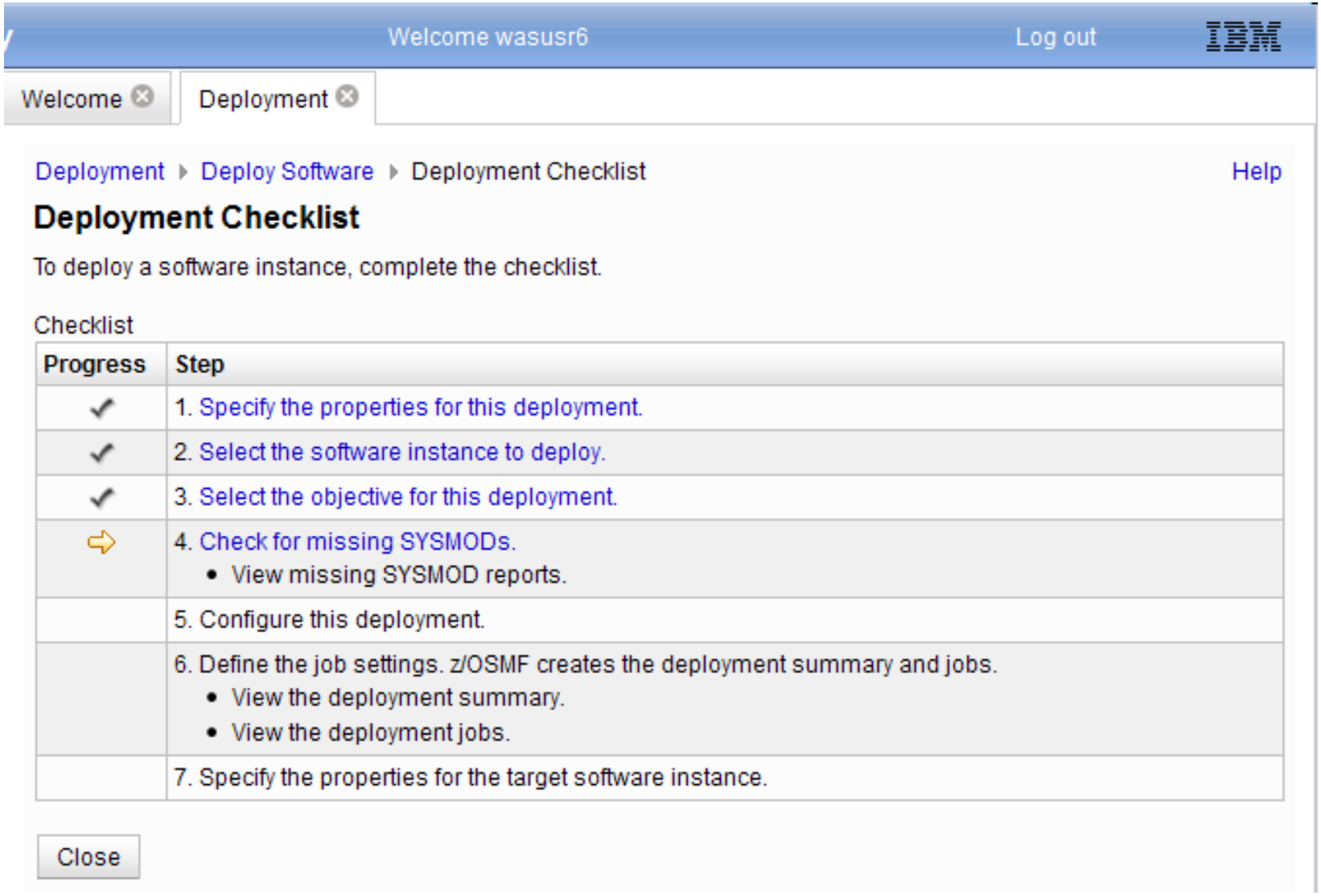
Deployment Checklist Progression



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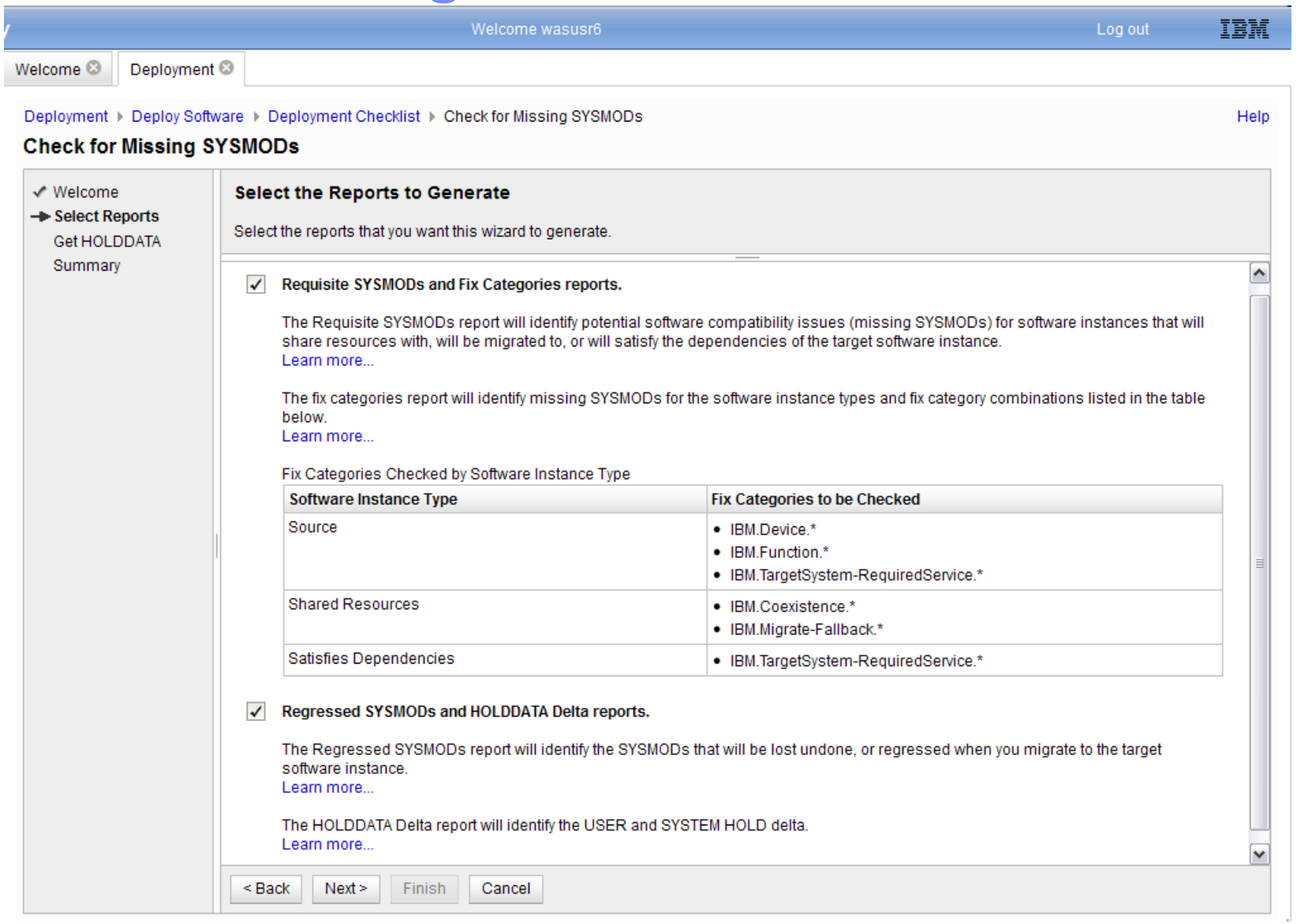
Check for Missing SYSMODs Wizard



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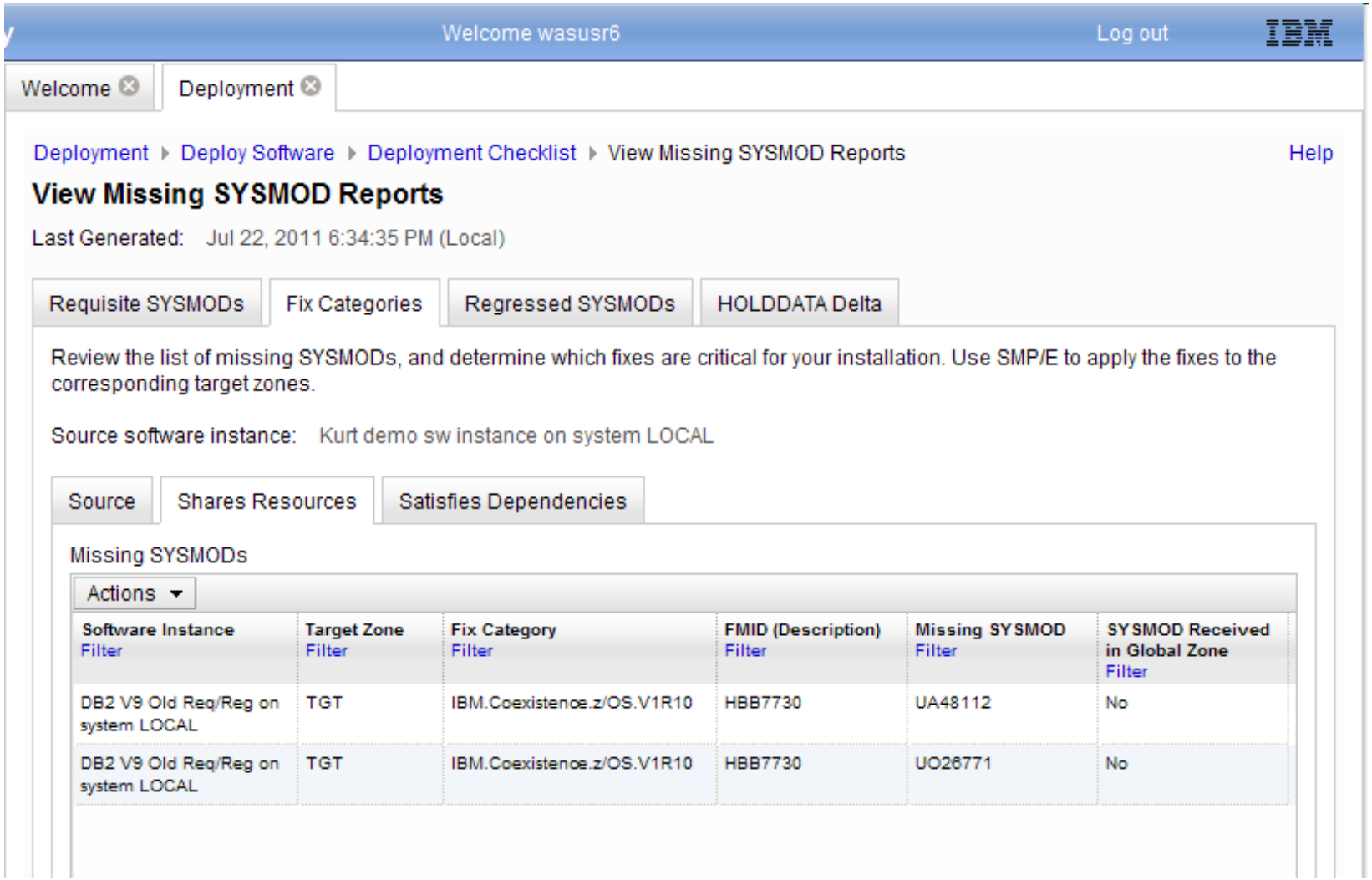
Check for Missing SYSMODs Reports



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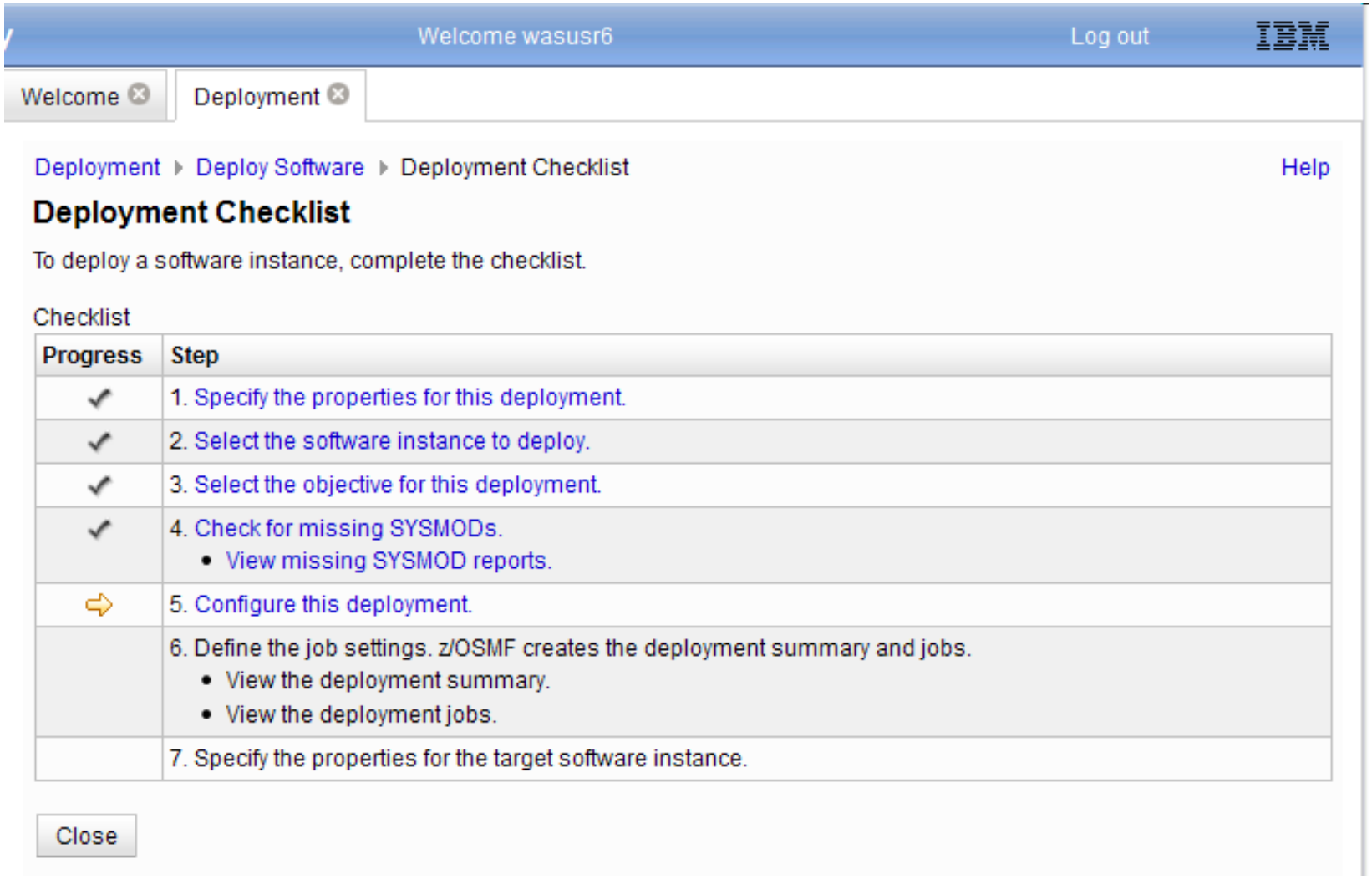
Deployment Checklist Progression



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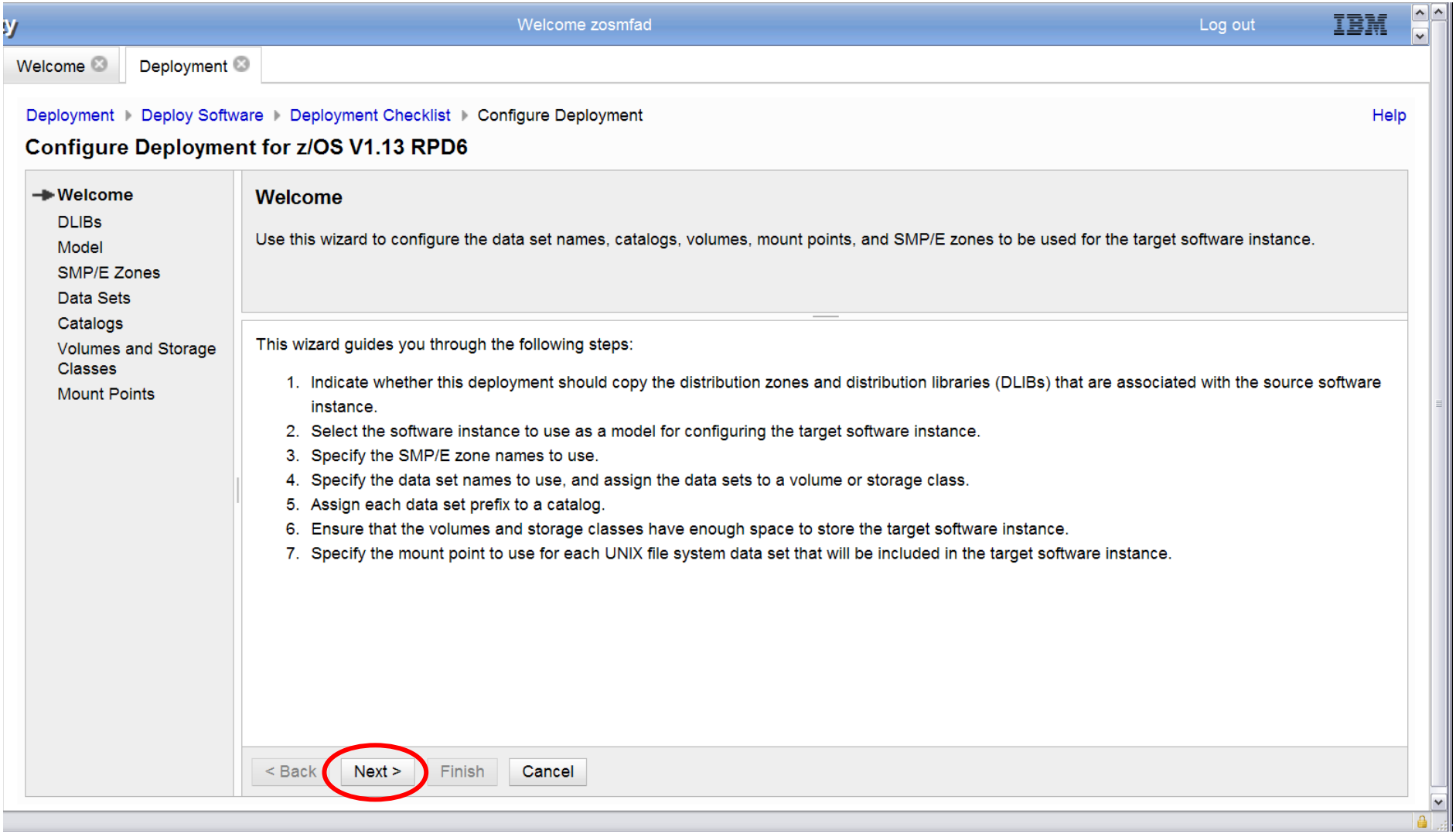
Configure Deployment Wizard



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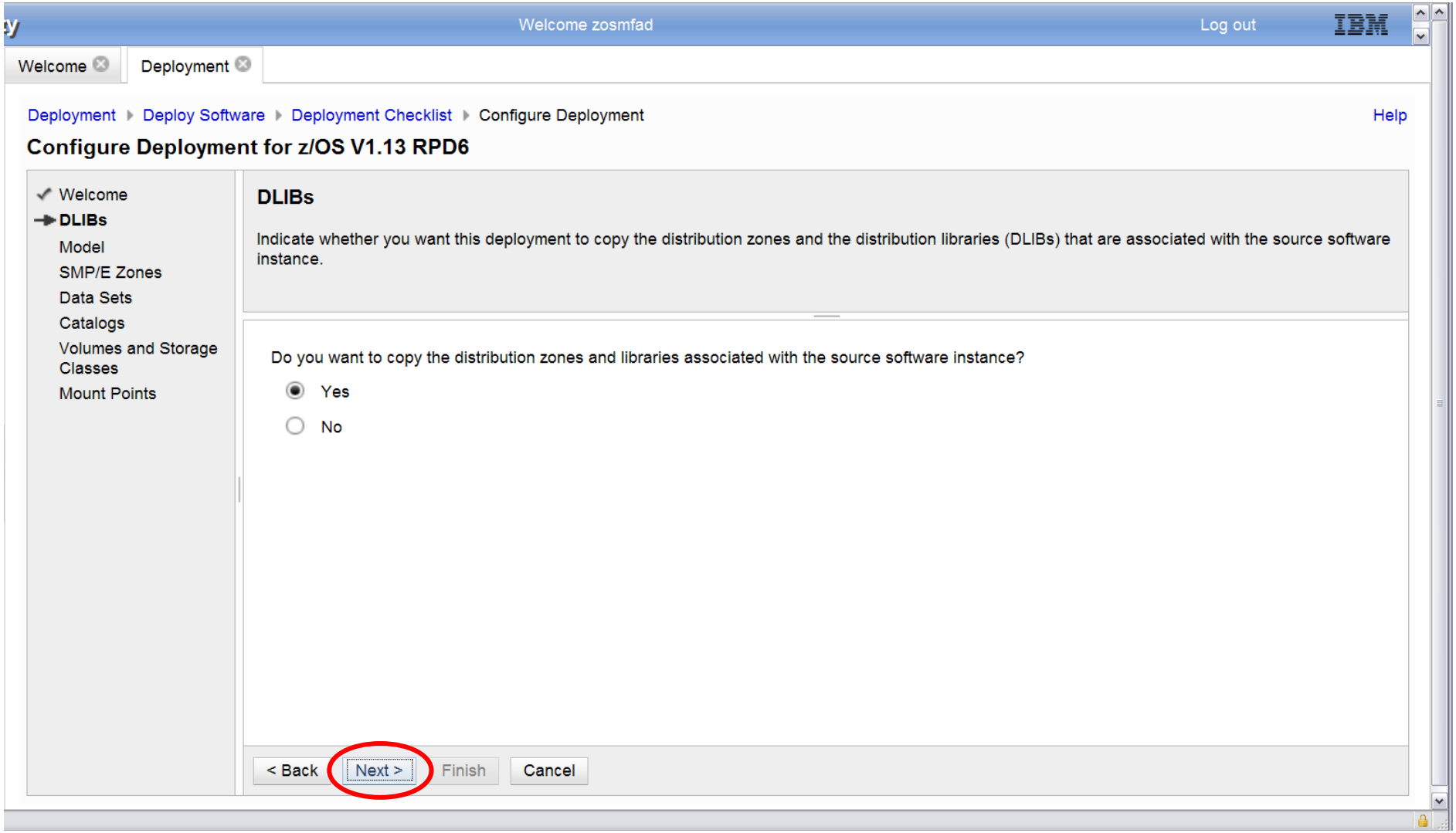
Copy DLIBs?



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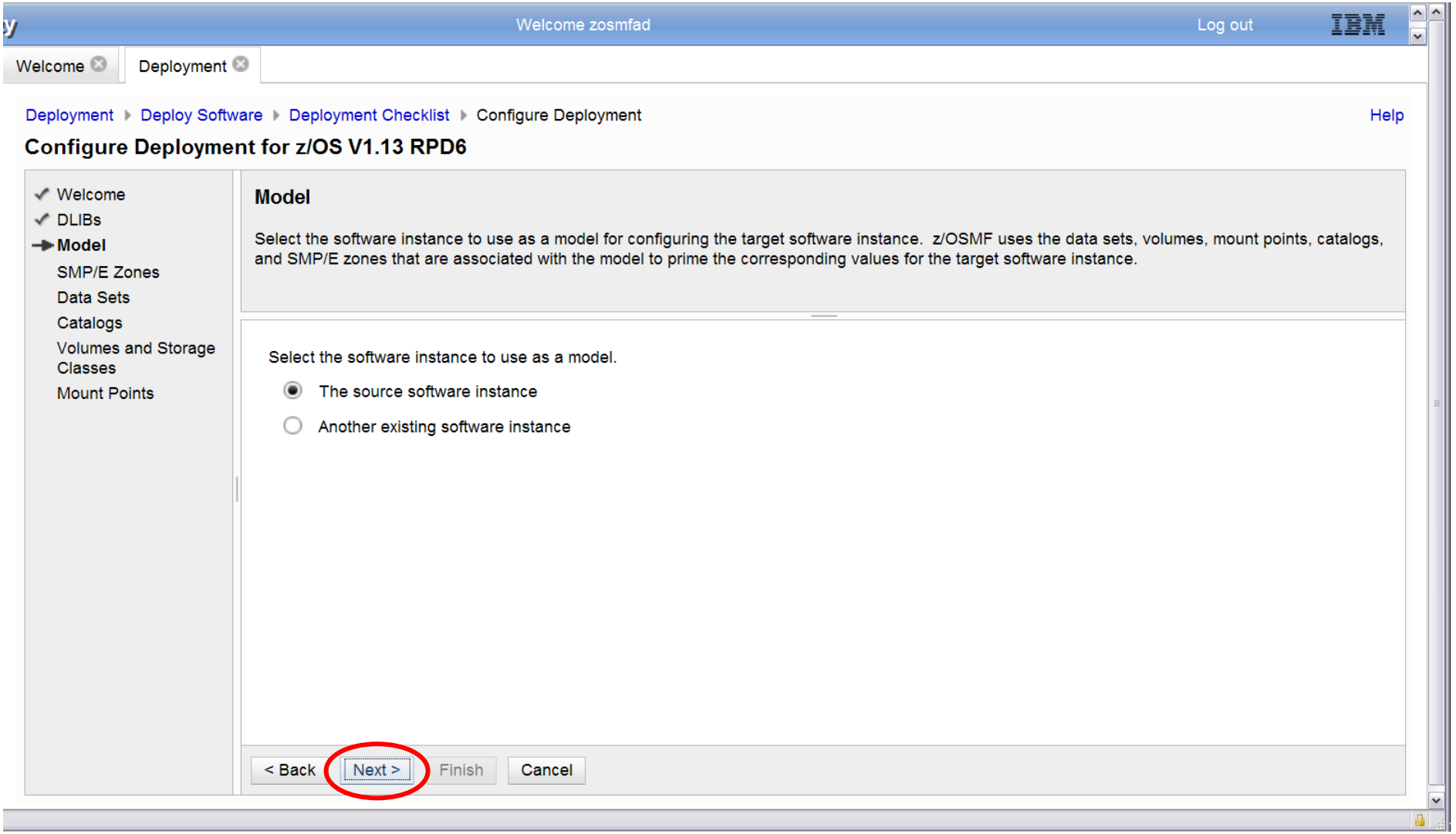
Software Instance to use as a Model



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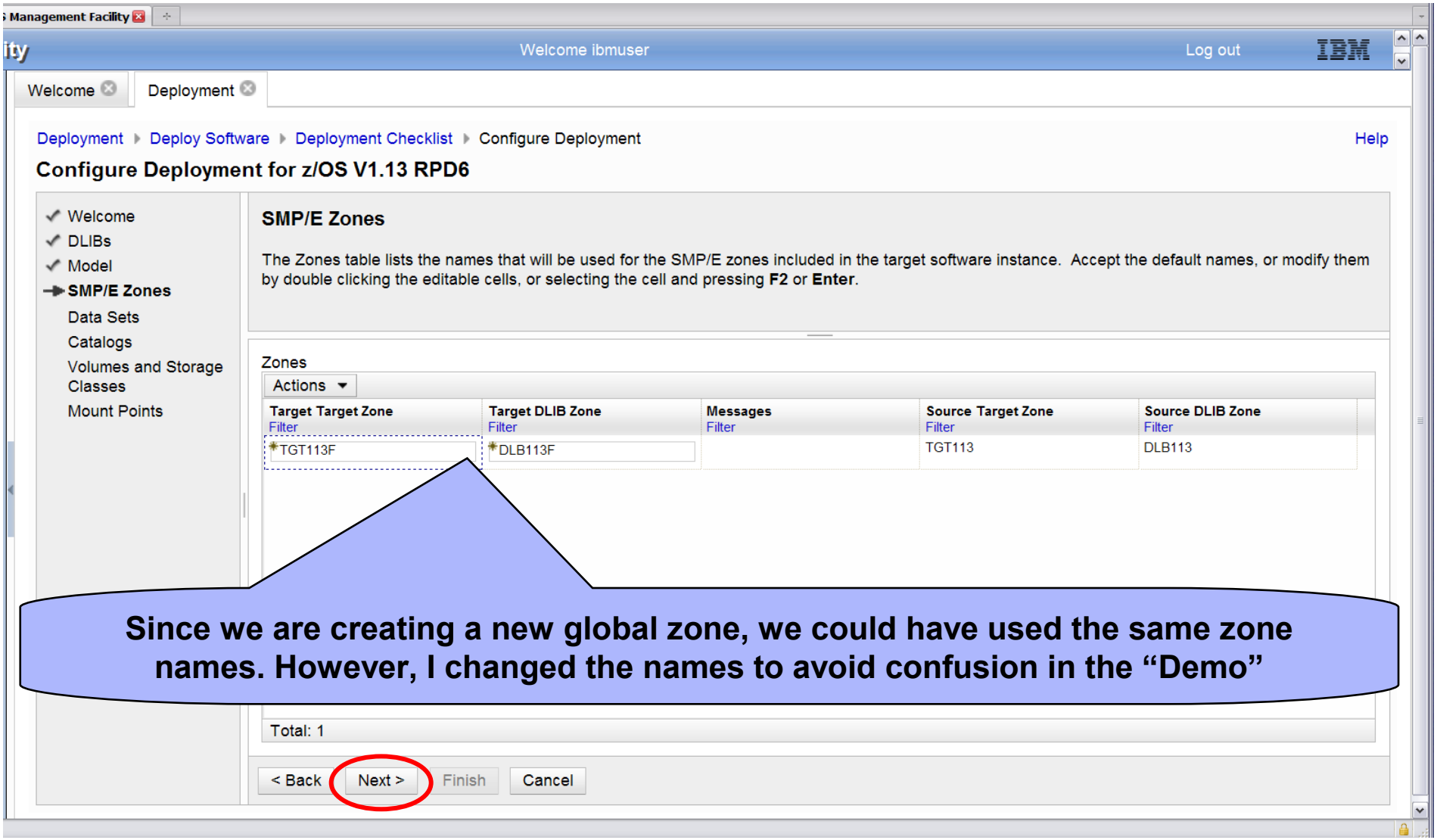
Configure Target Instance SMP/E Zone Names



Since we are creating a new global zone, we could have used the same zone names. However, I changed the names to avoid confusion in the "Demo"

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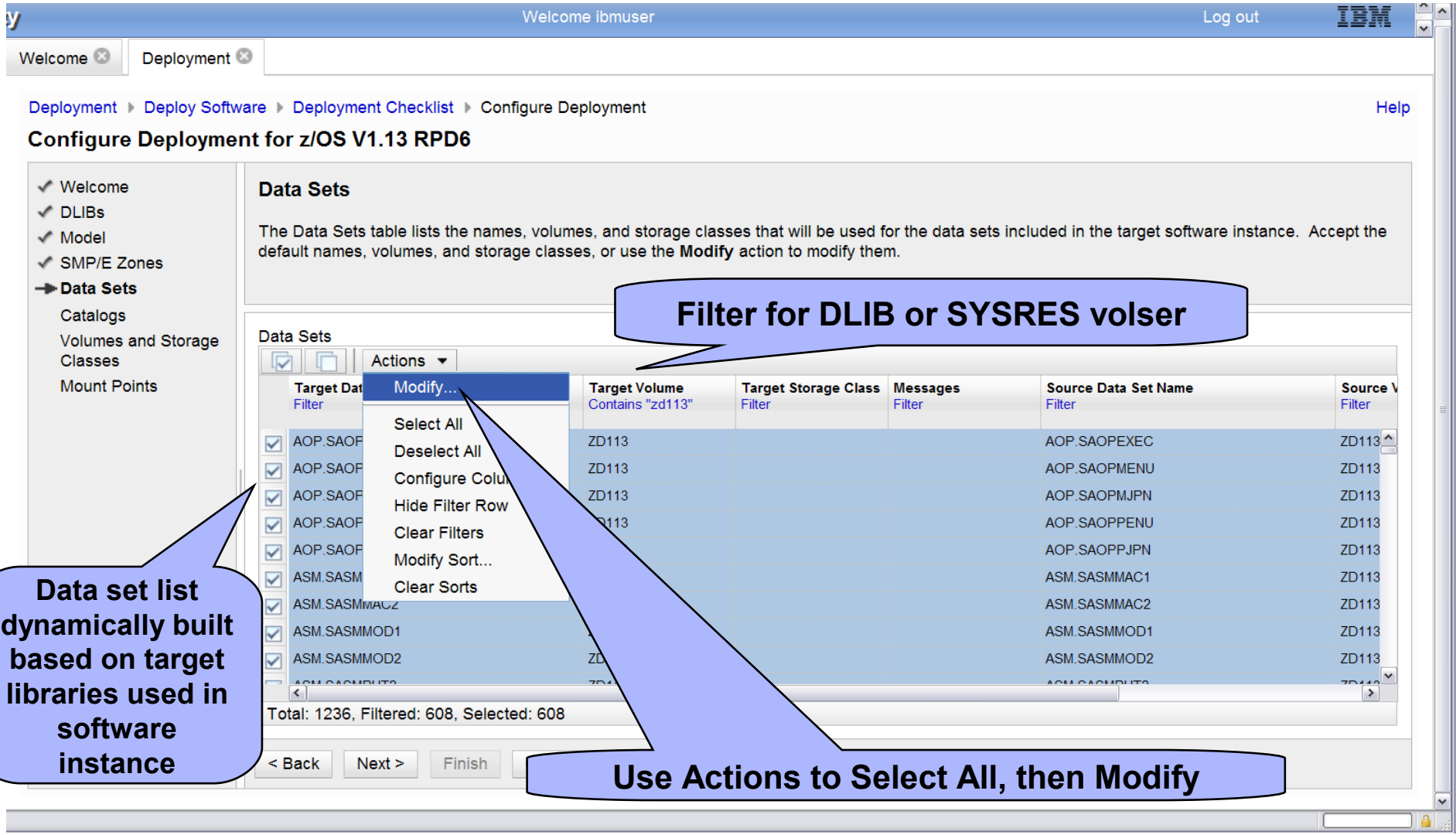
Configure Target Instance Data Sets



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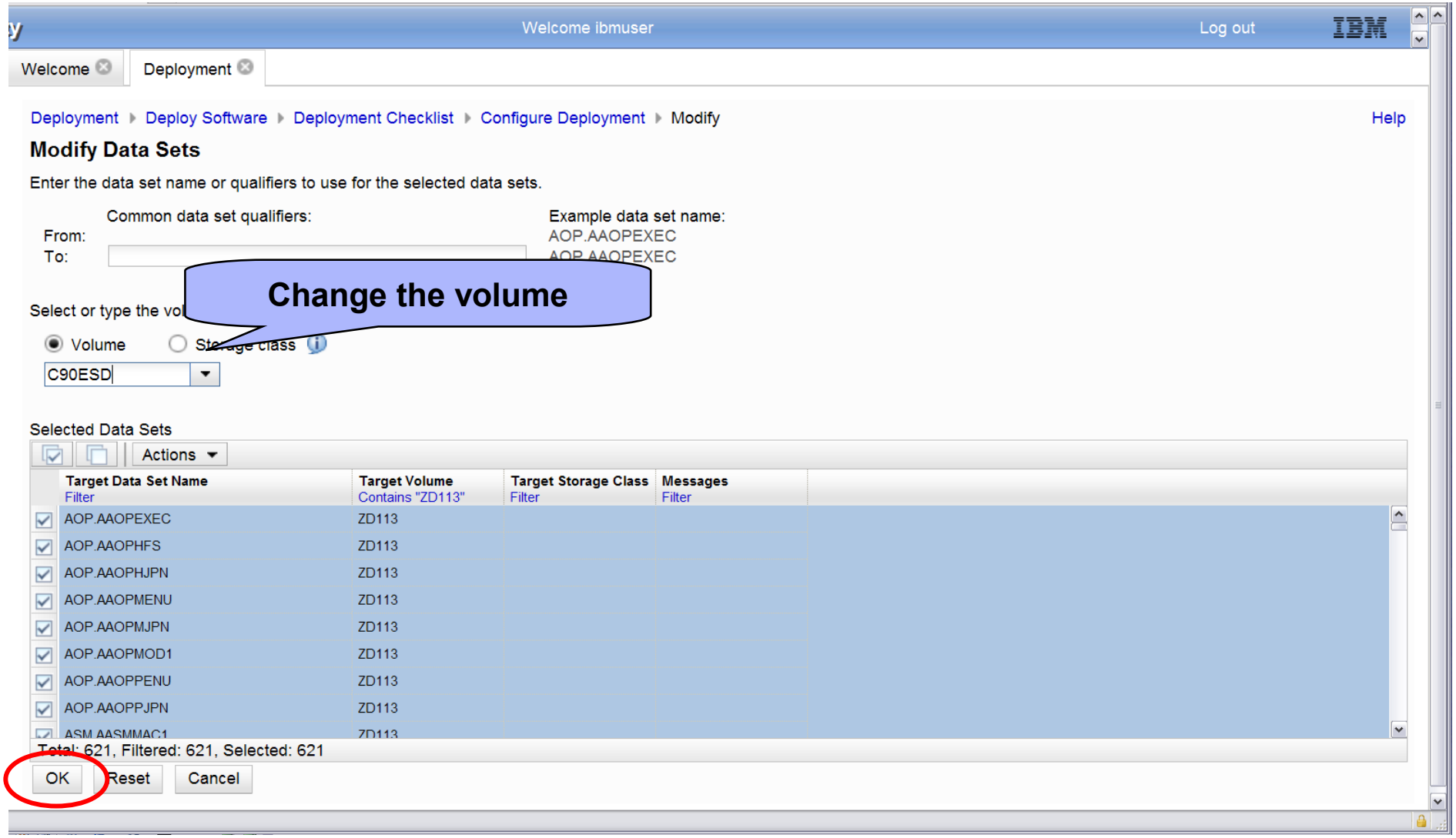
Configure Target Instance Data Sets (Volume)



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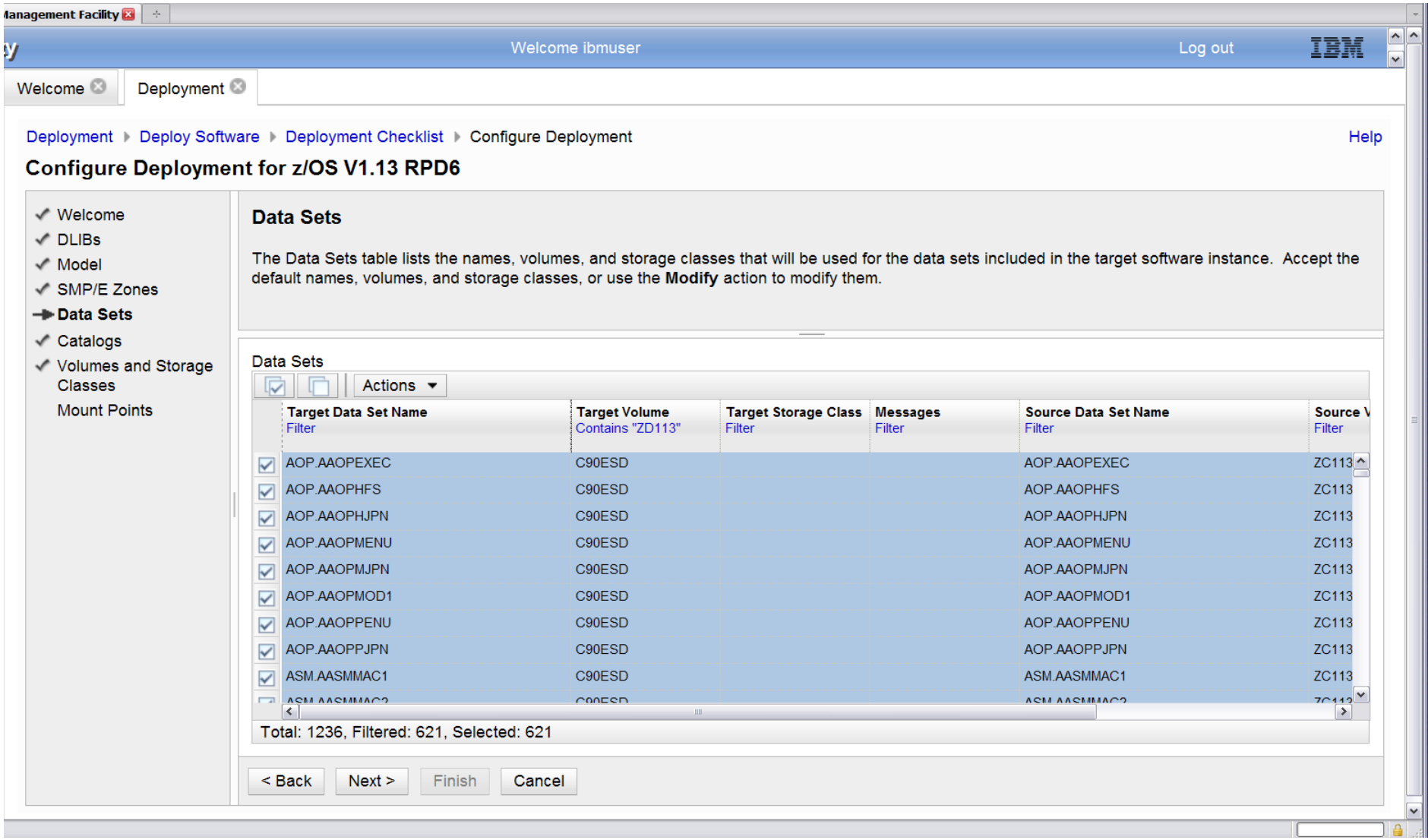
Updated Display with Modified Target Volume



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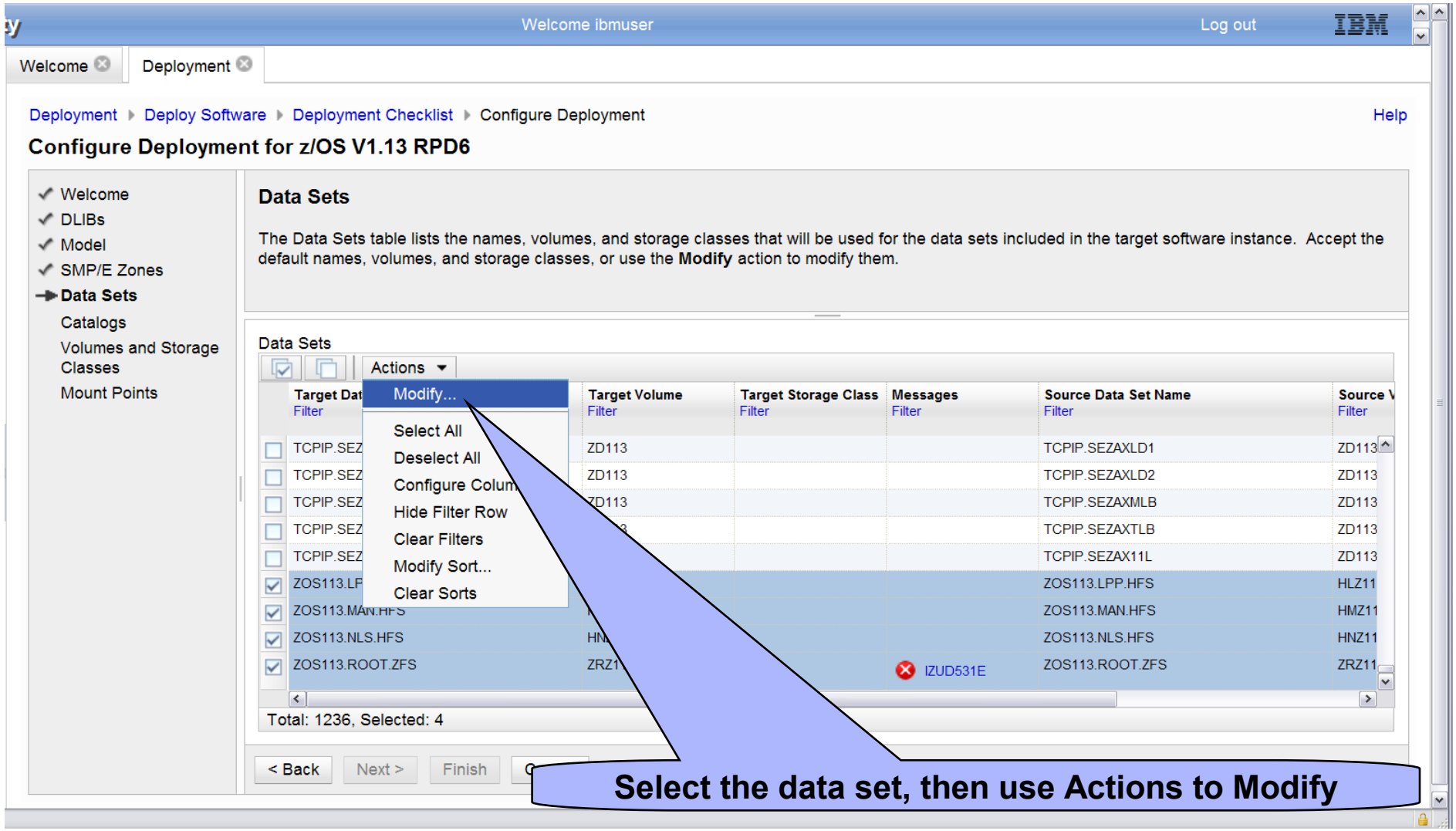
Configure Target Instance Data Sets (Names)



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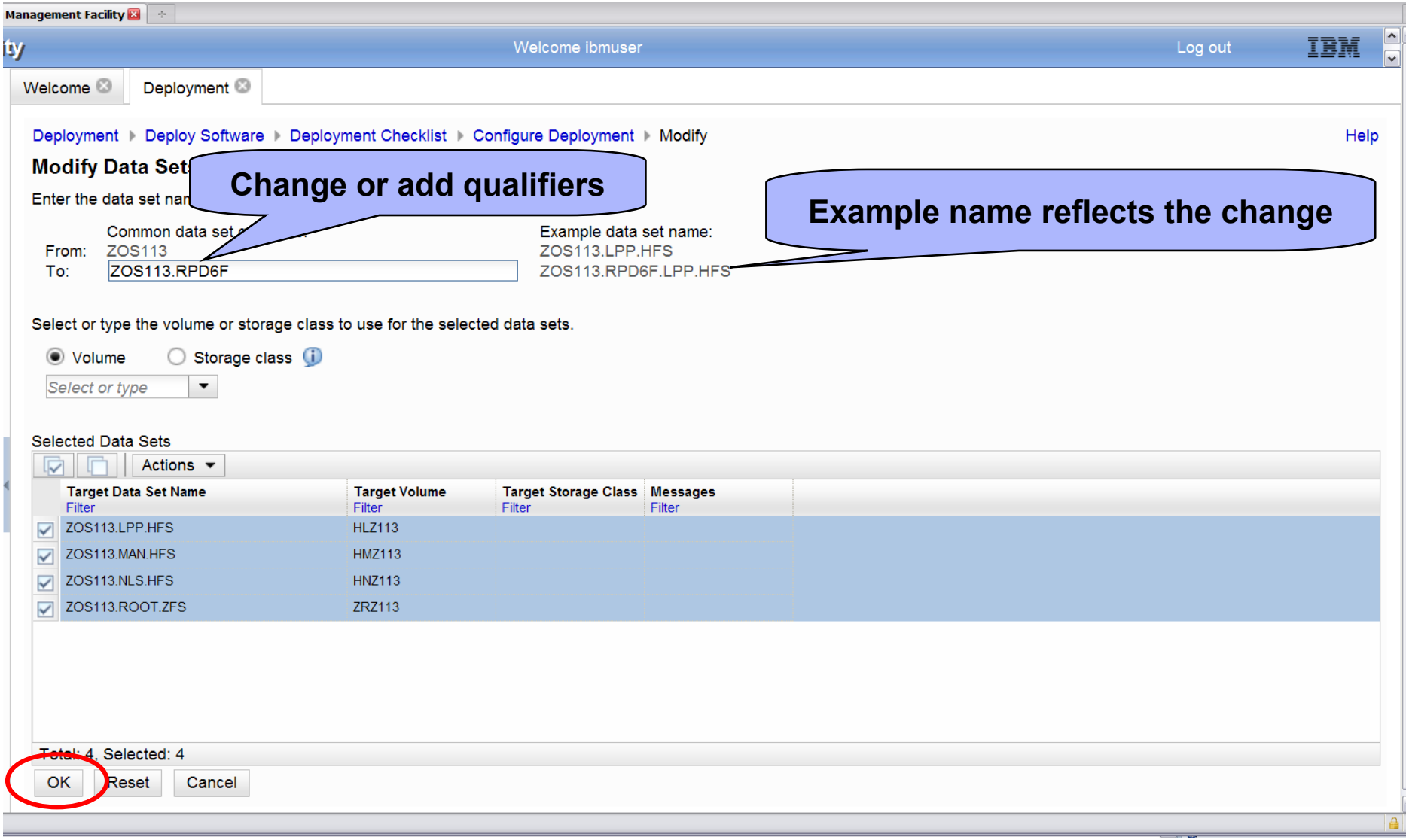
Configure Target Instance Data Sets (Names)



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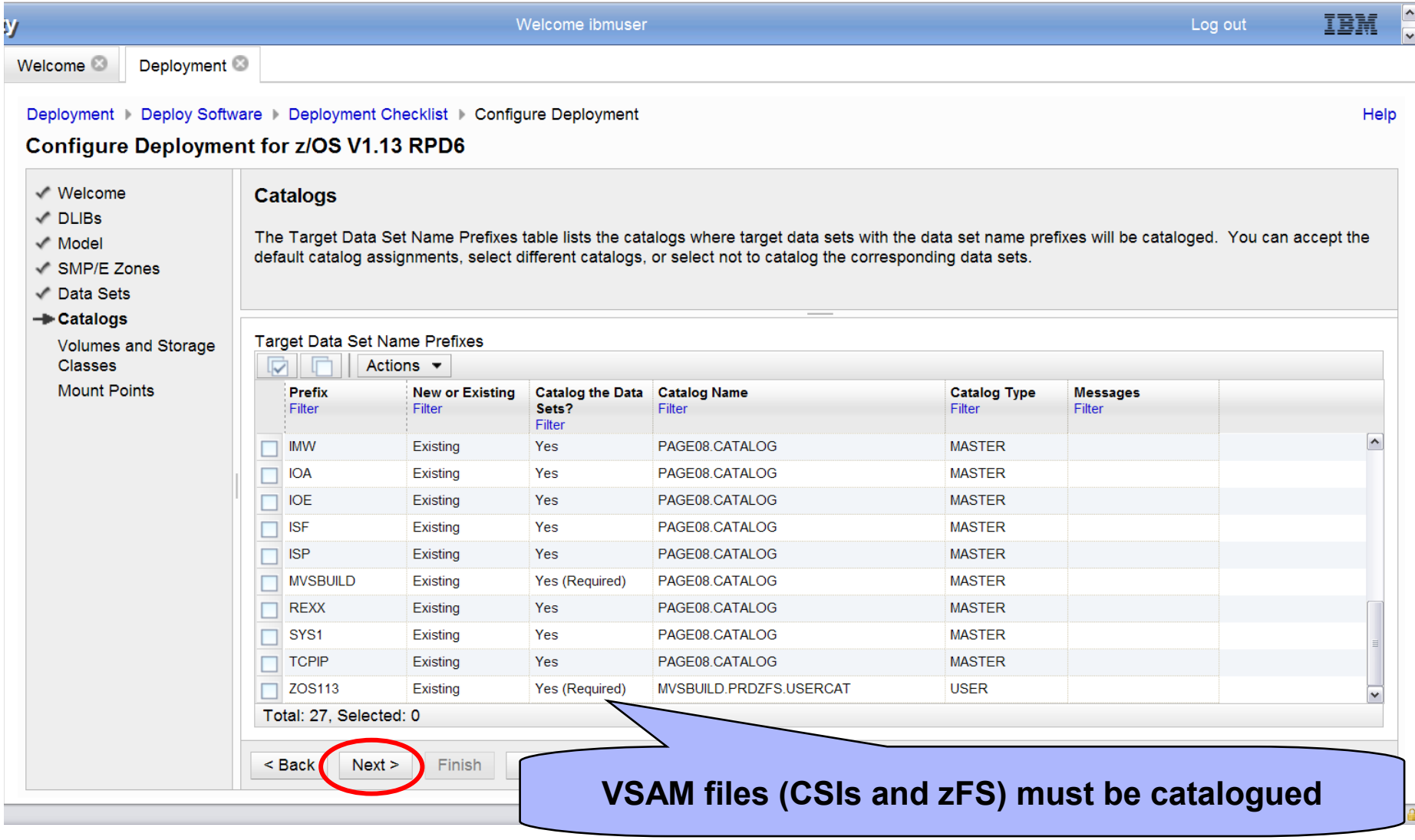
Configure Target Instance Catalog Environment



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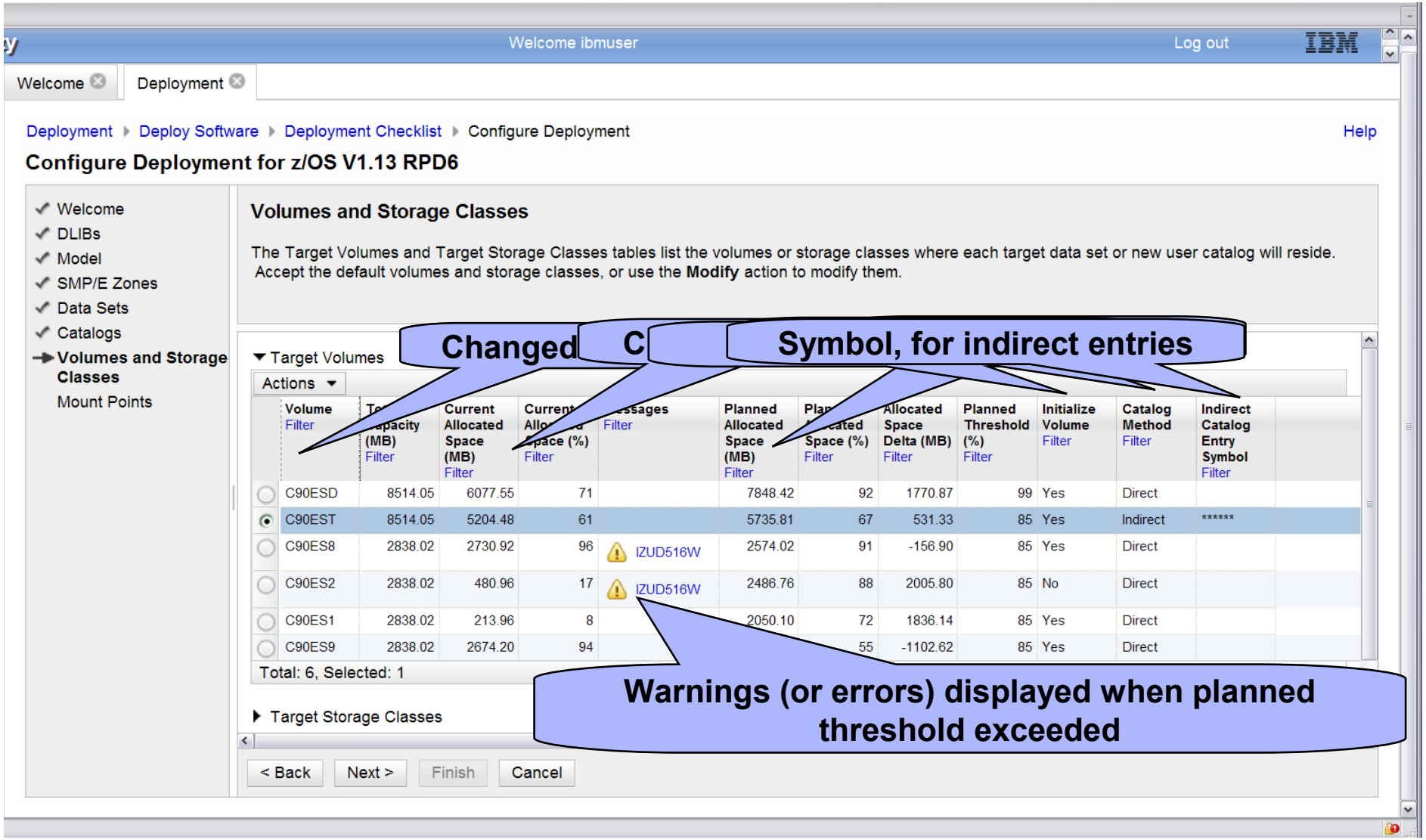
Configure Target Instance Volumes



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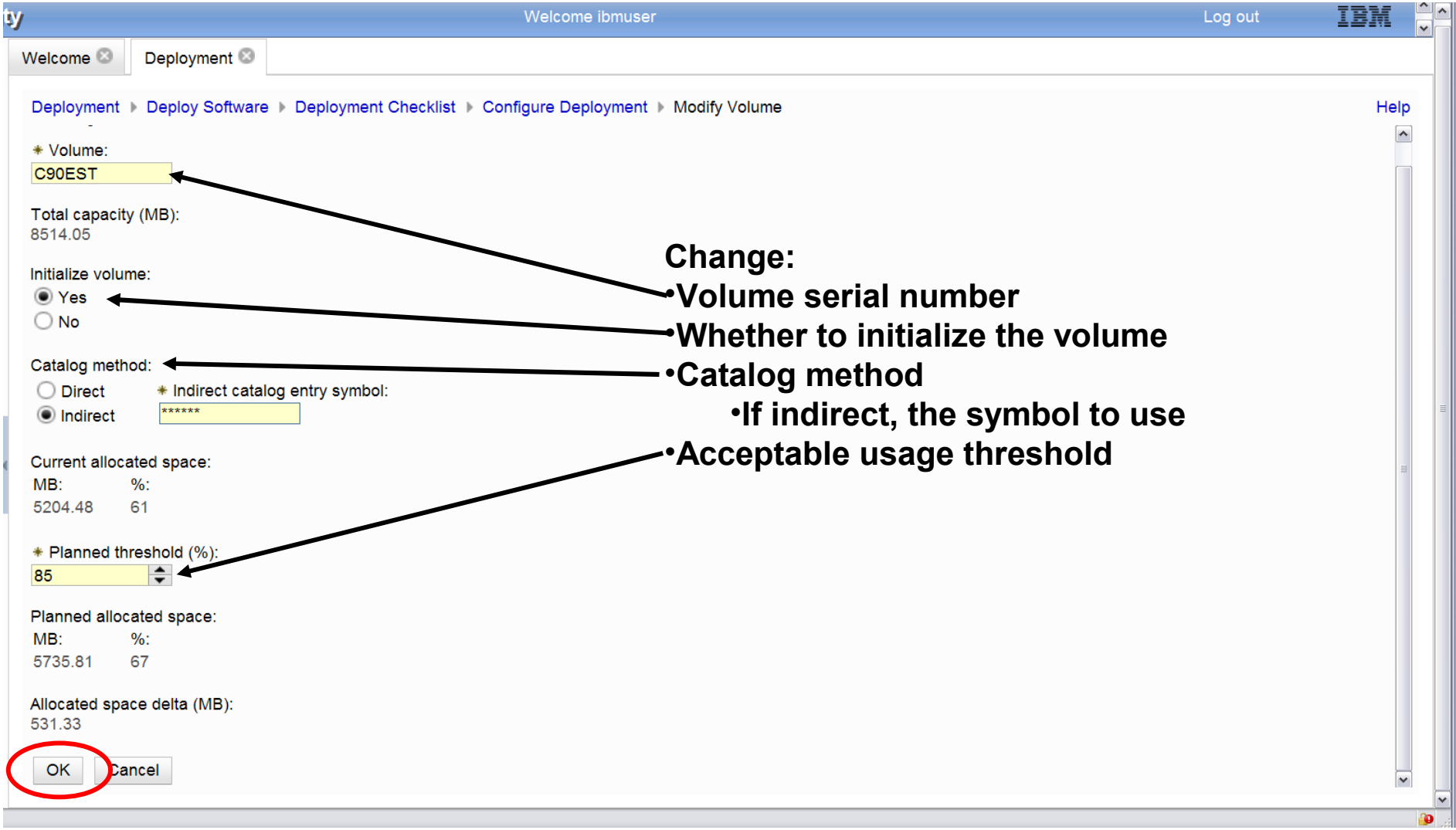
Modify Target Instance Volume



Change:

- **Volume serial number**
- **Whether to initialize the volume**
- **Catalog method**
  - **If indirect, the symbol to use**
- **Acceptable usage threshold**

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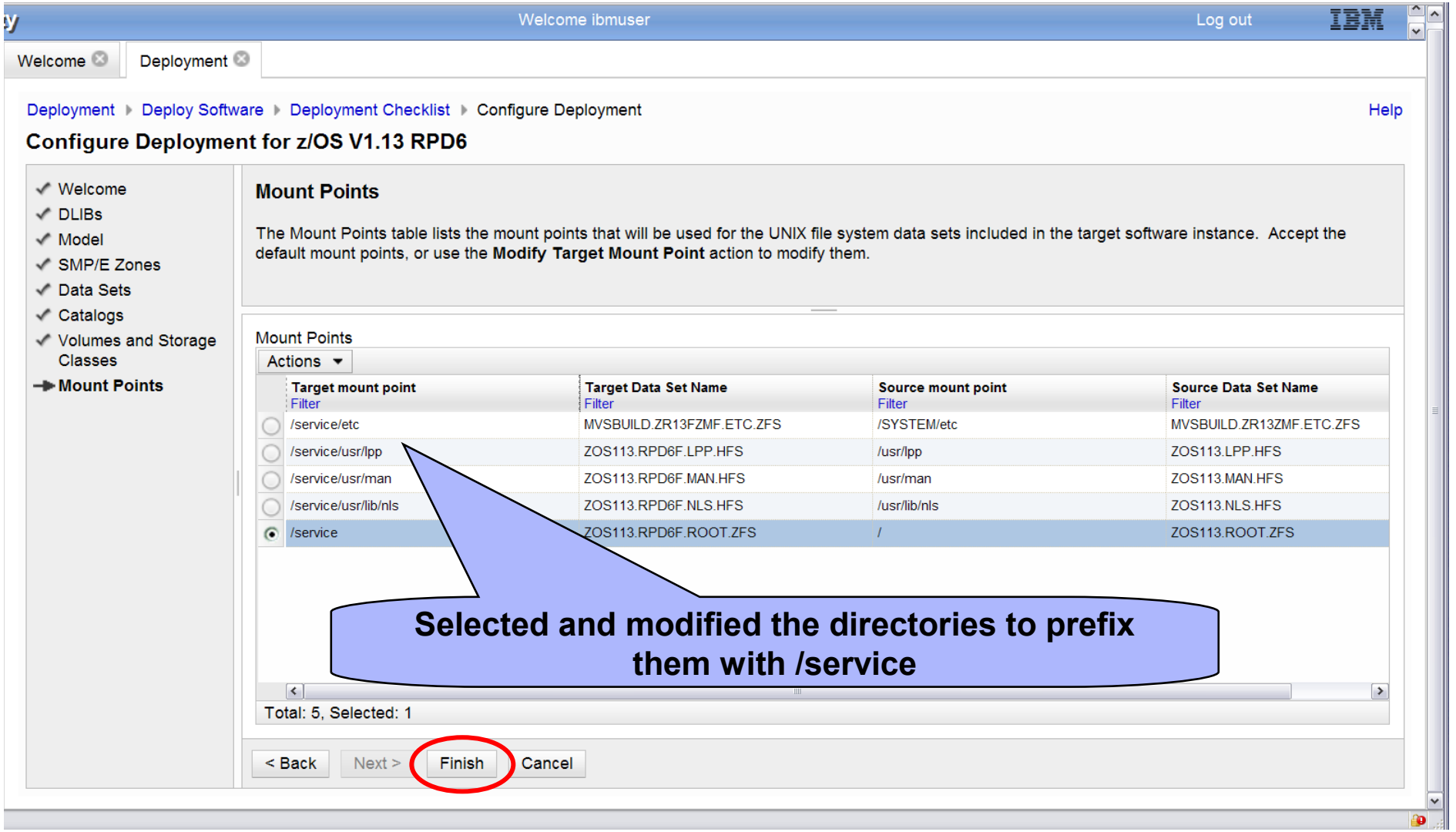
Configure Target Instance Mount Points



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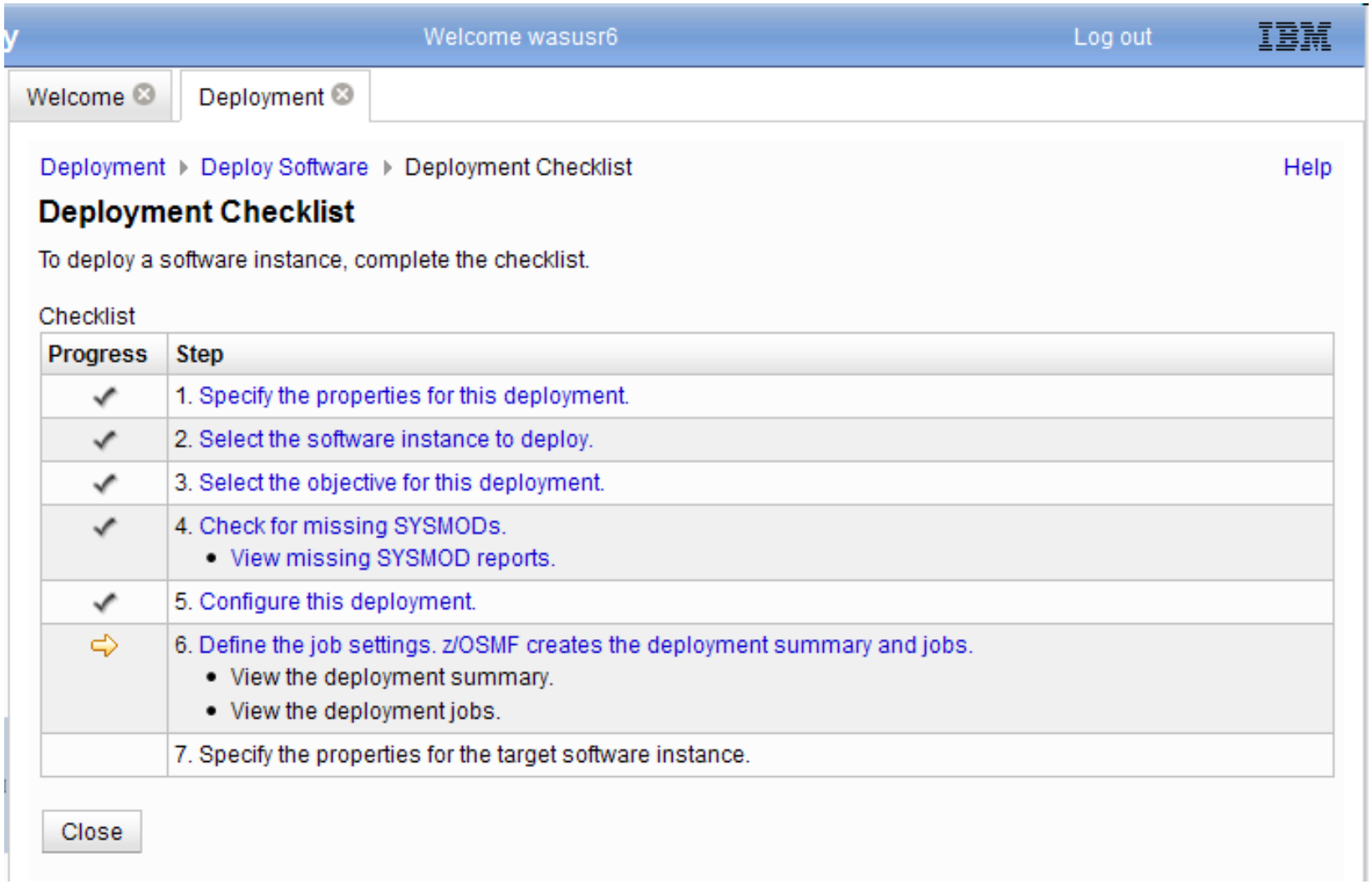
Deployment Checklist Progression



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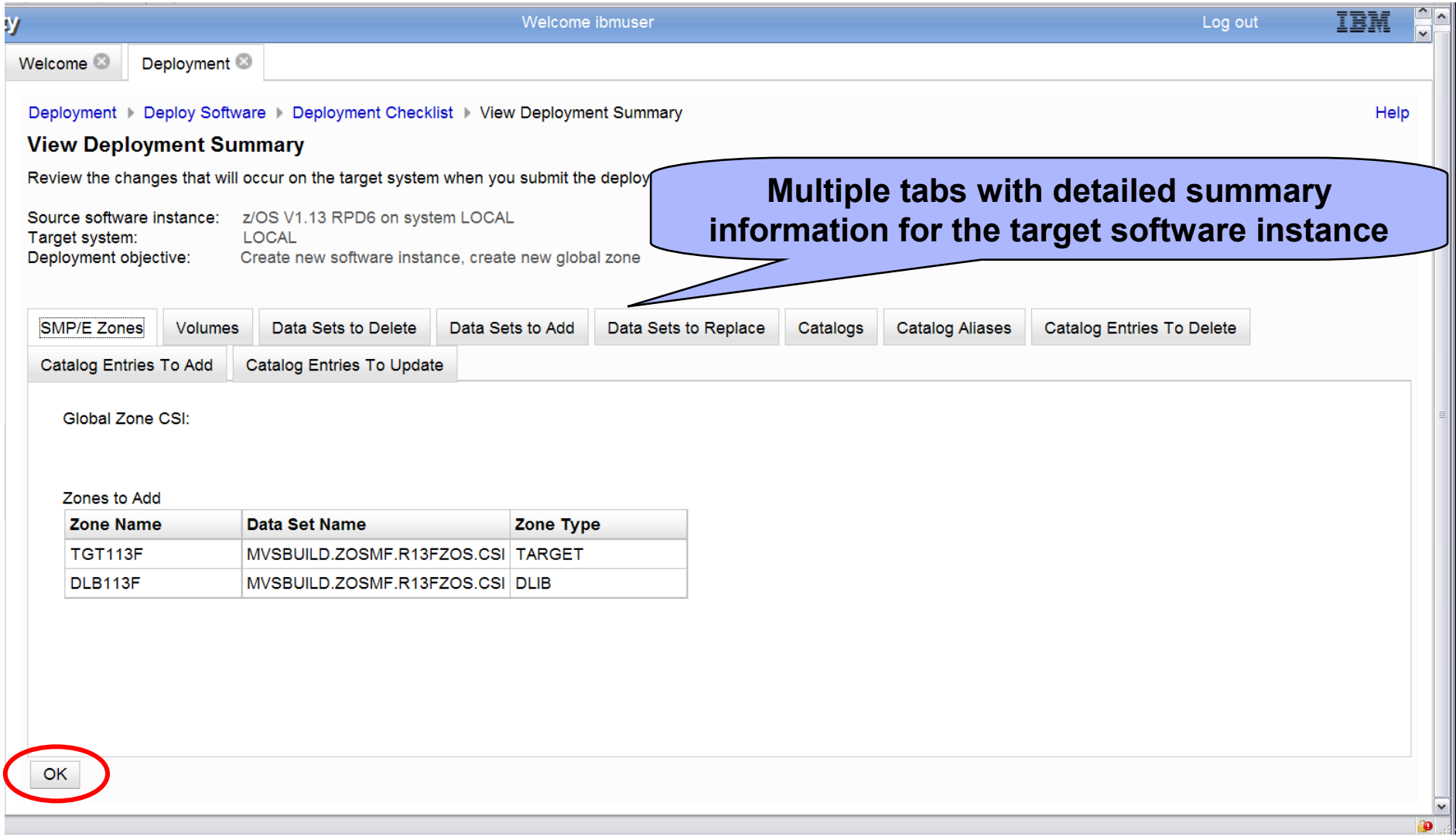
View Deployment Summary



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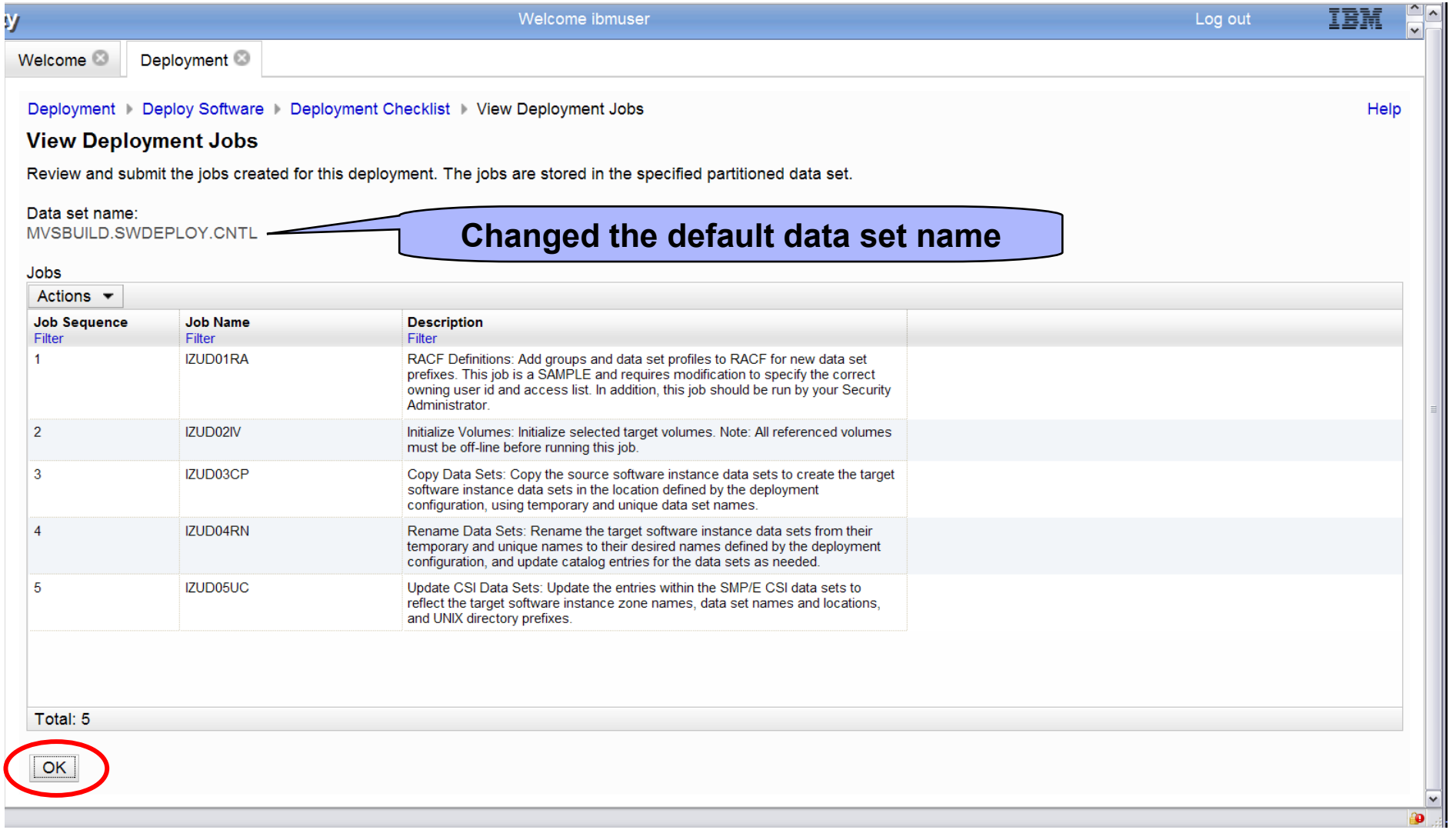
View Deployment Jobs



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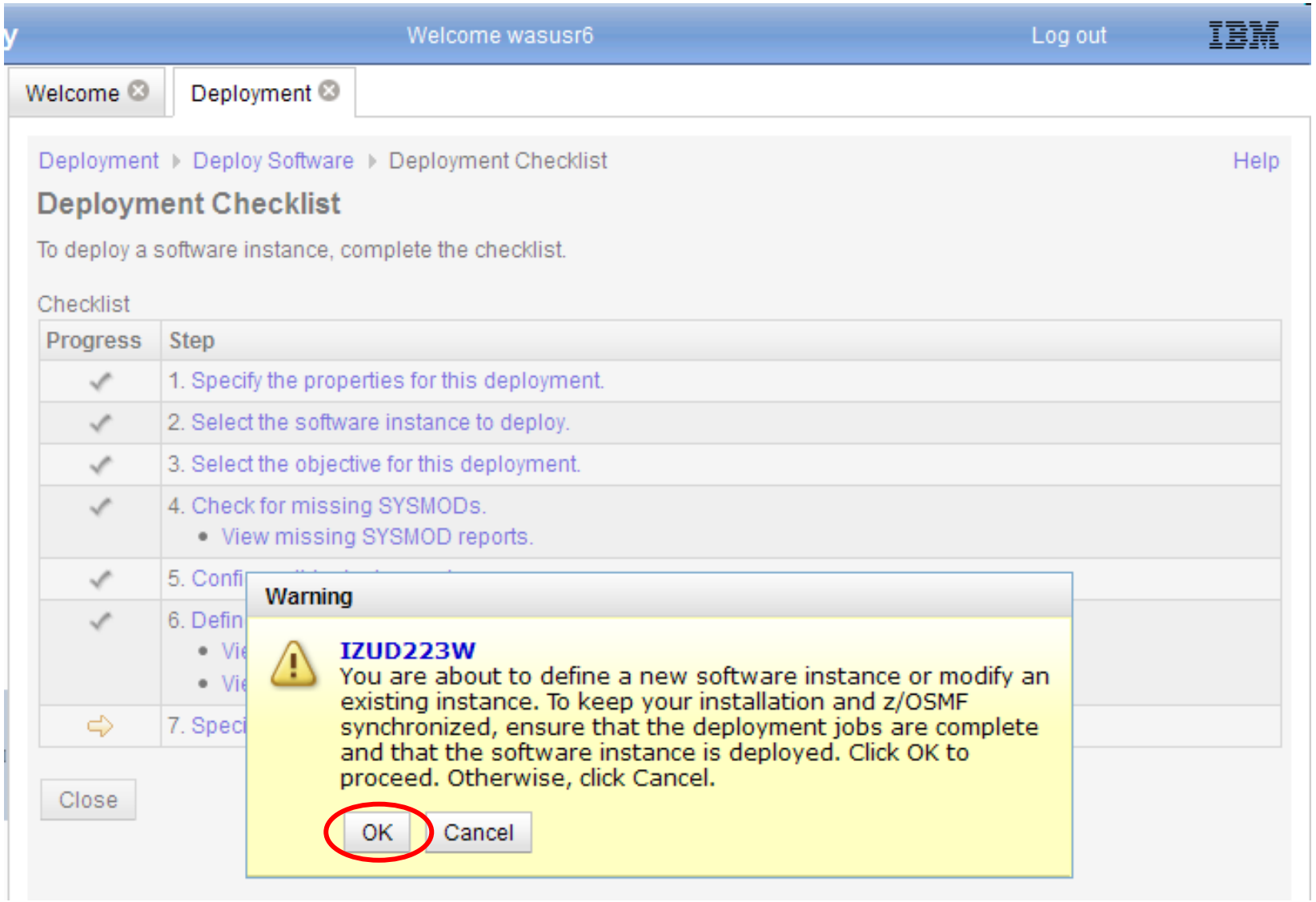
Specify the Properties of the Target Software Instance



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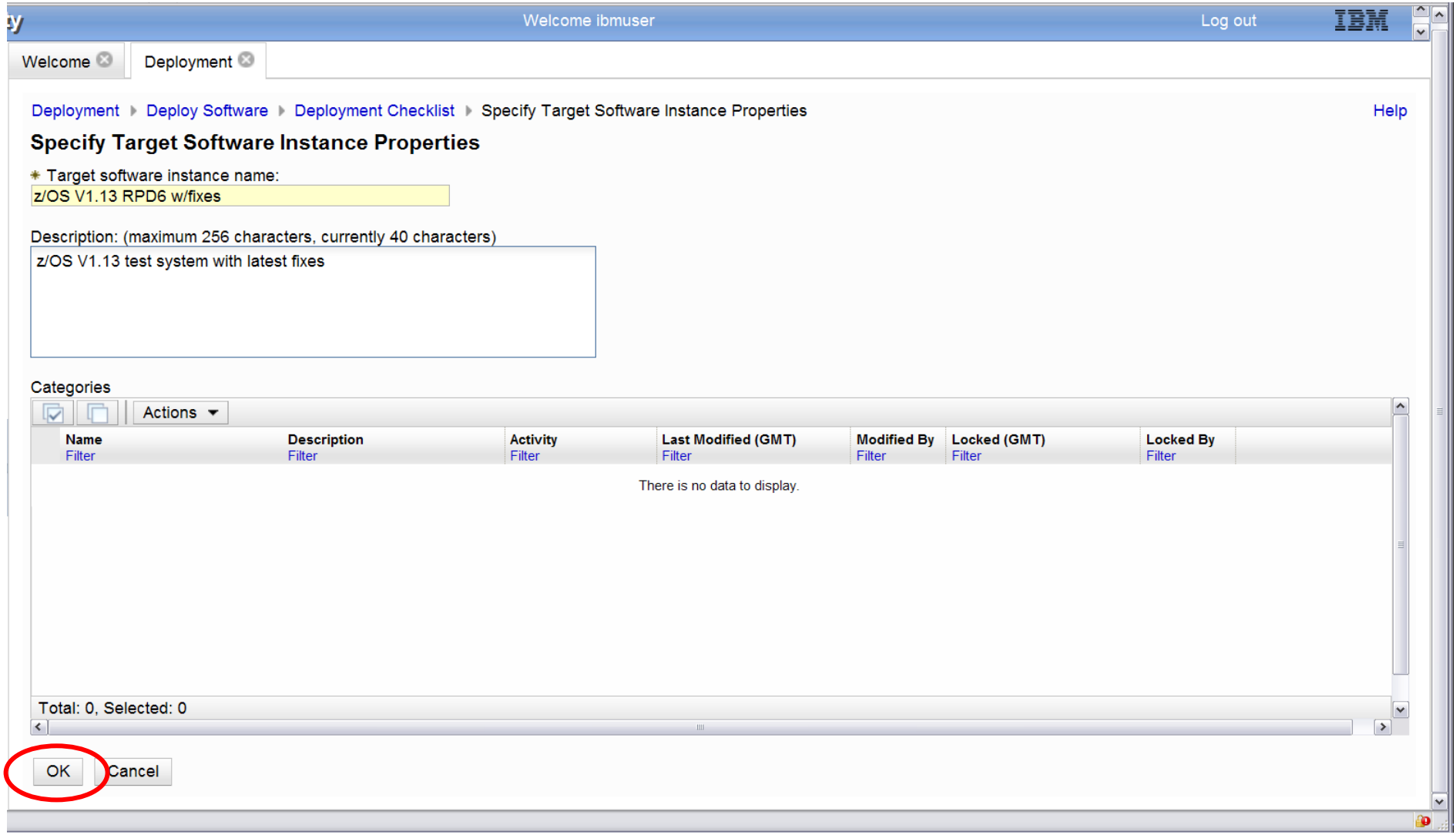
Specify the Properties of the Target Software Instance...



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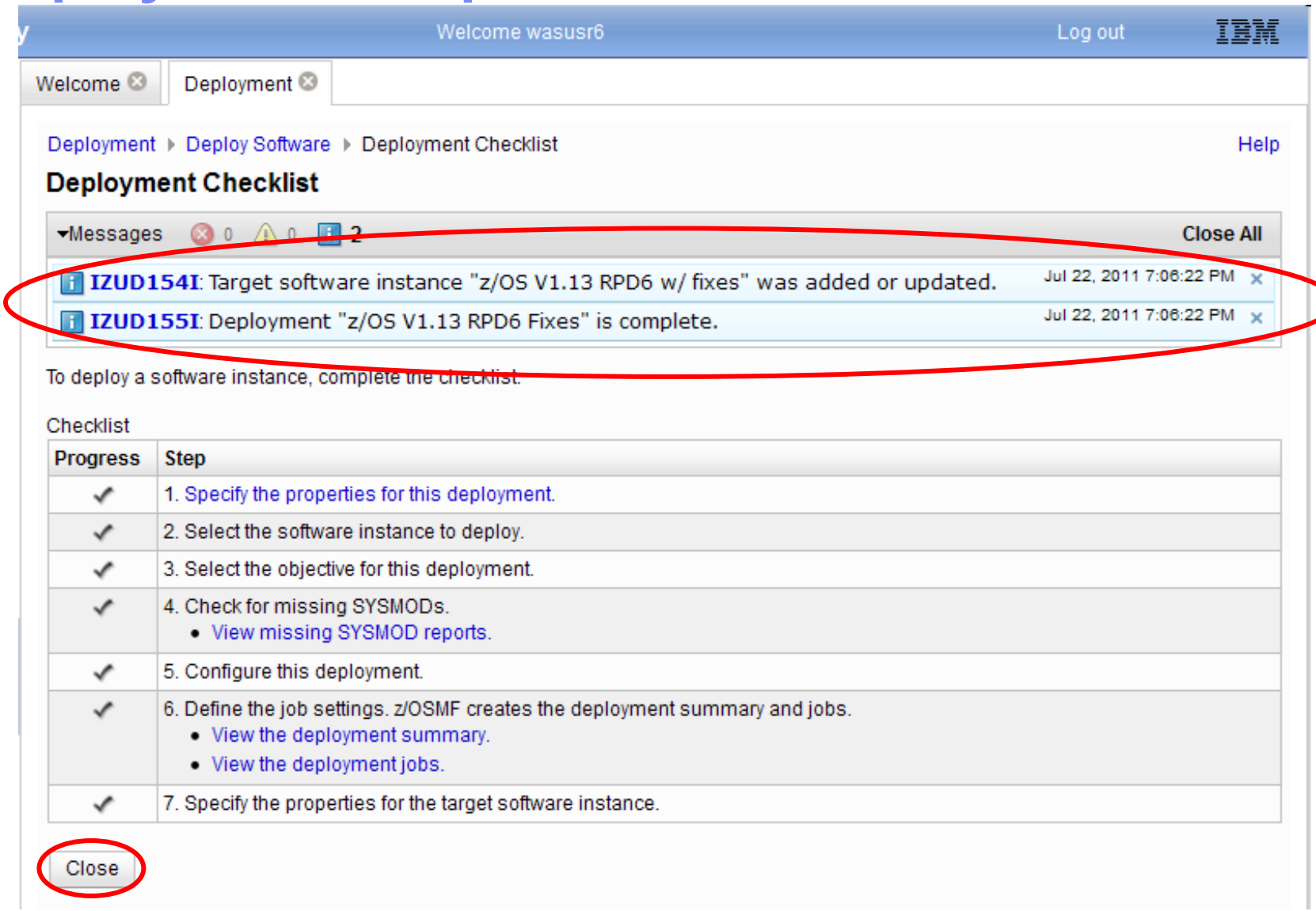
Deployment Complete!!!



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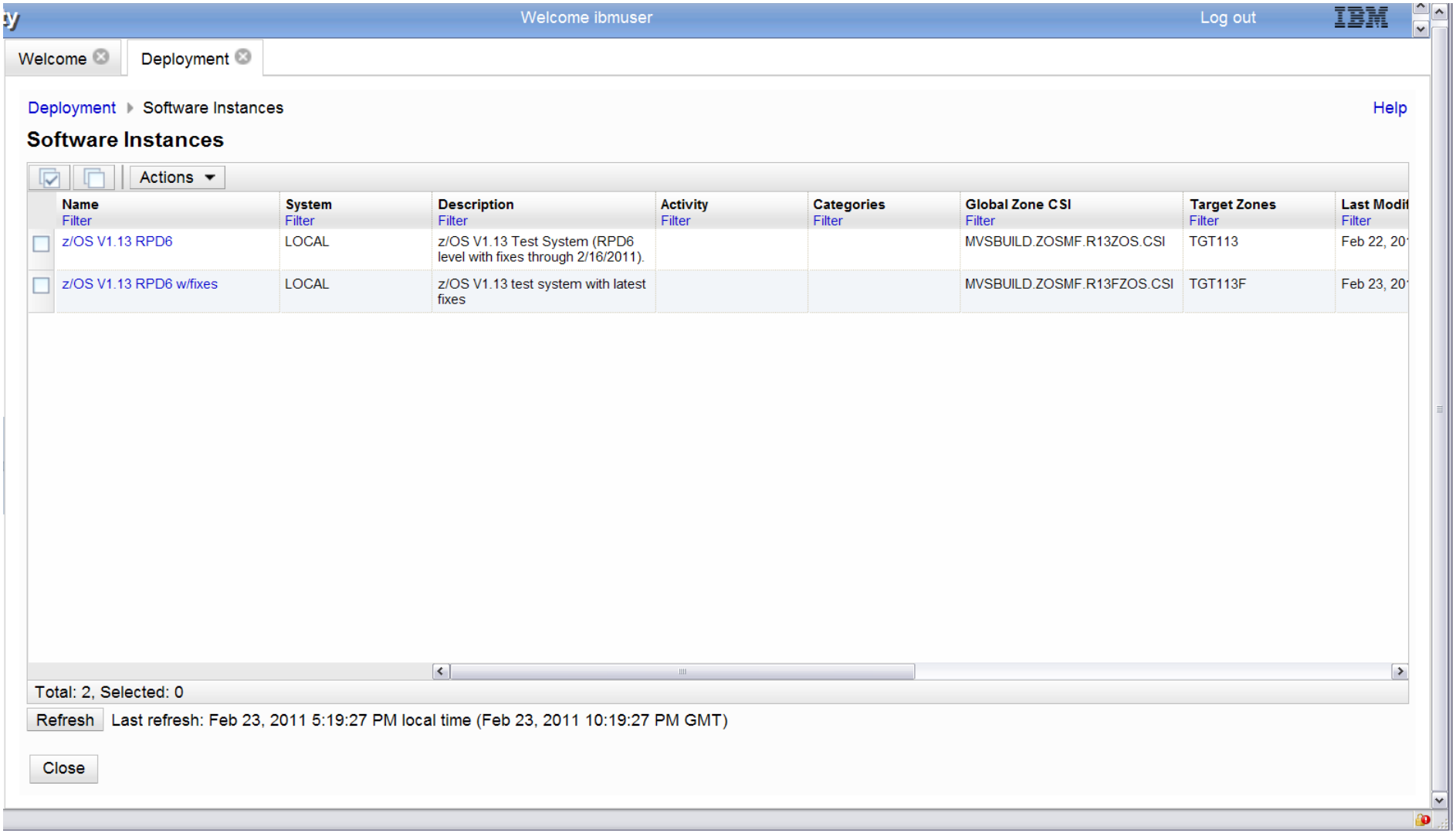
Target Software Instance Created



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Summary

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Summary

- The z/OS Software Deployment function of z/OSMF will provide rigor in the deployment of *any* SMP/E installed software.
- It will ensure:
  - ALL affected parts are copied
  - The zone(s) is carried forward with the software
- It will help to ensure:
  - Cross system requisites are satisfied (coexistence and preconditioning)
  - Cross product requisites (on the same system) are satisfied
  - Software fixes are not regressed
- Can be used to create a clone for subsequent installation or execution.
- Software Deployment will save user specified information and allow for reuse
  - Subsequent deployment operations of the same source will require little or no user input.
- Local and Remote deployments are supported

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Backup

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