

# IKANALM

## DevOps for z/OS on Azure

A Test Drive guide for using the  
IKAN ALM for z/OS solution on Microsoft Azure



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# Summary

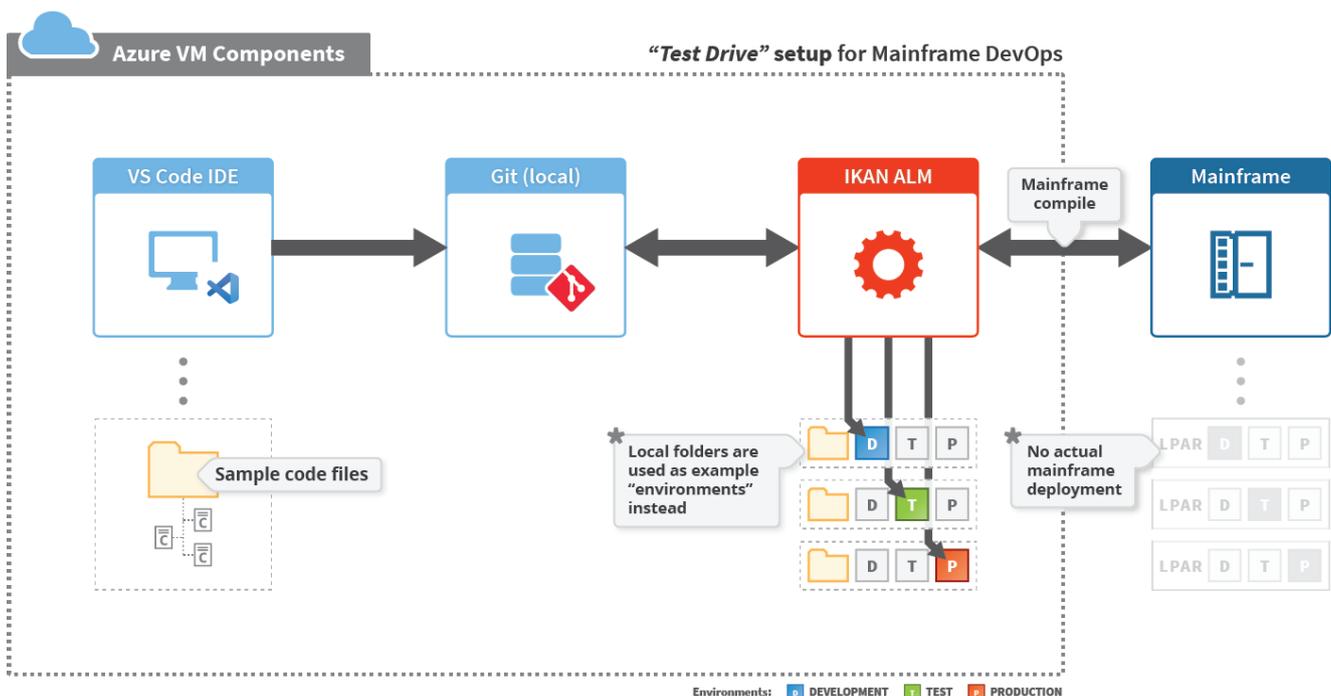
This document will guide you through your “Test Drive” of DevOps for z/OS on Microsoft Azure.

IKAN ALM is the actual DevOps software product on this “Test Drive” virtual machine that you will be working with. It is preconfigured and set up with a predefined z/OS project so you can start right away.

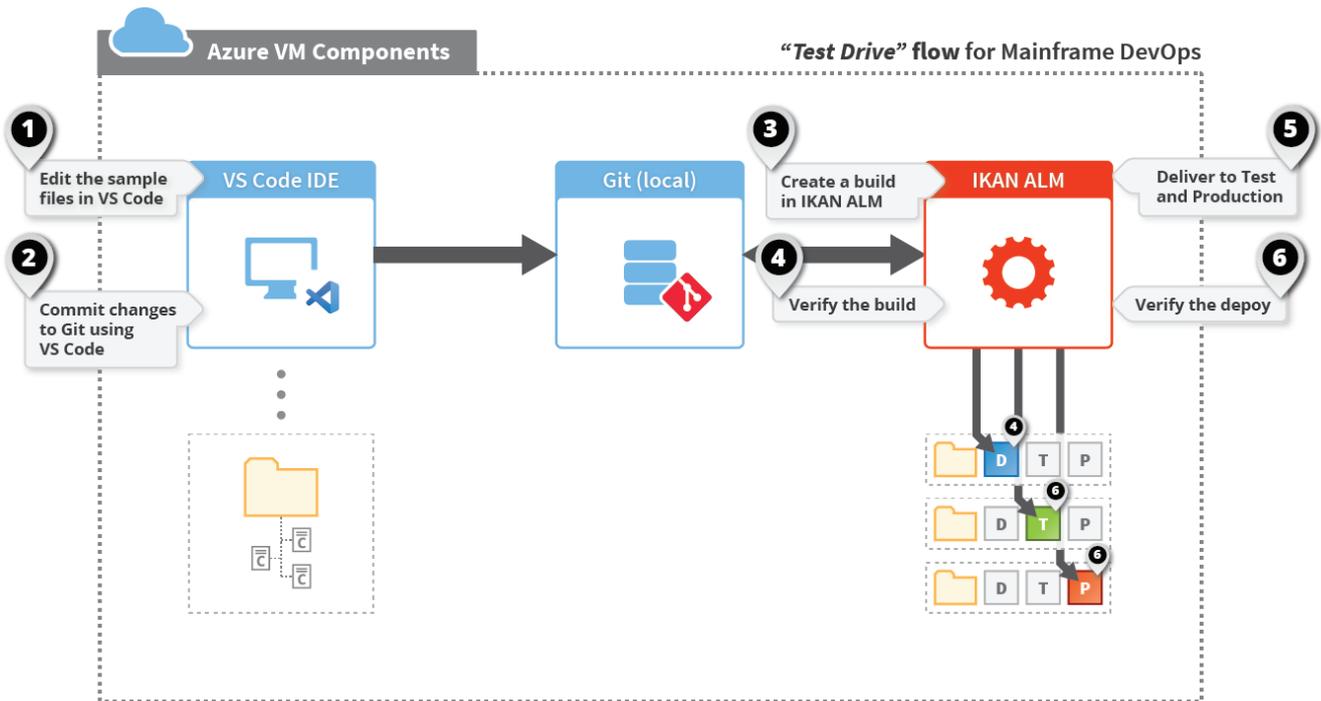
The purpose of this “Test Drive” is to provide you the experience of a standard IKAN ALM user. Such a user is able to create packages, and launch mainframe compiles (builds) and promotes (deploys). Global administration and project administration is beyond the scope of this “Test Drive”.

First let’s go through everything that we have made available for you

- **Sample (mainframe) code** which you can customize.
- **Visual Studio Code** IDE (which has Git integration to version your customized files).
- A local file-based **Git** repository.
- **IKAN ALM** preconfigured and with a **z/OS demo project**.



We have made up a **very basic scenario** that you can follow during the “Test Drive”.



## Making changes to the samples and committing to Git

We're using VS Code, but any IDE or editor will suffice. The only requirement for IKAN ALM to work is that your files are versioned, in this case we chose Git as version control repository.

Open VS Code by clicking on the desktop icon. You will notice some files have already been opened and the folder in which these files reside are located in the cloned Git repository (location: C:\ikan\workspace\demozos), this is your workspace.

```
ACCEPT1.cblbatch
1 IDENTIFICATION DIVISION.
2 PROGRAM-ID. ACCEPT1.
3 AUTHOR. GERARD PROVOOST.
4 * Uses the ACCEPT and DISPLAY verbs to accept a student record
5 * from the user and display some of the fields. Also shows how
6 * the ACCEPT may be used to get the system date and time.
7
8 * The YYYYMMDD in "ACCEPT Current Date FROM DATE YYYYMMDD."
9 * is a format command that ensures that the date contains a
10 * 4 digit year. If not used, the year supplied by the system will
11 * only contain two digits which may cause a problem in the year 2000.
12
13 DATA DIVISION.
14 WORKING-STORAGE SECTION.
15 01 StudentDetails.
16 02 StudentId PIC 9(7).
17 02 StudentName.
18 03 Surname PIC X(8).
19 03 Initials PIC XX.
```

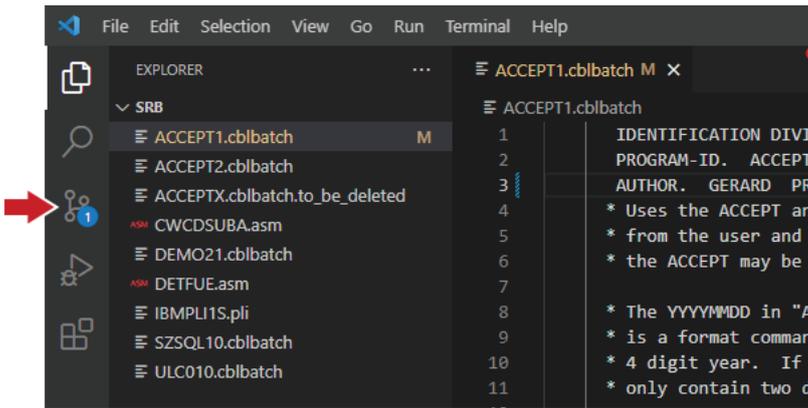
In the following steps we'll explain how to edit and commit the sample files.

## Edit the sample code

First edit the "ACCEPT1.cblbatch" file, you could for instance just add some extra characters.

Save the file. You will see the color of the file in the explorer change and "M" letter indicates it has been modified.

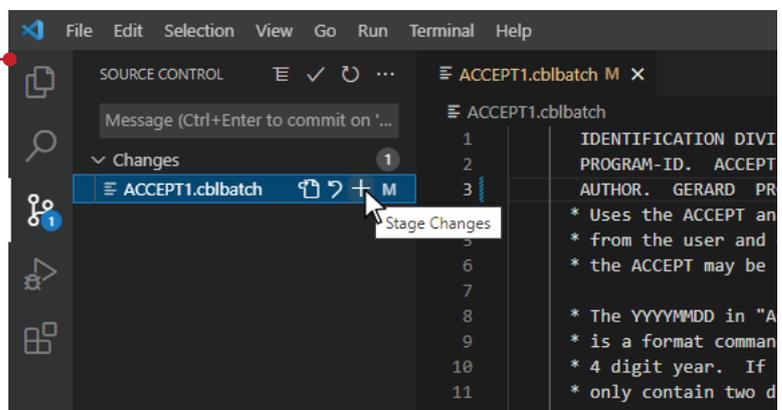
Next, go to the "Source Control" view (see the red arrow).



## Stage the changes

In Git you need to stage you changes before you can commit.

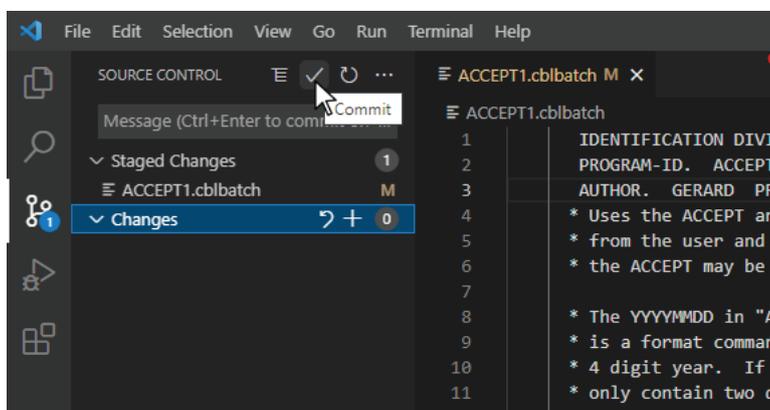
Press the "plus sign" to stage you changes.



## Commit the changes

Click the "checkmark" to commit your changes.

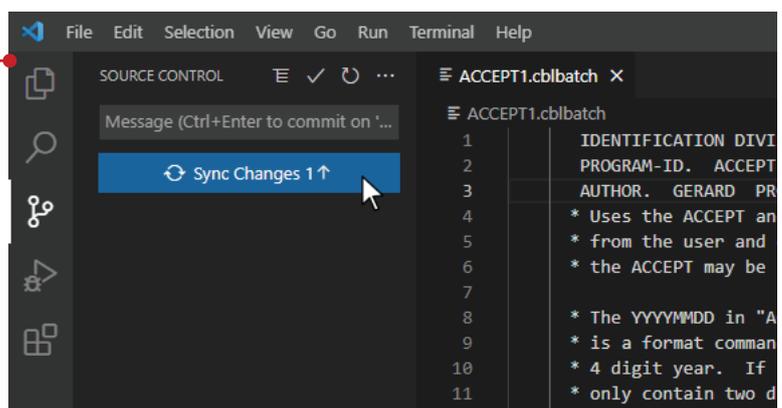
You can enter your commit message in the box below first (before pressing the button), or you can do this afterwards in a pop-up.



## Sync you changes

In Git you need to push the changes made in the local repository to the remote repository.

Press the "Sync Changes" button.



# Creating a Package and compiling the sample code

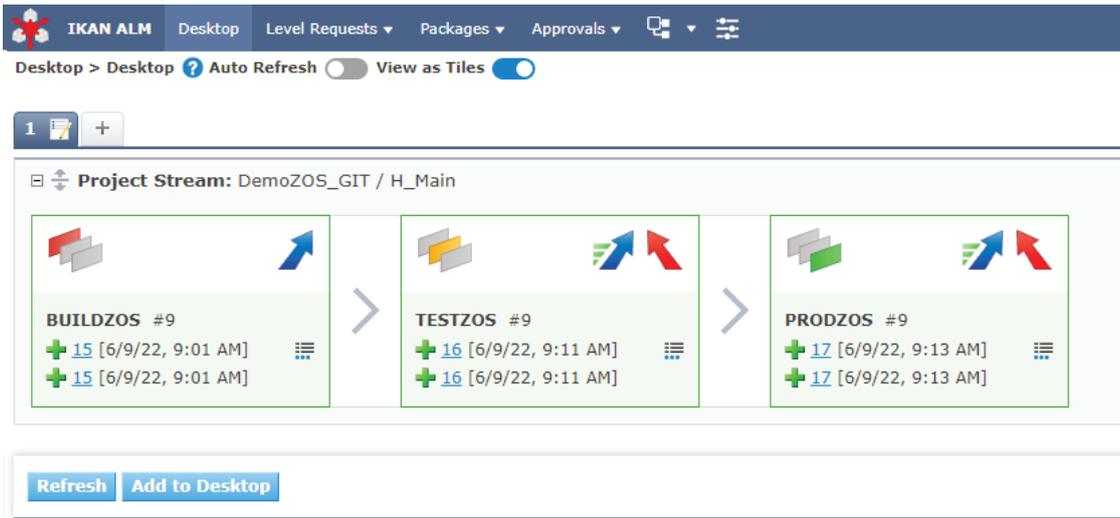


Click the **IKAN ALM icon** on your Windows desktop icon to open IKAN ALM, and log in with the following credentials:

**Username:** user

**Password:** user

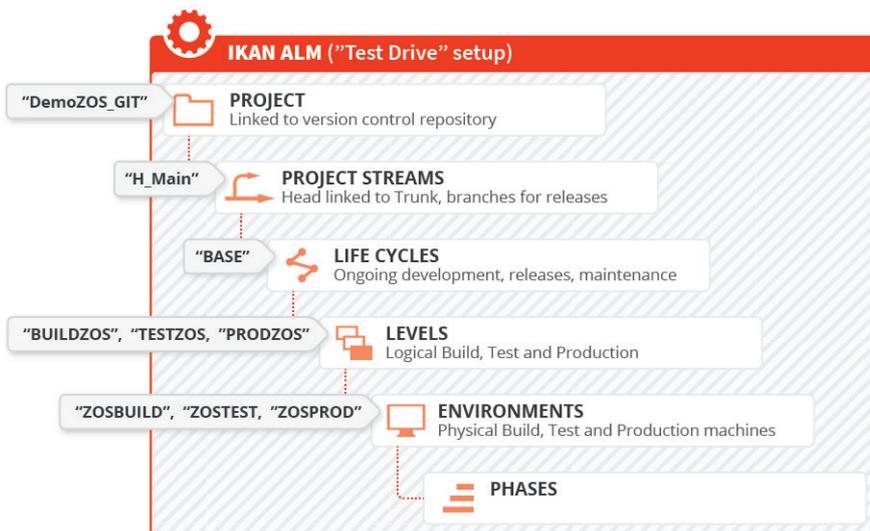
You will be taken to the IKAN ALM Desktop screen where you can see the Project Stream of our z/OS Demo project: "DemoZOS\_GIT".



A Project Stream is a working entity within IKAN ALM in which the lifecycles and their levels (Build, Test, Production) for our Demo project are defined. It is automatically created when we create a project in IKAN ALM.

**NOTE:** For our project the default "Head" Project Stream is sufficient, for complex projects you can define additional "Branch" Project Streams (parallel development,...). You can read more about this in the IKAN ALM User Guide.

In the image below you can see the IKAN ALM hierarchy of our Demo project. We will get back to this topic in the second part of this document.



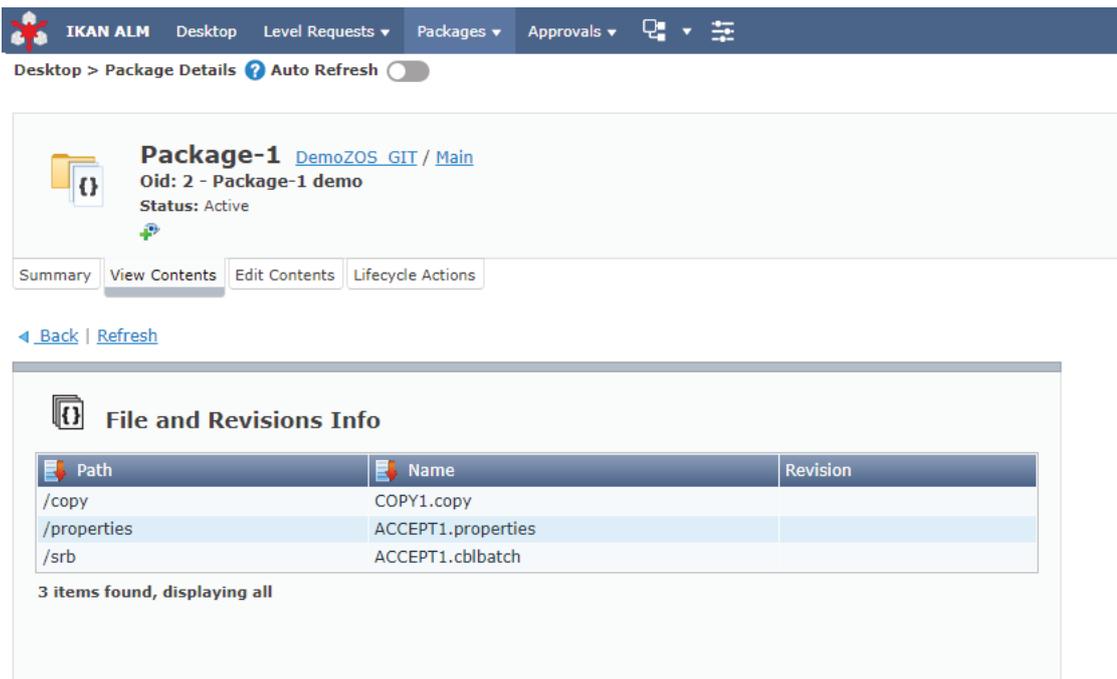
First let's look at what's inside the package that we are going to compile.

In the top menu click: "Packages > Overview Packages"

On this new screen click the "View" icon  in the "Packages Overview" pane. This will take you to the "Package Details" screen.

As you can see under the "View Contents" tab, we currently have 3 files in our package:

- COPY1.copy
- ACCEPT1.properties
- ACCEPT1.cblbatch



In case you have edited other files (previously in VS Code) besides the ones above, you will need to add them to the package by going to the "Edit Contents" tab, selecting your files and then hitting the "Save" button.

Now, let's go back to the IKAN ALM Desktop; in the top menu click: "Desktop".

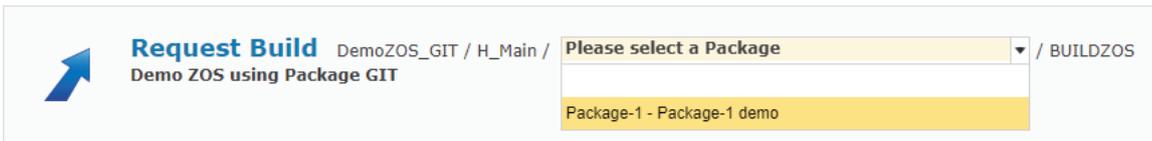
We are ready to build our Demo project. In IKAN ALM initiating a build (or deploy) process comes down to starting a "Level Request".

In this case, we request IKAN ALM to retrieve our package files and perform all the actions that are defined in the build level: "BUILDZOS". In IKAN ALM, the build and deploy actions are handled by Phases, more on this later.

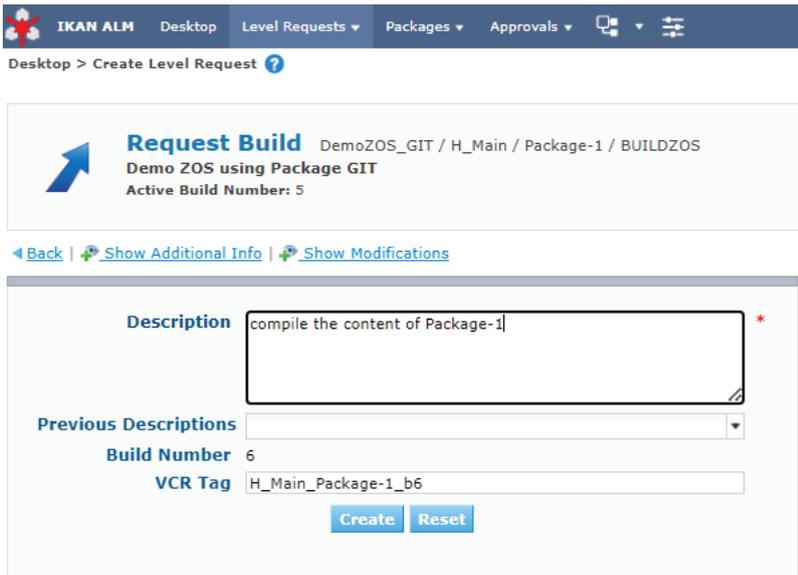


Click the "Request"  icon in the "BUILDZOS" tile of the Project Stream.

Select your package "Package-1" first.

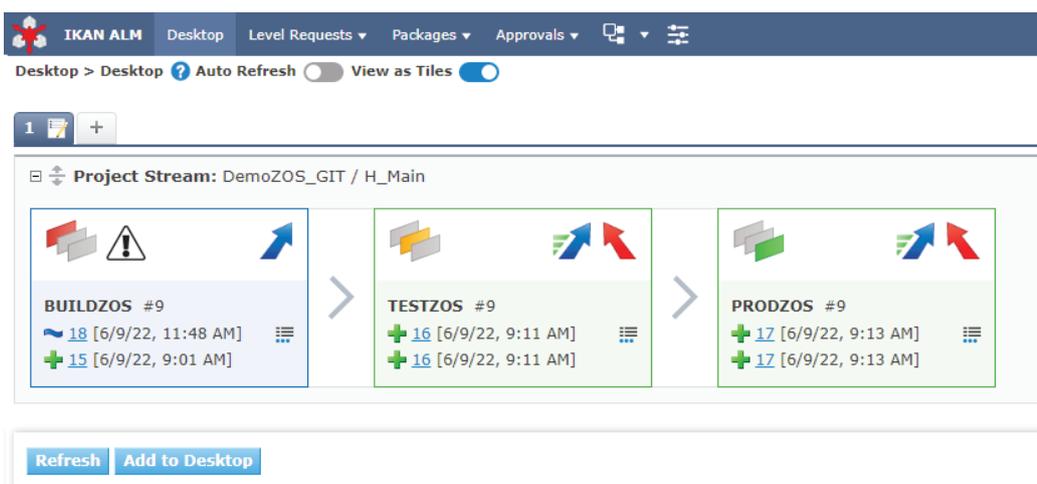


Provide a meaningful description, but do not modify the VCR Tag entry. This tag is automatically generated and will be created in Git when the build is successful.



**NOTE:** Optionally you can have a look at the sources we modified in our "Package-1" package by clicking the "Show Modifications" link.

Finally, hit the "Create" button, to start the Level Request. You will be taken back to the IKAN ALM Desktop. There you will notice that the Build Level tile has changed into a "running" state.



It's convenient to turn on the "Auto Refresh" switch (below the menu), so you don't have to refresh the page manually while you're waiting.

# Verifying the result of the (compile) Build Level Request

When the request had finished, you will see an green icon indicating the request has been successful.



The first line indicates the current Level Request, the second line indicates the latest successful Level Request.

Click on the first “Level Request OID” link, next to this icon. This will take you to the “Level Request Detail” page.

Desktop > Level Request Detail [?](#) Auto Refresh

**Success** [DemoZOS\\_GIT](#) / [H\\_Main](#) / [Package-1](#) / [BUILDZOS](#) / [Build# 10](#)  
**18 : Build for documentation**  
Requested by: user on: 6/9/22, 11:48:21 AM

Summary Phase Logs Results Approvals Issues Sources Modifications Dependencies

[< Back](#) | [Refresh](#) | [Build History](#)

**Actions**  
[Deliver to TESTZOS](#)

**Info**  
**Build Number** 10  
**VCR Tag** H\_Main\_Package-1\_b10  
**Action** Request Build  
**Type** Builds based on latest code  
**Start** 6/9/22, 11:48:22 AM  
**Duration** 00:01:02  
[Show more...](#)

**Builds & Deploys**

	OID	Environment	Machine
	11	ZOSBUILD	ikanalm

If you click on the “Phase Logs” tab you will see an ordered list of all the Phases that are used during the build process.

When you click the “Build # on machine *ikanalm*” bar, you can see the Phases that ran on the Build environment. Take your time to go through all the Phases and their logs.

**NOTE:** When we created the build level (and connected the build environment) for this “Test Drive”, IKAN ALM automatically set up all required general Phases. The only thing we had to do was to import the Phases that are specifically made to support the z/OS build process. The IKAN ALM Phases architecture is very easy to use and requires no programming skills whatsoever.

Below is an example of the "z/OS Maps and Programs compilation" Phase log.

**z/OS Maps and Programs compilation** 5/24/22, 11:23:11 AM 00

**Phase** z/OS Maps and Programs compilation - 2.1.0 **Duration** 00:00:21  
**Start Date/Time** 5/24/22, 11:23:11 AM **Status** Success

**Phase Parameters**

Key	Value
alm.phase.extractBundle	true
alm.phase.mainScript	zosCompilation.xml
propsfile.languages	\${dir.zosResources}/BUILD/languagesZOS.properties

**Message**

Script Execution successful.  
Execution results in : C:\ikan\ALM\_environments\DemoZOS\_GIT/build/target/7

**Log**

[Download Log](#)

```
[echo] ALM License found!  
[echo] Load C:/ikan/ALM_system/ZOS/PhaseResources/osfamily.properties  
[echo] WARNING: No c:/ikan/ALM_environments/DemoZOS_GIT/build/source/7/DemoZOS_GIT/DemoZOS_GIT.properties file found for this project.  
[echo]     Default project properties are used.  
[echo] Level: BUILDZOS Config: ZOS - Action: Requested Build START  
[echo] JOB execution 14.23.20 JOB00449 ---- TUESDAY, 24 MAY 2022 ----  
[echo] File ACCEPT1 was successful on ZOS.  
[echo] *** COMPILER ZOS for ACCEPT1 submitted to z/OS with success ***  
[echo] Generated Member files are copied from ZOS.  
[echo] DSNs IKANALM.DEMOS.P0000002... are deleted on ZOS.
```

BUILD SUCCESSFUL  
Total time: 20 seconds

[Download Log](#)

Under the "Results" tab you can see the actual compiled artifact.

We have created:

- a loadmodule: "ACCEPT1.load"
- a listing file: "ACCEPT1.listing"

**NOTE:** Because our "Test Drive" setup is minimal, other tabs such as "Approvals", "Issues" and "Dependencies" are empty.

You can read more about these features in the IKAN ALM User Guide.

**Results**

**Build: 8**

**Build File Name** DemoZOS\_GIT\_H\_Main\_Package-1\_b7\_BUILDZOS.zip  
**File Size** 17 KB  
**Archive Status** Present

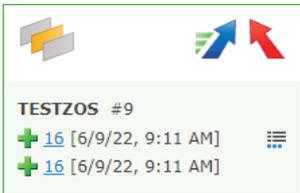
[Expand All](#) | [Collapse All](#)

- [-] DemoZOS\_GIT\_H\_Main\_Package-1\_b7\_BUILDZOS.zip
  - [+] copy
  - [-] listing
    - [-] ACCEPT1.listing, 52382B, 1:10 PM
  - [-] load
    - [-] ACCEPT1.load, 8160B, 1:10 PM
  - [+] properties
  - [+] srb

**NOTE:** Every build results is stored in the build archive (C:\ikan\ALM\_system\buildArchive\DemoZOS\_GIT\Main). On the Build Environment location (C:\ikan\ALM\_environments\DemoZOS\_GIT\build), we left the sources and targets from previous build Level Request as proof for you to see. Normally they are deleted automatically.

# Deploying (promote) the build to the Test and Production environment

In the previous step we have built our source code. Now, we want to deploy that build result to our Test environment and later on to our Production environment. Hence, we need a Test level and a Production level in our project lifecycle.

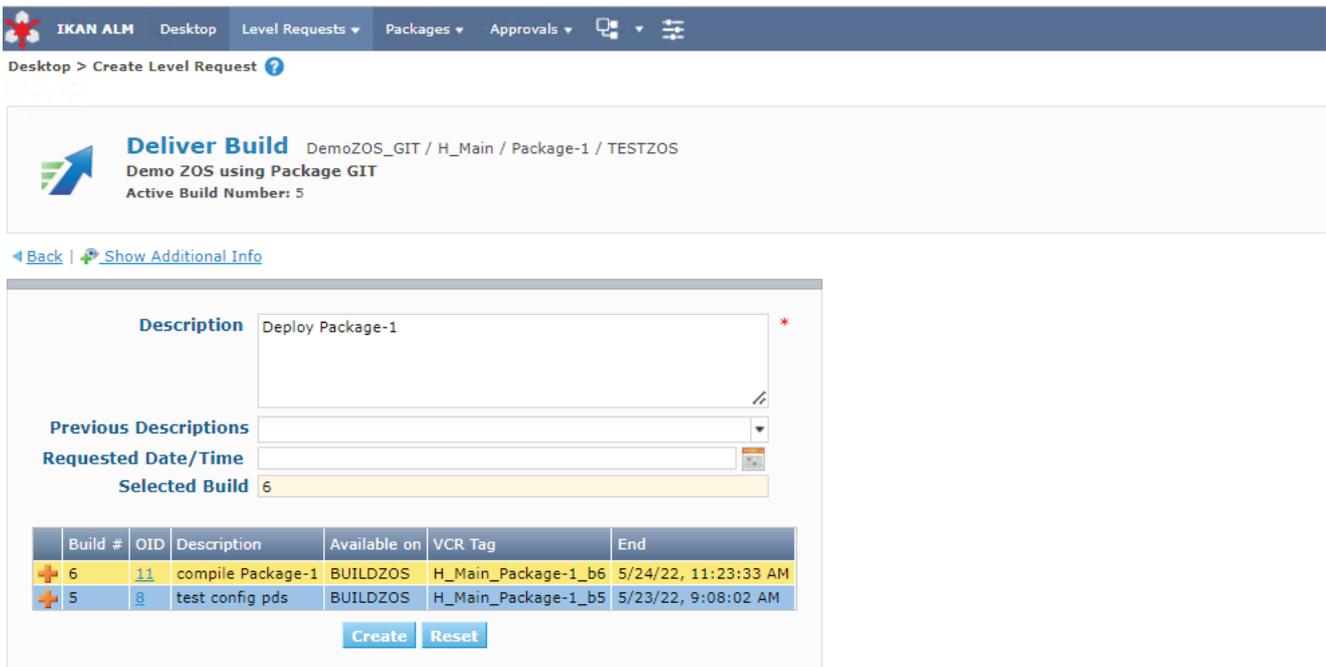


Go to the IKAN ALM Desktop, there you will see a Test level “TESTZOS” tile and a Production level “PRODZOS” tile, as we have already set this up for the “Test Drive”.

Click the “*Deliver*” icon  to initiate the Test (or the Deploy) Level Request.

On the “Deliver Build” page, select your package “Package-1” first.

As you can see the “Deliver Build” screen is almost identical to the “Request Build” screen except that here we can select which build we want to deliver to the Test environment.



Provide a meaningful description, select the latest build by clicking on the table row and hit the “*Create*” button.

**NOTE:** We can only select the build that is available on the build level “BUILDZOS”, that’s because the Test level is the next level after the build level in the project lifecycle. In case we would have selected the deliver to production (in the “PRODZOS” tile) instead, only the build that is on the Test level would be available.

Again we head back to the IKAN ALM Desktop and wait for the level request to finish.

# Verifying the (promote) Deploy Level Request

Click on the first “Level Request OID” link in the "TESTZOS" tile. This will take you to the “Level Request Detail” page.



If you click on the “Phase Logs” tab you will see an ordered list of all the Phases that are used during the build process.

**NOTE:** When we created the deploy level and environment for this “Test Drive”, IKAN ALM automatically set up all required Core Phases on the level and environment. The only thing we had to do was to import the Solution Phases that are specifically made to support the z/OS promote process.

Deploy 7 on machine ikanalm		6/9/22, 9:09:50 AM
OID 7	Start Date/Time	6/9/22, 9:09:50 AM
Environment ZOSTEST	Duration	00:01:34
Machine ikanalm	Status	Success
Deploy Parameters		
> + Transport Build Result		6/9/22, 9:10:41 AM
> + Decompress Build Result		6/9/22, 9:10:41 AM
> + z/OS Copy from Source folder to Target folder		6/9/22, 9:10:41 AM
> + z/OS Demote components and load-modules		6/9/22, 9:10:47 AM
> + z/OS Promote components and load-modules		6/9/22, 9:10:50 AM
> + z/OS Promote Debugger components		6/9/22, 9:11:07 AM
> + z/OS Delete Sources and their associated objects		6/9/22, 9:11:10 AM
> + z/OS DB2 Binds transfer and activation		6/9/22, 9:11:14 AM
> + z/OS Applying SQL files on DB2		6/9/22, 9:11:18 AM
> + z/OS Cics Load-modules activation		6/9/22, 9:11:21 AM
> + Cleanup Build Result		6/9/22, 9:11:24 AM

**NOTE:** On the Deploy Environment location (C:\ikan\ALM\_environments\DemoZOS\_GIT\testdeploy), we left the sources and targets from previous deploy Level Request as proof for you to see. Normally they are deleted automatically.

**This is the end of our very short introduction focused on a typical developer.** We only scratched the surface of the possibilities of using DevOps on the mainframe with IKAN ALM.

In the next part we will show you how the global and project setup was done in IKAN ALM, for those who are interested in the administrative part.

# Part II, The IKAN ALM setup for Administrators

## Global Administration: Initial Overview

Let's start with verifying what is already set up in the IKAN ALM Global Administration after a clean installation. We will describe it shortly, if however, you want to know more about a specific topic, have a look at the respective chapters in the Global Administration part of the IKAN ALM User Guide.

Open IKAN ALM and log in with the following credentials:

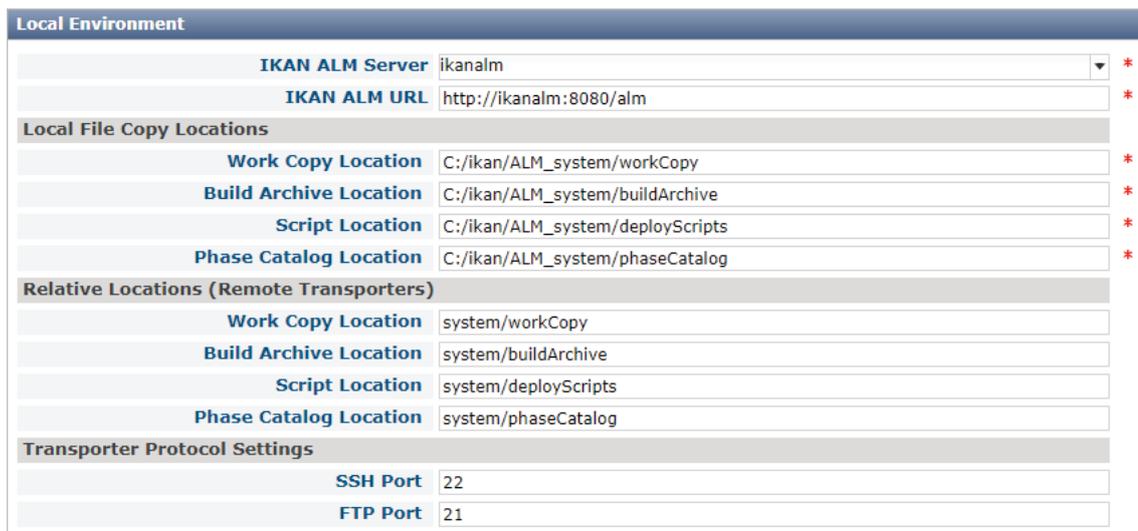
**Username:** global

**Password:** global

Click the "Global Administration" icon  in the menu. In the overview panel click "System Settings".

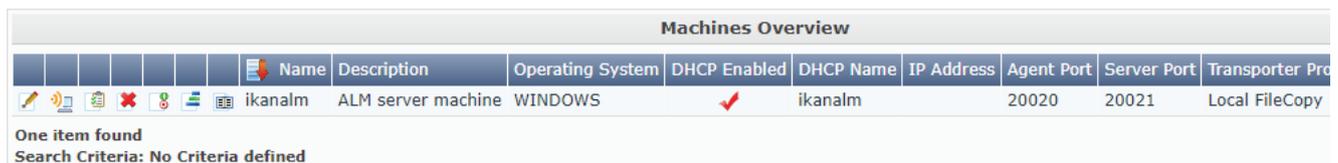
Here you will see the Build Archive Location on the IKAN ALM Server, where all the Build Artifacts (e.g., load modules, deployable archives, ...) will be stored after a successful build, so that they can be deployed later in the lifecycle. It is a local path on the server, something like "C:/ikan/ALM\_system/buildArchive", or "/opt/alm/system/buildArchive".

For the IKAN ALM Core Phases, the Work Copy, Script and Phase Catalog Locations are defined.



Local Environment	
IKAN ALM Server	ikanalm *
IKAN ALM URL	http://ikanalm:8080/alm *
Local File Copy Locations	
Work Copy Location	C:/ikan/ALM_system/workCopy *
Build Archive Location	C:/ikan/ALM_system/buildArchive *
Script Location	C:/ikan/ALM_system/deployScripts *
Phase Catalog Location	C:/ikan/ALM_system/phaseCatalog *
Relative Locations (Remote Transporters)	
Work Copy Location	system/workCopy
Build Archive Location	system/buildArchive
Script Location	system/deployScripts
Phase Catalog Location	system/phaseCatalog
Transporter Protocol Settings	
SSH Port	22
FTP Port	21

Under "Machines > Overview" (in the submenu), you will find the definition of the IKAN ALM machine.



Machines Overview									
	Name	Description	Operating System	DHCP Enabled	DHCP Name	IP Address	Agent Port	Server Port	Transporter Pro
    	ikanalm	ALM server machine	WINDOWS		ikanalm		20020	20021	Local FileCopy

One item found  
Search Criteria: No Criteria defined

If you click the "Edit" icon,  you will see the details of the machine and the connected environments.

There is also an Agent installed on this Machine, and both Agent and Server processes are running as a service. The Agents handle the Build and Deploy actions (bundled as Phases) on a specific Build, Test or Production environment.

### Edit Machine

<b>Name</b>	<input type="text" value="ikanalm"/> *
<b>Description</b>	<input style="width: 90%;" type="text" value="ALM server machine"/>
<b>Operating System</b>	WINDOWS *
<b>DHCP Enabled</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No
<b>DHCP Name</b>	<input type="text" value="ikanalm"/> *
<b>IP Address</b>	<input type="text"/>
<b>Agent Port</b>	<input type="text" value="20020"/>
<b>Server Port</b>	<input type="text" value="20021"/>
<b>Transporter Protocol</b>	Local FileCopy *
<b>Locked</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>Concurrent Deploy Limit</b>	<input type="text" value="0"/> *

[History](#)

If you go back and click the "Installed Phases" icon,  you can see the Current Server Activity and the Current Agent Activity, which should both be active (green icon).

**Current Server Activity:** Idle !

**Show Core Phases**  Yes  No  All

Installed Server Phases		
Name	Version	Core Phase
com.ikanalm.phases.core.level.build	5.9.0	✓
com.ikanalm.phases.core.level.cleanup	5.9.0	✓
com.ikanalm.phases.core.level.deploy	5.9.0	✓
com.ikanalm.phases.core.level.issue.tracking	5.9.0	✓
com.ikanalm.phases.core.level.link.filevisions	5.9.0	✓
com.ikanalm.phases.core.level.retrieve.source	5.9.0	✓
com.ikanalm.phases.core.level.tag	5.9.0	✓
com.ikanalm.phases.core.scripting.scriptingPhase	5.9.0	✓

8 items found, displaying all

**Current Agent Activity:** Idle !

**Show Core Phases**  Yes  No  All

Installed Agent Phases	
Name	Version
com.ikanalm.phases.core.build.archive.result	5.9.0
com.ikanalm.phases.core.build.cleanup.result	5.9.0
com.ikanalm.phases.core.build.cleanup.source	5.9.0
com.ikanalm.phases.core.build.compress.result	5.9.0
com.ikanalm.phases.core.build.transport.deployscript	5.9.0
com.ikanalm.phases.core.build.transport.packageresults	5.9.0
com.ikanalm.phases.core.build.transport.source	5.9.0
com.ikanalm.phases.core.build.verify.buildscript	5.9.0
com.ikanalm.phases.core.deploy.cleanup.buildfiles	5.9.0
com.ikanalm.phases.core.deploy.decompress.buildresult	5.9.0
com.ikanalm.phases.core.deploy.transport.buildresult	5.9.0
com.ikanalm.phases.core.deploy.verify.deployscript	5.9.0
com.ikanalm.phases.core.scripting.scriptingPhase	5.9.0
com.ikanalm.phases.mainframe.zosBindDb2	2.1.0
com.ikanalm.phases.mainframe.zosCompilation	2.1.0
com.ikanalm.phases.mainframe.zosCopyForCompilation	2.1.0
com.ikanalm.phases.mainframe.zosCopySourceToTarget	2.1.0
com.ikanalm.phases.mainframe.zosDeleteObsoleteFiles	2.1.0
com.ikanalm.phases.mainframe.zosDemotion	2.1.0
com.ikanalm.phases.mainframe.zosPromotion	2.1.0
com.ikanalm.phases.mainframe.zosSqlDb2	2.1.0
com.ikanalm.phases.mainframe.zosUpdateCics	2.1.0
com.ikanalm.phases.mainframe.zosUpdateDebugger	2.1.0

23 items found, displaying all

Under "Scripting Tools > Overview" (in the submenu), you can see that the "ANT 1.10.10" scripting tool is defined. This tool is used by IKAN ALM to execute Build and Deploy scripts. Click the "Edit" icon,  for more details.

Scripting Tools Overview				
		Name	Type	Description
		ANT1.10.10	ANT	Ant build tool
		NANT0.92	NANT	NAnt build tool

2 items found, displaying all  
Search Criteria: No Criteria defined

The Git repository is another key component in our Demo project setup. IKAN ALM uses this repository to monitor and retrieve the sample code files.

Under "Version Control Repositories > Overview", you can click the "Edit" icon  on the "demozos" entry for more details.

### Edit Git Repository

<b>Name</b>	<input type="text" value="demozos"/>	*
<b>Description</b>	<input style="width: 90%;" type="text" value="DemoZOS internal Git"/>	
<b>Command Path</b>	<input type="text" value="C:/ikan/ALM_system/PhaseTools/git-2.35.1/bin"/>	*
<b>Cache Location</b>	<input type="text" value="C:/ikan/ALM_system/gitCache/demozos"/>	*
<b>Repository URL</b>	<input type="text" value="file:///C:/ikan/repositories/git/demozos.git"/>	*
<b>Repository Push URL</b>	<input type="text"/>	
<b>Default Branch Name</b>	<input type="text" value="master"/>	*
<b>User ID</b>	<input type="text"/>	
<b>Password</b>	<input type="password" value="....."/>	
<b>Repeat Password</b>	<input type="password" value="....."/>	
<b>Time-Out (Sec.)</b>	<input type="text" value="360"/>	*
<b>Omit Blobs When Cloning</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No	

[\\_History](#)

Connected Projects				
Name	Description	Project Type	Locked	Hidden
DemoZOS_GIT	Demo ZOS using Package GIT	Package-based		

One item found

## Looking at the z/OS Project

In the Project Administration context, select "Project > Project Administration" and select the "DemoZOS\_GIT" project we created.

The screenshot shows the IKAN ALM Project Administration interface. The top navigation bar includes 'IKAN ALM', 'Desktop', 'Level Requests', 'Packages', 'Approvals', and a dropdown menu. Below this, a breadcrumb trail shows 'DemoZOS\_GIT' > 'History Log' > 'Project Stream' > 'Lifecycles' > 'Levels' > 'Build Environments' > 'Deploy Environments' > 'Audit Project'. The main content area is titled 'Project Administration > Project Info'. The 'Project Info' panel displays the following details:

- Name:** DemoZOS\_GIT
- Description:** Demo ZOS using Package GIT
- Project Type:** Package-based
- Locked:** No
- Hidden:** No
- VCR:** demozos
- VCR Project Name:** Check Project Name in the VCR
- Issue Tracking System:** Build Script (build.xml), Deploy Script (deploy.xml)
- Security Settings (optional):** User Access (ALM User), Admin Access (ALM Administrator)

At the bottom of the panel are buttons for 'History', 'Clone Project', 'Lock', 'Edit', 'Refresh', and 'Back'. To the right of the main panel is a sidebar with several sections:

- Administration:** History Log, Audit Project
- Levels:** Create B..., Create T..., Create P..., Overview
- Project Streams:** Create Branch, Overview
- Build Enviro:** Create, Overview, Build Pai
- Lifecycles:** Create, Overview
- Deploy Envir:** Create, Overview, Deploy P

The Project Type is Package-based. A Package allows moving one or more individual files selected manually from a VCR stream, this is a common way of working on the mainframe.

You can see that the Git repository "demozos" is connected to this project.

As mentioned in the first part: together with the Project, a Head Project Stream is created that points to the master branch of the project in Git.

If you go to "Project Streams > Overview", then click the "Edit" icon  and then click the "Edit" button on the "Project Stream Info" panel.

Here you can see all the options defined such as "Prefix", "Build Type", "Accept Forced Build", etc...

All of this is explained in the User Guide.

The screenshot shows the 'Edit Project Stream' dialog box with the following configuration:

- Prefix:** Main
- Status:** Stable
- Description:** HEAD for DEMOMVS
- Locked:**  Yes  No
- Hidden:** No
- Tag-Based:** No
- Build Type:** Full Build
- Highest Build Number:** 0
- Accept Forced Build:** No
- Tag Template:** \${streamType}\_\${prefix}\_\${package}
- Lifecycle:** BASE

At the bottom of the dialog are buttons for 'Save', 'Refresh', and 'Cancel'.

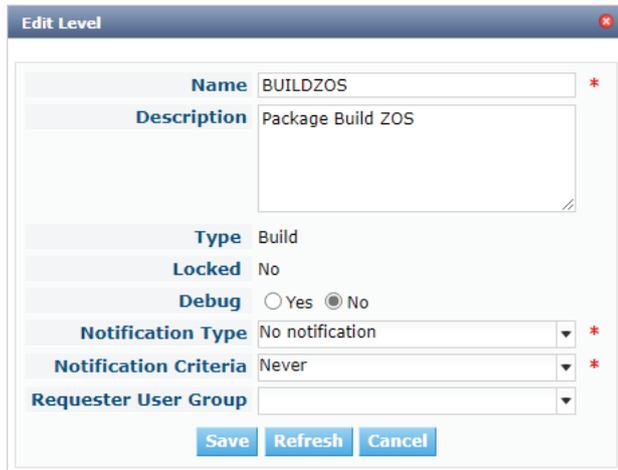
## The Build Level

A Build Level is the first level in the lifecycle and is responsible for building your code.

Under "*Lifecycles > Overview*" you will notice the BASE Lifecycle which is linked to the main Project Stream.

Click the "Edit" icon  next to this Lifecycle, you will see all the levels that are connected to this BASE lifecycle.

Click the "Edit" icon  on the "BUILDZOS" level, this is the Build Level. On the "Level Info" panel click the "*Edit*" button.



The screenshot shows the 'Edit Level' dialog box for the 'BUILDZOS' level. The fields are as follows:

- Name:** BUILDZOS \*
- Description:** Package Build ZOS
- Type:** Build
- Locked:** No
- Debug:**  Yes  No
- Notification Type:** No notification \*
- Notification Criteria:** Never \*
- Requester User Group:** (empty dropdown)

Buttons at the bottom: Save, Refresh, Cancel.

Most fields speak for themselves (let's ignore the Notification, Schedule and Requester fields for now).

Activating the Debug option makes it easier to track things in the beginning, especially when a Build fails. Once everything runs smoothly, you can disable it.

Click the "*Cancel*" button.

When we create a level, the Phases linked to that Level are automatically created as well. Those Phases will be executed when a Level Request is initiated.

You can see the Phases by selecting the "Edit Phases" link underneath the "Phases Overview" panel.

Phases Overview								
				Phase Name	Phase Version	Fail On Error	Next Phase On Error	Description
				Retrieve Code	5.9.0	Yes	Cleanup Work Copy	
				Build	5.9.0	Yes	Cleanup Work Copy	
				Tag Code	5.9.0	Yes	Cleanup Work Copy	
				Link File Revisions	5.9.0	No	Cleanup Work Copy	
				Cleanup Work Copy	5.9.0	No		

## The Build Environment

A (Build) Level is a conceptual step in the Lifecycle. We still need a physical machine to execute our Build on, so we have to link a Build Environment (the machine we will build on) to the Build Level.

Click "*Build Environments > Overview*", then click the "Edit" icon  for the "ZOSBUILD" environment.

**Build Environment Info**

<b>Name</b>	ZOSBUILD	<b>Build Tool</b>	ANT1.10.10
<b>Level</b>	BUILDZOS	<b>Source Location</b>	C:/ikan/ALM_environments/DemoZOS_GIT/build
<b>Machine</b>	ikanalm	<b>Target Location</b>	C:/ikan/ALM_environments/DemoZOS_GIT/build

[History](#) [View Parameters](#) [Edit](#) [Back](#)  
[Clone](#)

Phases Overview			
Phase Name	Phase Version	Fail On Error	Next Phase On Error
Transport Source	5.9.0	Yes	Cleanup Source
z/OS Copy from Source folder to Target folder	2.1.0	Yes	Cleanup Source
z/OS Copy Sources to z/OS for compilation	2.1.0	Yes	Cleanup Source
z/OS Maps and Programs compilation	2.1.0	No	Compress Build
Compress Build	5.9.0	Yes	Cleanup Source
Archive Result	5.9.0	Yes	Cleanup Source
Cleanup Source	5.9.0	No	Cleanup Result
Cleanup Result	5.9.0	No	

[Edit Phases](#)

Just as for the Level, the Phases linked to the Environment are created together with the Build Environment. They will be executed when the Build of a Level Request will be executed on the IKAN ALM Agent.

IKAN ALM always starts by transferring the sources to the "Source location" and placing the result in the "Target Location". These locations are automatically cleaned up when the Level Request has finished, unless we have chosen to use the debug function.

**NOTE:** The source and target locations can be chosen freely. In our example it is "C:/ikan/ALM\_environments/DemoZOS\_GIT/build/".

**NOTE:** In order to distinguish Levels from Environments, we use uppercase for the level and lowercase for the environment directories. Levels and Environments can have the same name.

If you click the "Edit" button in the "Build Environment Info" panel, you can see we have set "Downloadable Build" option to "Yes", so we are able to download the build result.

## The Build Environment and Phases parameters

Phases can -or sometimes must- be provided with additional information in the form of parameters. For example: a Phase may need a location of a specific resource. This enables a high level of customization without the need to alter the Phase's inner mechanics. The Phase parameters make it possible to customize the build and deploy process with minimum effort and without the need of programming skills.

Phase parameters can be set on various entities: Machines, Environments and Phases, following a cascading order.

For the z/OS solution we are working with Phase Models, Resources and Scripts that are tailored to the client's main-frame environment and integrated into IKAN ALM by the z/OS Phases and Phase parameters.

## Auditing the Project

When creating or making changes to a level, IKAN ALM automatically blocks the level and requires the user to run a project audit prior to using it. This project audit is a verification process performed by IKAN ALM which checks the project setup consistency.

On the overview, you will see most of the different objects we created.

The information screen for our Project displays the Build Archive of the Head Project Stream (where our future Builds will be stored) and the Build Level containing one Build Environment on the IKAN ALM Agent, where the build will be executed.

**Project Administration > Audit Project** ?

**INFO: THE PROJECT CONFIGURATION IS CONSISTENT.**

**Actions**

No actions available

**Project Streams**

Project Stream	Description	Locked	Build Archive Location	Message
H_Main	HEAD for DEMOMVS		C:/ikan/ALM_system/buildArchive/DemoZOS_GIT/Main	

**Environments**

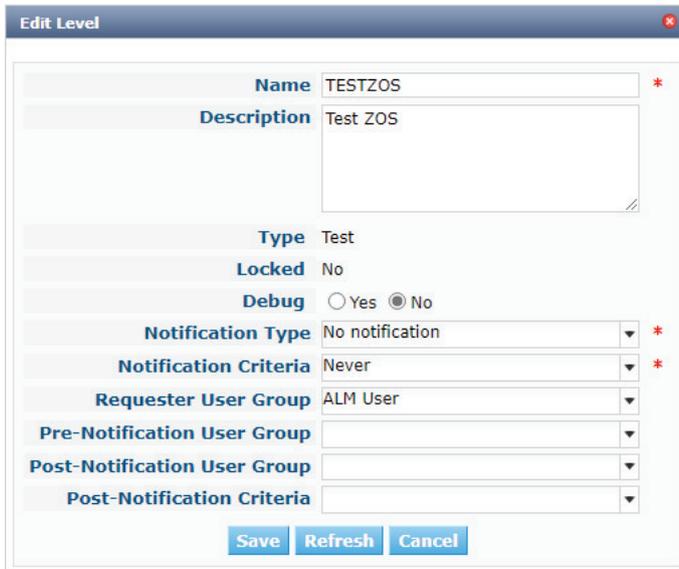
Environment	Level	Locked	Machine	Target	Message
ZOSBUILD	BUILDZOS		ikanalm	C:/ikan/ALM_environments/DemoZOS_GIT/build/target	
ZOSPROD	PRODZOS		ikanalm	C:/ikan/ALM_environments/DemoZOS_GIT/proddeploy/target	
ZOSTEST	TESTZOS		ikanalm	C:/ikan/ALM_environments/DemoZOS_GIT/testdeploy/target	

## The Test (and Production) Level

A Test Level is the next level (in our lifecycle) after the Build Level and is responsible for delivering the build to the Test department. Likewise a Production Level is the next level after the Test Level. Since Test Levels and Production Levels are similar, apart from the notification options, this topic applies to both.

In the Project Administration section, edit the Project.

Go to “Levels > Overview”, click the “Edit” icon  for the “TESTZOS” level and then click the “Edit” button on the “Level Info” panel.

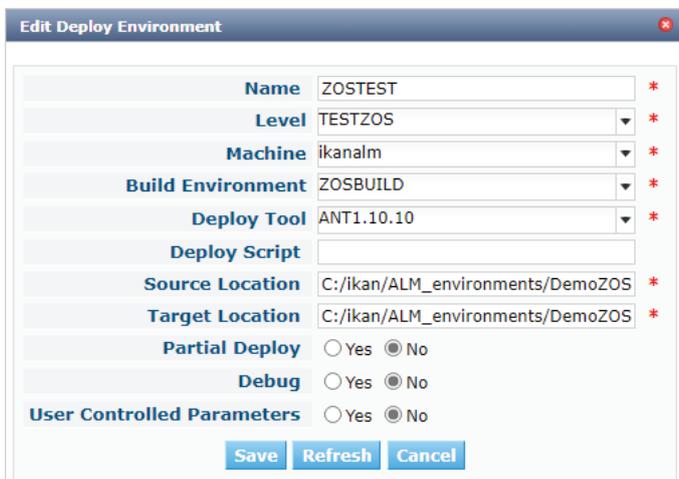


Name	TESTZOS
Description	Test ZOS
Type	Test
Locked	No
Debug	<input type="radio"/> Yes <input checked="" type="radio"/> No
Notification Type	No notification
Notification Criteria	Never
Requester User Group	ALM User
Pre-Notification User Group	
Post-Notification User Group	
Post-Notification Criteria	

## The Deploy Environment

Similar to Build Level, the Test Level (or Production Level) is just a conceptual step in the lifecycle. We need a physical Machine to which we can deploy our Build result, so we need to link a Deploy Environment to the Level.

Go to “Deploy Environments > Overview”, click the “Edit” icon  for the “ZOSTEST” environment and then click the “Edit” button on the “Deploy Environment Info” panel.



Name	ZOSTEST
Level	TESTZOS
Machine	ikanalm
Build Environment	ZOSBUILD
Deploy Tool	ANT1.10.10
Deploy Script	
Source Location	C:/ikan/ALM_environments/DemoZOS
Target Location	C:/ikan/ALM_environments/DemoZOS
Partial Deploy	<input type="radio"/> Yes <input checked="" type="radio"/> No
Debug	<input type="radio"/> Yes <input checked="" type="radio"/> No
User Controlled Parameters	<input type="radio"/> Yes <input checked="" type="radio"/> No

This is almost similar to a Build Environment.

The deploy will be executed by the IKAN ALM Agent on the selected Machine. We have “ZOSBUILD” selected as “Build Environment” to indicate that we want to deploy the result of our Build Environment to our Deploy Environment.

The Build result previously created will be extracted in the “Source Location”.

You can view the Phases that will be executed during the deployment (Level Request) to this Deploy Environment in the “Phases Overview” panel.

## Creating the Deploy Parameters

What we did earlier for the Build parameters, should also be done for the deploy parameters on the Deploy Environment and on the deployment Phases.

We have set these already according to our z/OS Demo project setup.

You can see them by going to “Deploy Environments > Deploy Parameters” for the environment and for the machine by going to “Global Administration > Machines > Machine Parameters”.

Parameters Overview							
Environment	Type	Machine	Actions	Key	Value	Description	
ZOSPROD	Deploy	ikanalm		ftp.active	true;false		
				propsfile.objtypes	\${dir.zosResources}/globalObjtypes.properties		
				propsfile.environment	\${dir.zosResources}/DEPLOY/Prod/environment_deploy...		
				undoDeployment	false>true;deletion		Undo Deployment
				dir.zosResources	C:/ikan/ALM_system/ZOS/PhaseResources		ZOS resource files
				dir.zosModels	C:/ikan/ALM_system/ZOS/PhaseModels/DEPLOY		Phase Models
ZOSTEST	Deploy	ikanalm		ftp.active	true;false		
				propsfile.objtypes	\${dir.zosResources}/globalObjtypes.properties		
				propsfile.environment	\${dir.zosResources}/DEPLOY/Test/environment_deploy...		
				undoDeployment	false>true;deletion		Undo Deployment
				dir.zosResources	C:/ikan/ALM_system/ZOS/PhaseResources		ZOS resource files
				dir.zosModels	C:/ikan/ALM_system/ZOS/PhaseModels/DEPLOY		Phase Models

12 Parameters in 2 Environments found, displaying all  
 Search Criteria: Parameter Type - Deploy

## Auditing the Project

Just as for the Build Level, we needed to audit the project first to unlock the Test and Prod Levels.

# The z/OS solution Phases

Phases represent specific tasks or actions that must be performed on the Levels and Environments.

IKAN ALM comes with a set of “Core” Phases, “Solution Phases” such as the z/OS Phases, but you can also create your own “Custom Phases” which gives you endless possibilities.

The main advantage of using Phases is that they allow you to customize your project's workflow with reusable building blocks. On top of that, they can be shared and distributed onto local and remote machines.

We will shortly cover the three major components: the Phases, the Resource files and the Model files that are used by the z/OS solution on IKAN ALM.

## Phases

The z/OS Phases are used to run different z/OS tasks. Most of these Phases will generate JCL that will be submitted for execution on the z/OS mainframe machine.

## Models

For the previously mentioned JCL generation we use predefined JCL Models. See the sample below for a sample JCL Model for a CICS pre-compile compilation.

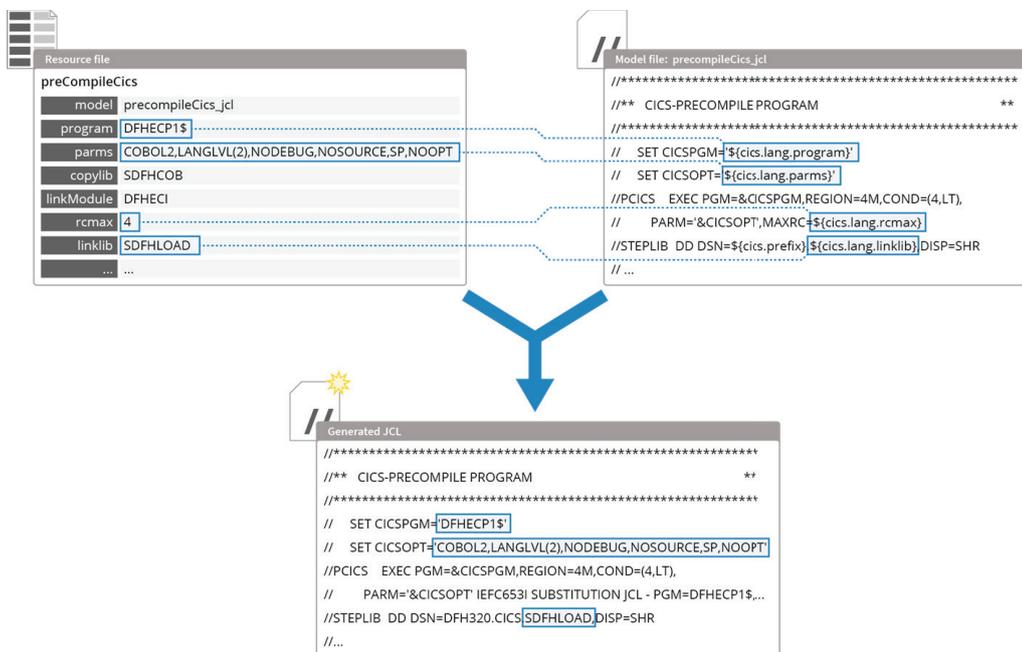
```
//*****  
//**   CICS-PRECOMPILE PROGRAM                               **  
//*****  
//   SET CICSPPGM='${cics.lang.program}'  
//   SET CICSOPT='${cics.lang.parms}'  
//PCICS EXEC PGM=&CICSPPGM,REGION=4M,COND=(4,LT),  
//   PARM='&CICSOPT',MAXRC=${cics.lang.rcmax}  
//STEPLIB DD DSN=${cics.prefix}.${cics.lang.linklib},DISP=SHR  
//SYSPRINT DD SYSOUT=*  
//*SYSPRINT DD DISP=(MOD,PASS),DSN=&&PCMPLIST,  
//*   UNIT=SYSDA,SPACE=(CYL,(10,10)),  
//*   DCB=(RECFM=FBA,LRECL=133,BLKSIZE=0)  
//SYSPUNCH DD DSN=&&SYSCIN,DISP=(,PASS),  
//   UNIT=${env.zos.unit},DCB=BLKSIZE=400,  
//   SPACE=(400,(400,400))  
//SYSIN DD DSN=&&&SRCOMPIL,DISP=(OLD,PASS)  
//   SET SRCOMPIL=SYSCIN
```

## Resource files

The JCL Model files have parameters defined (e.g. `$(cics.lang.program)`) that are substituted by the values from the Resource files. Below is a sample of some properties in a CICS Build resource file.

```
# -----  
#   Properties for CICS  
# -----  
cics.name=CICSTEST  
cics.TOR.name=CICTTEST  
cics.FOR.name=CICFTEST  
cics.prefix=DFH320.CICS
```

When we combine these three components we get the following:



For this Demo project setup we have already defined everything. In order to use the z/OS solution in your company's environment, you will need to adapt the model and resource files.

## More information

For more in-depth information, refer to the following documentation:

- IKAN ALM User Guide
- How to Guide - Using and Developing Custom Phases in IKAN ALM
- IKAN ALM Installation Guides

You can find those documents on our website <https://docs.ikanalm.com>

If you still did not find all the answers to your questions, do not hesitate to contact us at:

<https://www.ikanalm.com/contact-us.html>

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