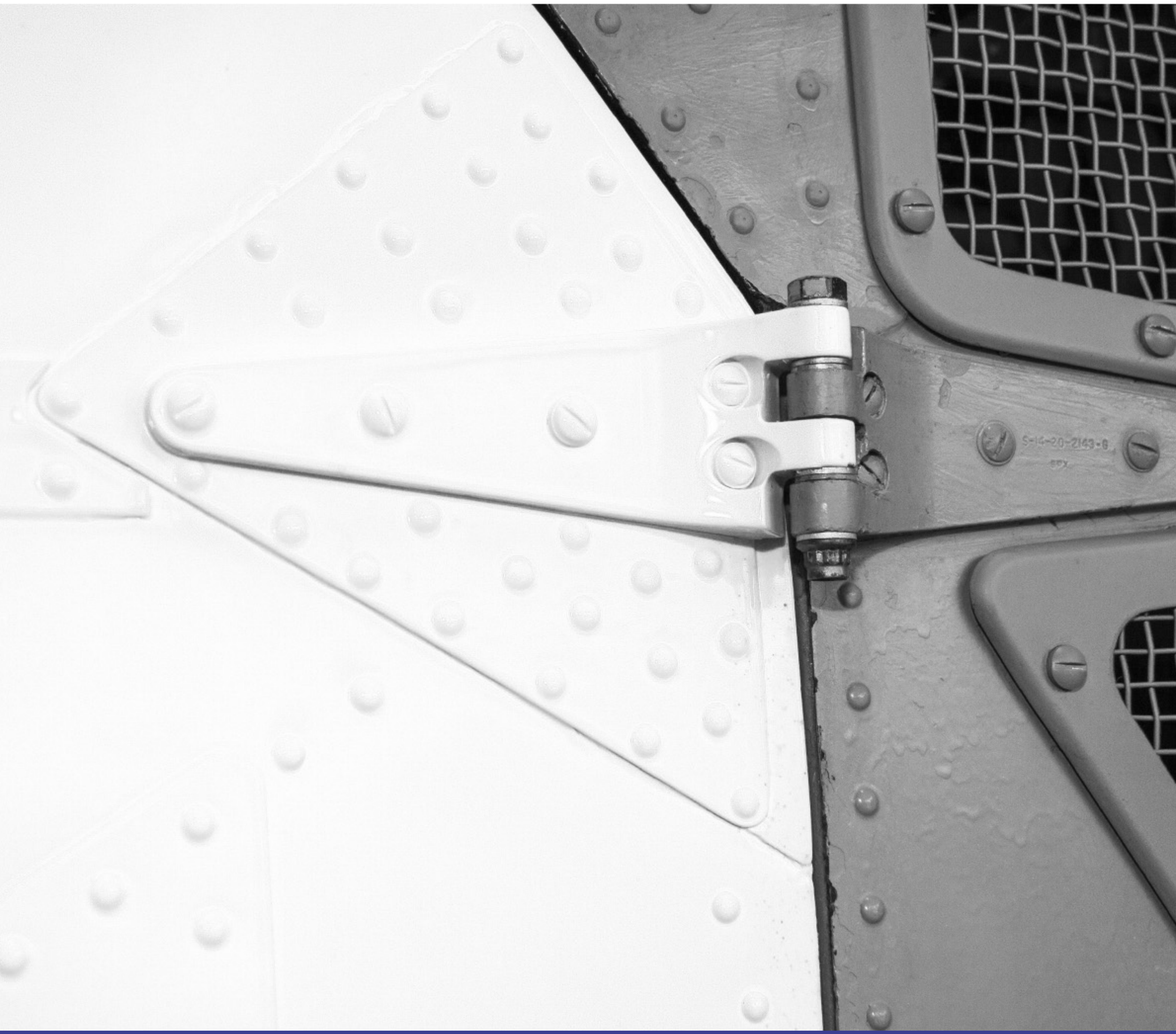
Integrating Kobee and Mainframes

Cost-effective and easy to implement Enterprise-wide ALM for both mainframe and non-mainframe environments



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Summary

This technical document is intended for developers, technical people, mainframe or non-mainframe experts, and software architects.

Kobee is a web-based Application Lifecycle Management tool. It combines continuous integration and lifecycle management, offering a single point of control and delivering support for build and deploy processes (manually generated or automated), approval processes, release management, and software lifecycles. Kobee tightly integrates with leading third-party versioning solutions, build and deploy tools, and issue tracking software. It supports both mainframe and non-mainframe systems and, in case of mixed environments, it will handle the dependencies between both systems.

This document aims at explaining how, by using Kobee, you can manage your application lifecycle, be it on mainframe or on distributed systems or on a combination of the two, and how you can easily deploy the developed applications on the mainframe.

We will describe in detail how Kobee works and what the different tasks are for Users and Administrators.

We are confident that after having read this document, you will be convinced of the enormous advantages of putting in place our Kobee solution.

If you would still have questions, do not hesitate to contact us.

Remark: Although Kobee supports many types of mainframes (IBM, Fujitsu, Unisys, Bull,..), we will use IBM z/OS as an example throughout this document.

Kobee: The Ideal ALM Solution for the Mainframe

In the following section, we will explain more in detail how Kobee handles the lifecycle to compile and deploy your applications on the mainframe.

Today, traditional mainframe development is already often enhanced with Eclipse-based development to address the requirements of modern end-user applications. The main issue when combining mainframe and distributed development, is how to deploy the developed applications on the mainframe.

We will cover 2 points of view: the Kobee User and the Kobee Administrator.

User

A User creates/updates packages to compile and deploy (promote) one or more programs he developed.

Administrator

The initial Kobee setup for the mainframe and the project setup are done by the Kobee Administrator.

Kobee – User’s Point of View

Once the initial setup has been done and the projects have been set up by the Kobee Administrator, a User can start using Kobee.

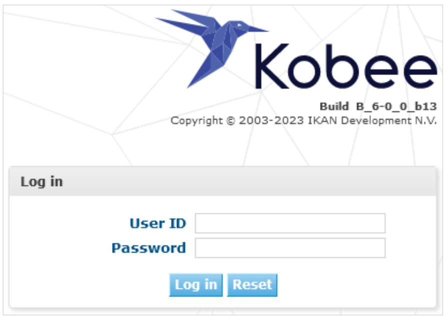
Basically, a User can create a Compile/Build or Deploy action (a “Level Request” in Kobee terminology) in 4 steps:

1. Log on to Kobee and display the Desktop Overview
2. Create or update a package and link it to a Project Stream
3. Select the appropriate Action (Compile/Build or Deploy)
4. Create the Level Request

Once the Level Request is created, a series of information screens will be available to provide additional information on the requested action, allowing following up its status and the results.

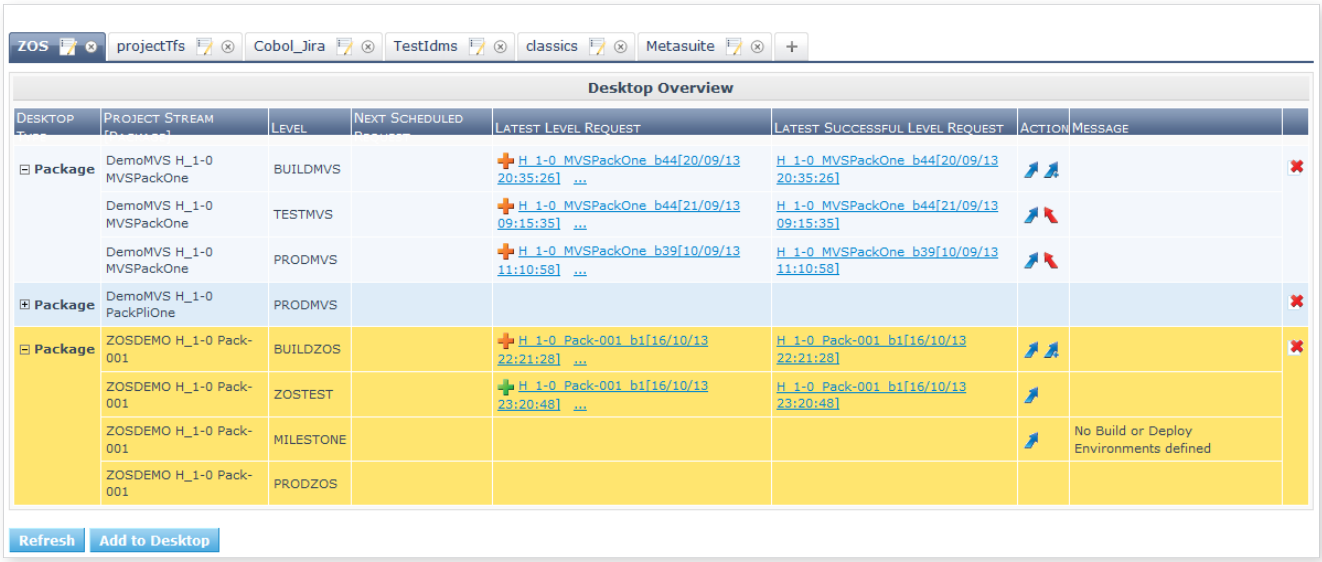
Step 1

Step1: Log on and display the Desktop Overview



Kobee logon screen

Next, the Desktop Overview will be displayed showing the list of Project Streams or Packages the User is working with. This Desktop can be completely customized.



Desktop Overview

Desktop	Project Stream	Level	Next Scheduled	Latest Level Request	Latest Successful Level Request	Action	Message	
⊟ **Package**	DemoMVS H_1-0 MVSPackOne	BUILDMVS		H_1-0_MVSPackOne_b44[20/09/13 20:35:26] ...	H_1-0_MVSPackOne_b44[20/09/13 20:35:26]	↗ ↗		✖
	DemoMVS H_1-0 MVSPackOne	TESTMVS		H_1-0_MVSPackOne_b44[21/09/13 09:15:35] ...	H_1-0_MVSPackOne_b44[21/09/13 09:15:35]	↗ ↖		
	DemoMVS H_1-0 MVSPackOne	PRODMVS		H_1-0_MVSPackOne_b39[10/09/13 11:10:58] ...	H_1-0_MVSPackOne_b39[10/09/13 11:10:58]	↗ ↖		
⊞ **Package**	DemoMVS H_1-0 PackPliOne	PRODMVS						✖
⊟ **Package**	ZOSDEMO H_1-0 Pack-001	BUILDZOS		H_1-0_Pack-001_b1[16/10/13 22:21:28] ...	H_1-0_Pack-001_b1[16/10/13 22:21:28]	↗ ↗		✖
	ZOSDEMO H_1-0 Pack-001	ZOSTEST		H_1-0_Pack-001_b1[16/10/13 23:20:48] ...	H_1-0_Pack-001_b1[16/10/13 23:20:48]	↗		
	ZOSDEMO H_1-0 Pack-001	MILESTONE				↗	No Build or Deploy Environments defined	
	ZOSDEMO H_1-0 Pack-001	PRODZOS						

Desktop Overview for the z/OS project

The following basic information will be displayed:

- **Project type:** release-based or package-based
- **Project Stream (package) name**
- **Defined Levels:**
  A level is a logical step in the application lifecycle. The available levels are: Build (Compile), Test and Production. One or more of each of those levels can be used to define a lifecycle.

- **Next Scheduled Request:**
  If a Schedule was assigned to a Level (like in continuous integration) this field contains the execution date and time of the next request.
- **Latest Level Request:** shows the status of the latest request, the VCR tag and timestamp.
- **Latest successful Level Request:** shows the latest successful level request
- **Action:** the available action icons for the Level. When clicking an action button, a level request will be started.
- **Message:** if it is not possible to define a request for a specific level, this message indicates the reason.

The z/OS project we use here as an example is a package-based project for which the following Levels have been defined: a Build Level (BUILDZOS) and some Deploy Levels (ZOSTEST, MILESTONE and PRODZOS). Those Levels are linked to Lifecycle(s), and the Project Stream(s) (i.e., the Head or a Branch) is/are also linked to a Lifecycle.

For mainframe use, a project must be package-based. A package allows the User to select one or several components of a Project Stream which should be built and deployed together, ignoring the other Project Stream components. Such a package has to stay coherent for building and deploying. A Package (of components) will always be linked to a Project Stream (in our example: ZOSDEMO H_1.0 Pack-001) and it will always follow that Project Stream's lifecycle. Also, a package has to progress with the Project Stream's lifecycle independently of possible other packages linked to the same Project Stream.

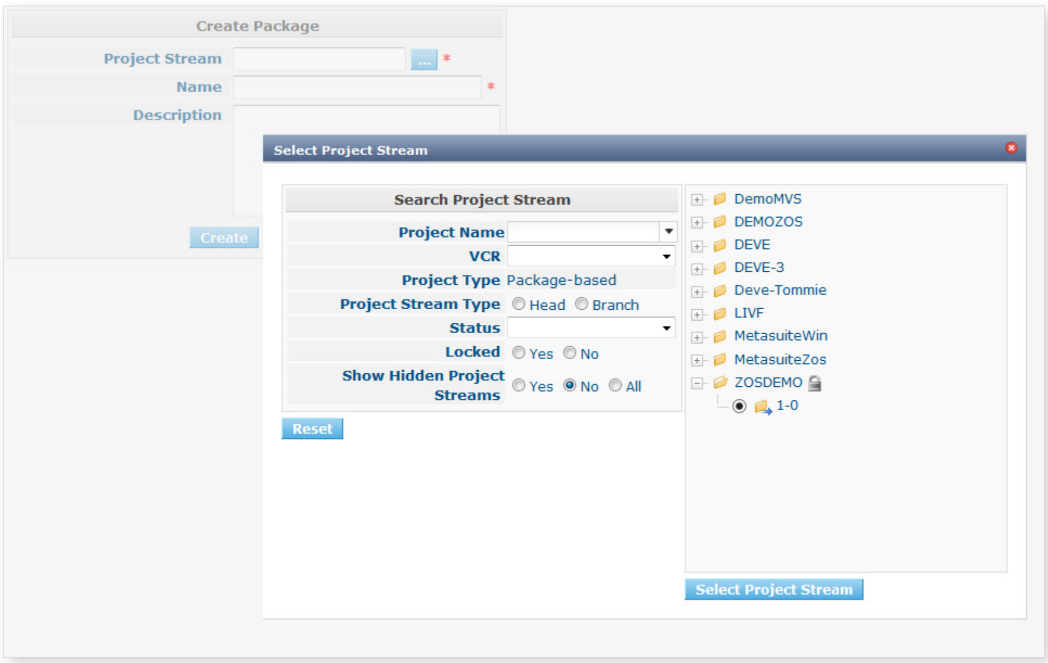
For distributed release-based projects, on the other hand, all components are built and deployed together.

Step 2

Step 2: Create/update a package and link it to a Project Stream

Before compiling/building, the User has to create a package that contains the sources he wants to compile/build and the copybooks.

1. First of all, the User has to specify the link to the correct Project Stream.



Create Package

Project Stream	… *
Name	*
Description	

Create

Select Project Stream

Search Project Stream

Project Name	
VCR	
Project Type	Package-based
Project Stream Type	○ Head ○ Branch
Status	
Locked	○ Yes ○ No
Show Hidden Project Streams	○ Yes [✓ No] ○ All

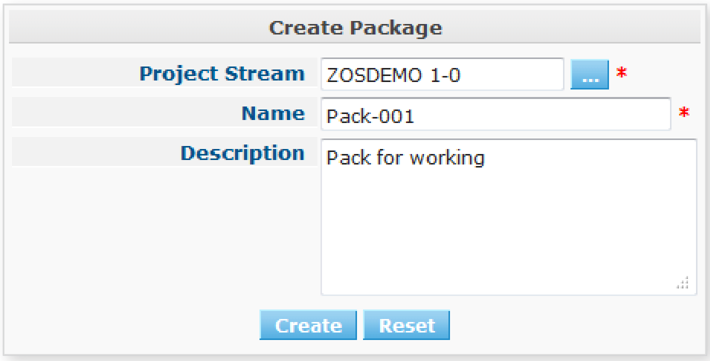
Reset

- DemoMVS
- DEMOZOS
- DEVE
- DEVE-3
- Deve-Tommie
- LIVF
- MetasuiteWin
- MetasuiteZos
- ZOSDEMO
  - [✓ 1-0]

Select Project Stream

Select Project Stream

2. Next, he has to specify the name and description for the Package.

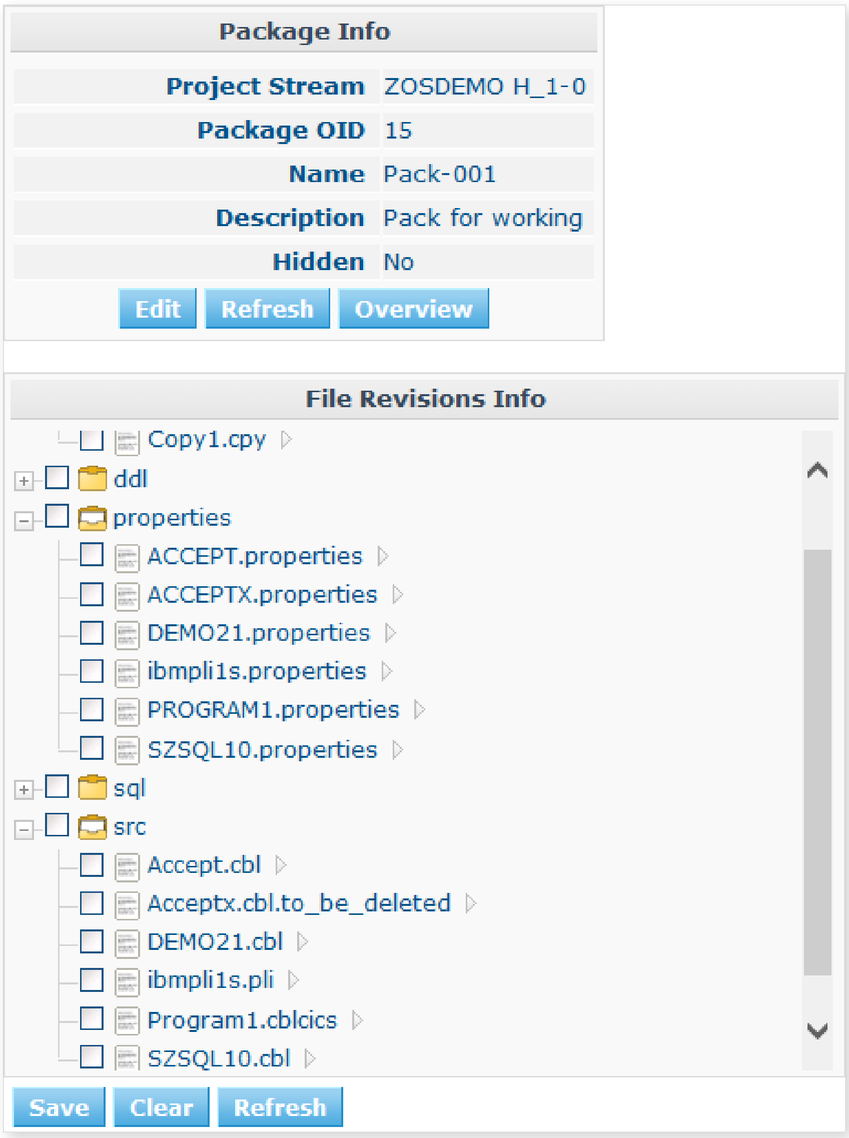

Create Package

Project Stream	ZOSDEMO 1-0 *
Name	Pack-001 *
Description	Pack for working

Create Package

3. Once that is done, the User can select the required programs.
Kobee will display all the files available for the selected Project Stream. The User can select the files and indicate the required revision number. Many types of files can be selected, built and deployed in the same process. (i.e., JCLs, Procs, Maps, Sysin, SQL, Sources with Assemble, COBOL, Pl/1 languages, IDMS entities,..).

The following figure shows the package information before selection.


Package Info

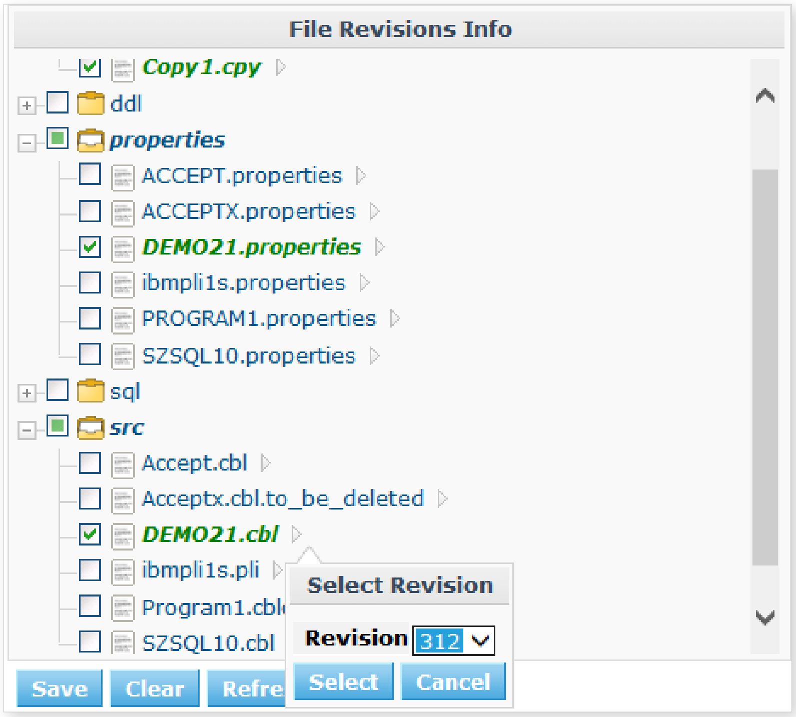
Project Stream	ZOSDEMO H_1-0
Package OID	15
Name	Pack-001
Description	Pack for working
Hidden	No

File Revisions Info

```
    Copy1.cpy
+ ddl
- properties
    ACCEPT.properties
    ACCEPTX.properties
    DEMO21.properties
    ibmpli1s.properties
    PROGRAM1.properties
    SZSQL10.properties
+ sql
- src
    Accept.cbl
    Acceptx.cbl.to_be_deleted
    DEMO21.cbl
    ibmpli1s.pli
    Program1.cblcics
    SZSQL10.cbl
```

Package info before selection

The next figure shows the package information after the selection of the required files.

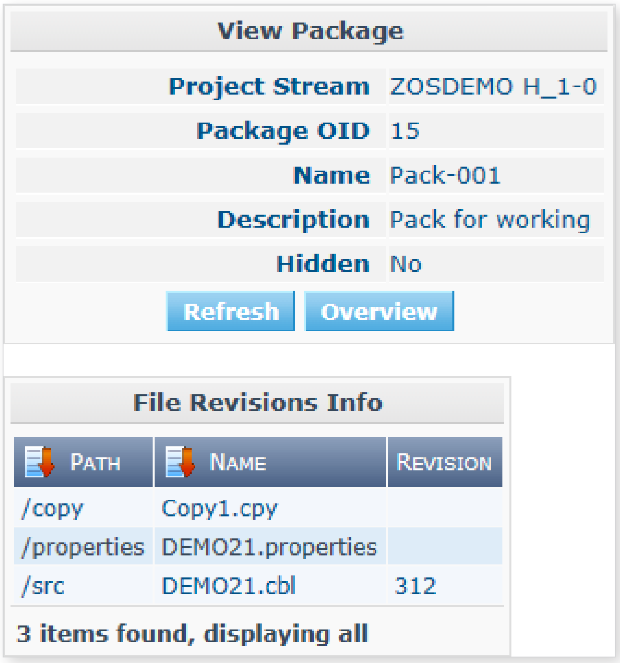


- ✓ Copy1.cpy
- ddl
- properties
  - ACCEPT.properties
  - ACCEPTX.properties
  - ✓ DEMO21.properties
  - ibmpli1s.properties
  - PROGRAM1.properties
  - SZSQL10.properties
- sql
- src
  - Accept.cbl
  - Acceptx.cbl.to_be_deleted
  - ✓ DEMO21.cbl
  - ibmpli1s.pli
  - Program1.cbl
  - SZSQL10.cbl

Revision 312

Package info after selection

The final Package content would look as follows:



Project Stream	ZOSDEMO H_1-0
Package OID	15
Name	Pack-001
Description	Pack for working
Hidden	No

PATH	NAME	REVISION
/copy	Copy1.cpy	
/properties	DEMO21.properties	
/src	DEMO21.cbl	312

3 items found, displaying all

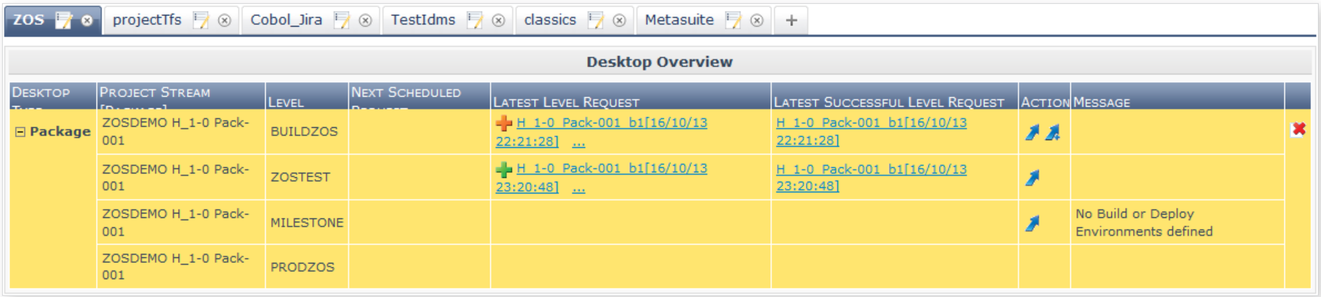
View package

Once the Kobee User has defined the package, he can start building/compiling and, next, promoting or deploying his programs.

Step 3

Step 3: Select the required Action

To execute a build/compile or deploy, the User can simply click the required action button in the Action column.



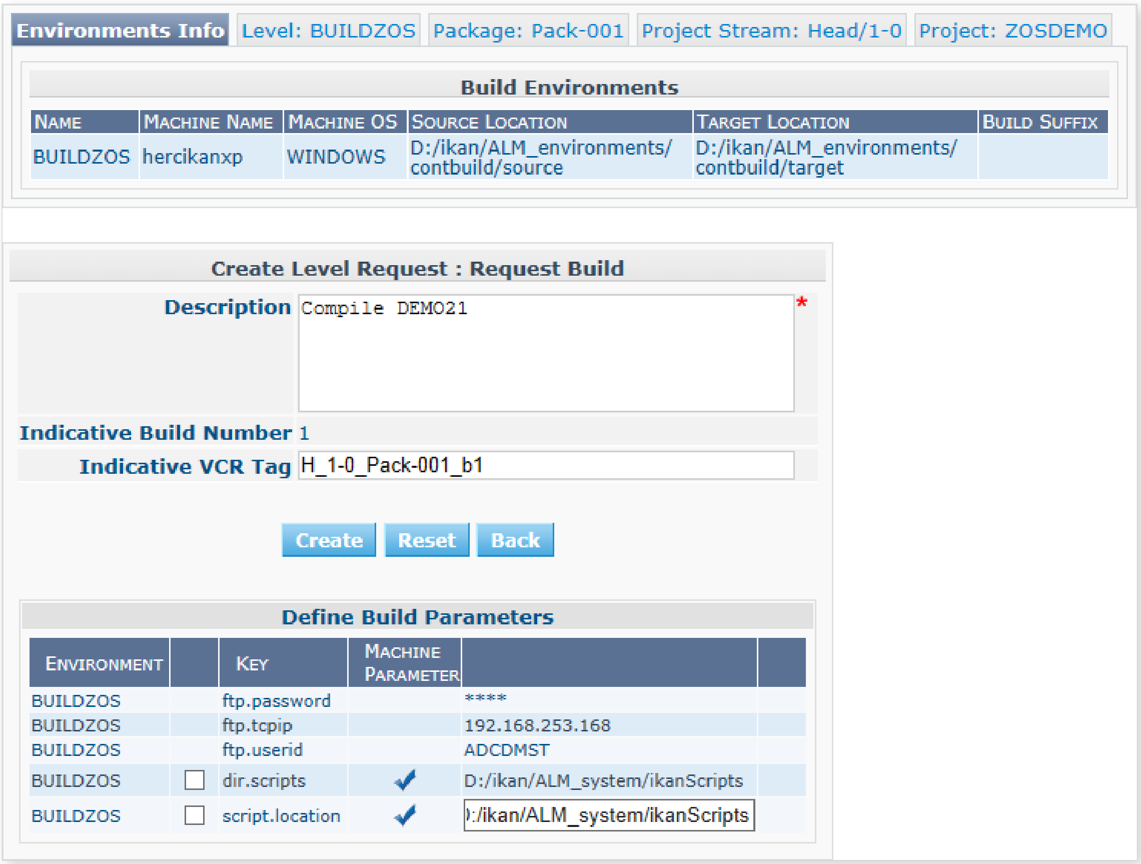
Desktop Overview

Desktop	Project Stream	Level	Next Scheduled	Latest Level Request	Latest Successful Level Request	Action	Message	
⊟ **Package**	ZOSDEMO H_1-0 Pack-001	BUILDZOS		H_1-0_Pack-001_b1[16/10/13 22:21:28] ...	H_1-0_Pack-001_b1[16/10/13 22:21:28]			✖
	ZOSDEMO H_1-0 Pack-001	ZOSTEST		H_1-0_Pack-001_b1[16/10/13 23:20:48] ...	H_1-0_Pack-001_b1[16/10/13 23:20:48]			
	ZOSDEMO H_1-0 Pack-001	MILESTONE					No Build or Deploy Environments defined	
	ZOSDEMO H_1-0 Pack-001	PRODZOS						

Step 4

Step 4: Create the Level Request

To start a compile for the project in our example, the User would click the appropriate Level Request action button at the Build Level. Next, the Create Level Request screen will be displayed.



Build Environments

Name	Machine Name	Machine OS	Source Location	Target Location	Build Suffix
BUILDZOS	hercikanxp	WINDOWS	D:/ikan/ALM_environments/contbuild/source	D:/ikan/ALM_environments/contbuild/target	

Create Level Request : Request Build

Description	Compile DEMO21 *
Indicative Build Number	1
Indicative VCR Tag	H_1-0_Pack-001_b1

Define Build Parameters

Environment		Key	Machine Parameter		
BUILDZOS		ftp.password		****	
BUILDZOS		ftp.tcpip		192.168.253.168	
BUILDZOS		ftp.userid		ADCDMST	
BUILDZOS	☐	dir.scripts	✓	D:/ikan/ALM_system/ikanScripts	
BUILDZOS	☐	script.location	✓	):/ikan/ALM_system/ikanScripts	

View package

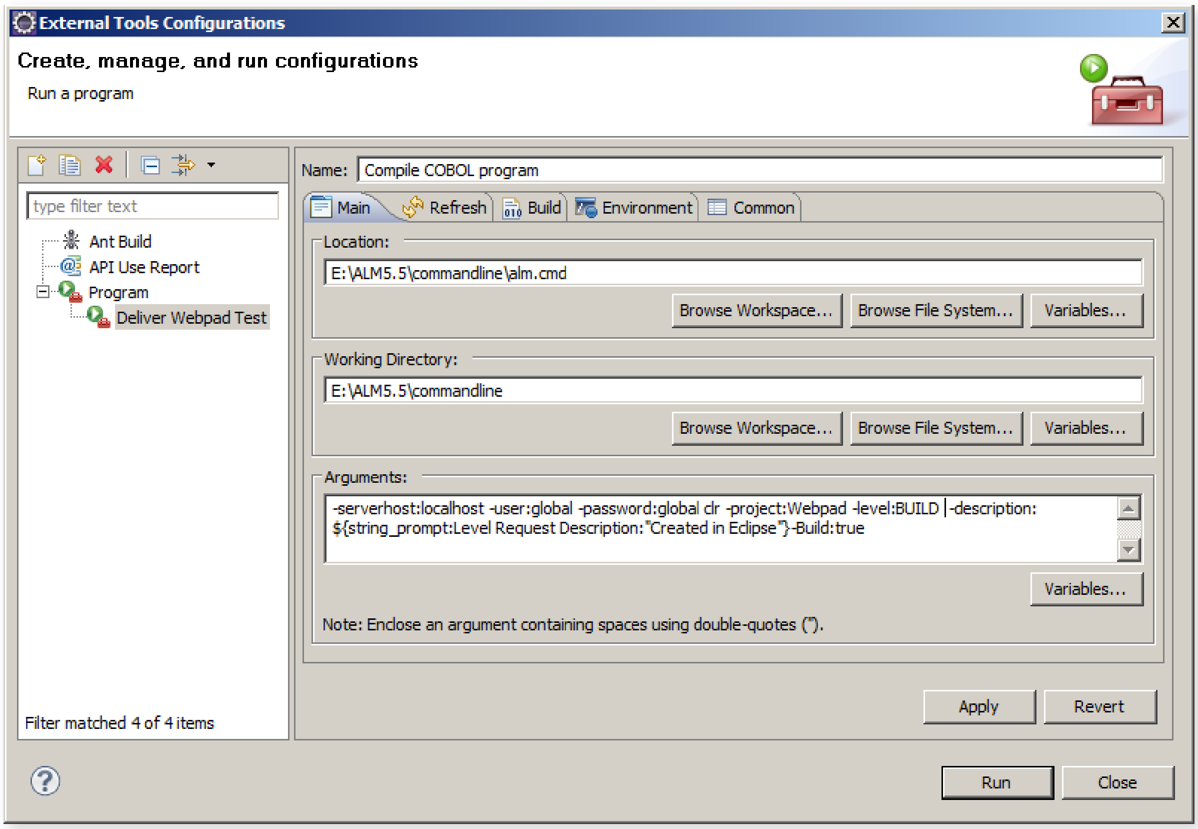
On this screen, the User can enter a description, view the parameters linked to the level request and, if configured that way, change some parameter values.

By clicking the Create button, the level request will be created and the process will start.

In fact, that is all a User needs to do for compiling all the programs in his package: go to his Desktop, click the appropriate action button and create a Level Request to execute a Build/Compile or a Deploy.

Alternative Way: Commandline Interface (CLI)

Another possibility to create a Compile/Build or Deploy action is to use the Commandline Interface (CLI) and to use the external tool configuration from Eclipse to configure the Level Request from within Eclipse.


External Tools Configurations

Create, manage, and run configurations

Run a program

Name: Compile COBOL program

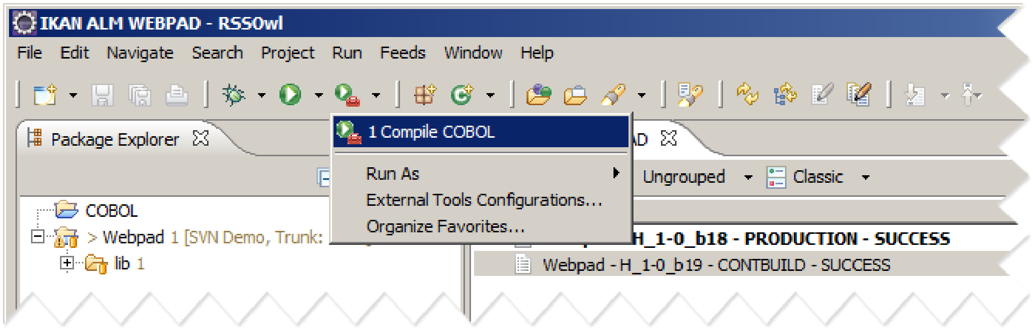
Location: E:\ALM5.5\commandline\alm.cmd

Working Directory: E:\ALM5.5\commandline

Arguments:
```
-serverhost:localhost -user:global -password:global clr -project:Webpad -level:BUILD -description:
${string_prompt:Level Request Description:"Created in Eclipse"}-Build:true
```

Note: Enclose an argument containing spaces using double-quotes (").

External Tool Configuration from Eclipse



Launch Kobee Level Request to Compile from within Eclipse

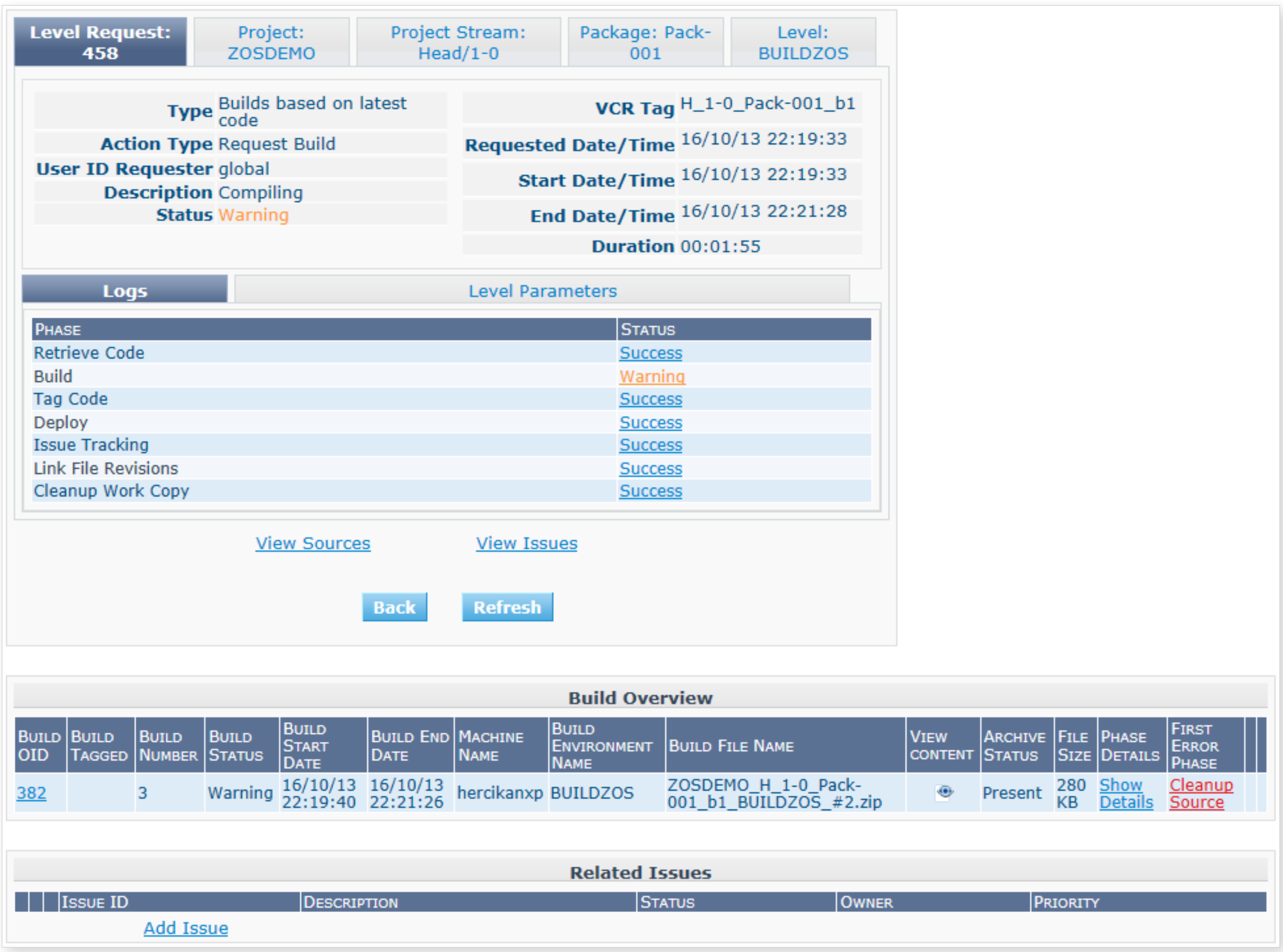
Additional information provided by Kobee

Besides creating a Level request, Kobee also provides a lot of additional information to a User:

- An overview of each Level Request.
- For each Level Request: detailed information through the interface.
- Kobee reports. Kobee comes with predefined reports, but the User can also define his own reports.

On the following pages we will show some sample Kobee screens with more detailed information, such as the detailed Level Request information, the Build Log, the used Parameters, a sample report, a sample notification e-mail and the integration with an Issued Tracking System.

Finally, we will also show what happens behind the scene on the mainframe.



Type	Builds based on latest code	**VCR Tag**	H_1-0_Pack-001_b1
Action Type	Request Build	**Requested Date/Time**	16/10/13 22:19:33
User ID Requester	global	**Start Date/Time**	16/10/13 22:19:33
Description	Compiling	**End Date/Time**	16/10/13 22:21:28
Status	Warning	**Duration**	00:01:55

Phase	Status
Retrieve Code	Success
Build	Warning
Tag Code	Success
Deploy	Success
Issue Tracking	Success
Link File Revisions	Success
Cleanup Work Copy	Success

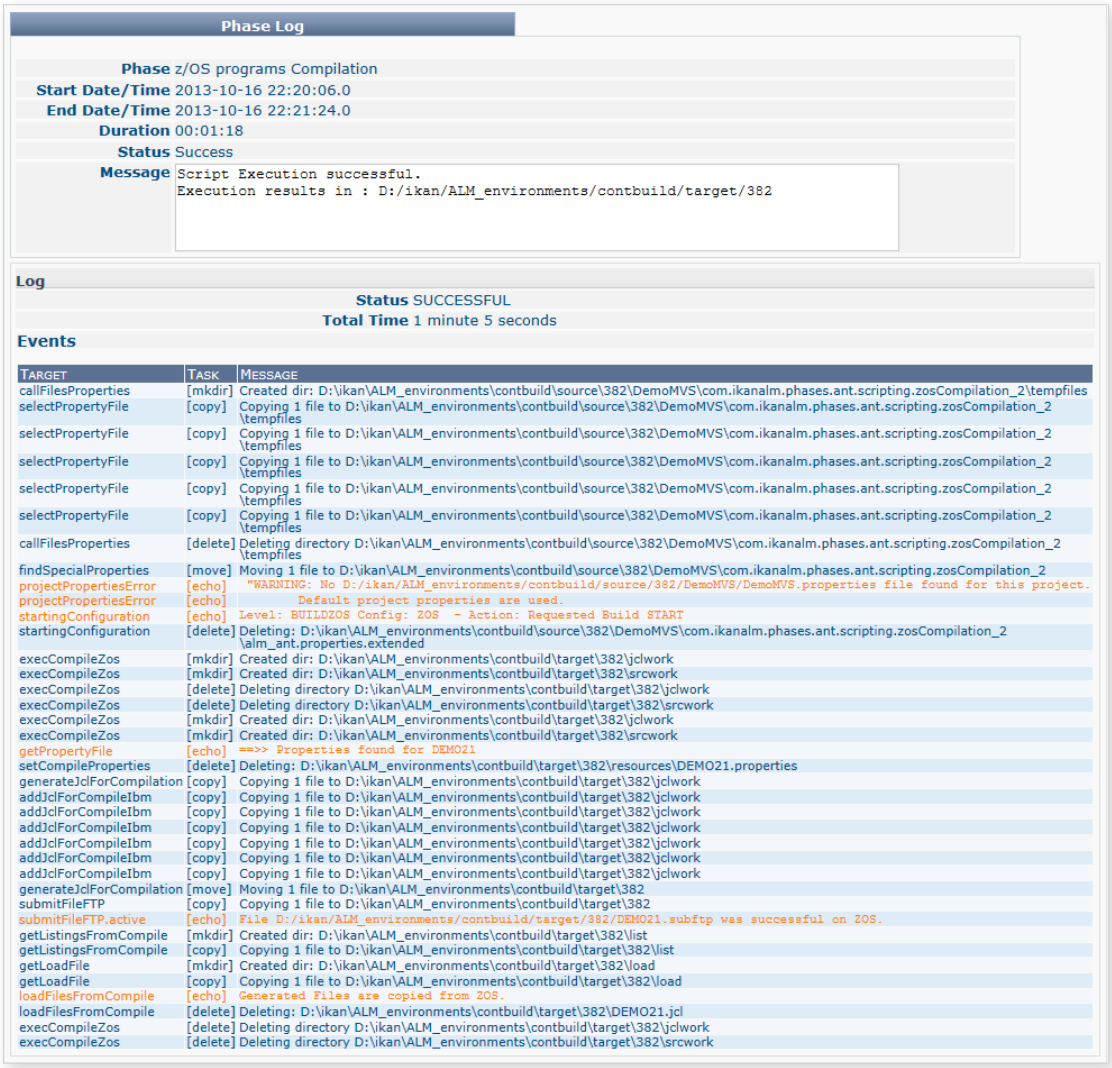
Build Overview

Build OID	Build Tagged	Build Number	Build Status	Build Start Date	Build End Date	Machine Name	Build Environment Name	Build File Name	View content	Archive Status	File Size	Phase Details	First Error Phase
382		3	Warning	16/10/13 22:19:40	16/10/13 22:21:26	hercikanxp	BUILDZOS	ZOSDEMO_H_1-0_Pack-001_b1_BUILDZOS_#2.zip		Present	280 KB	Show Details	Cleanup Source

Related Issues

Issue ID	Description	Status	Owner	Priority
Add Issue				

Level Request: Detailed Overview



Phase Log

Phase	z/OS programs Compilation
Start Date/Time	2013-10-16 22:20:06.0
End Date/Time	2013-10-16 22:21:24.0
Duration	00:01:18
Status	Success
Message	Script Execution successful. Execution results in : D:/ikan/ALM_environments/contbuild/target/382

Log

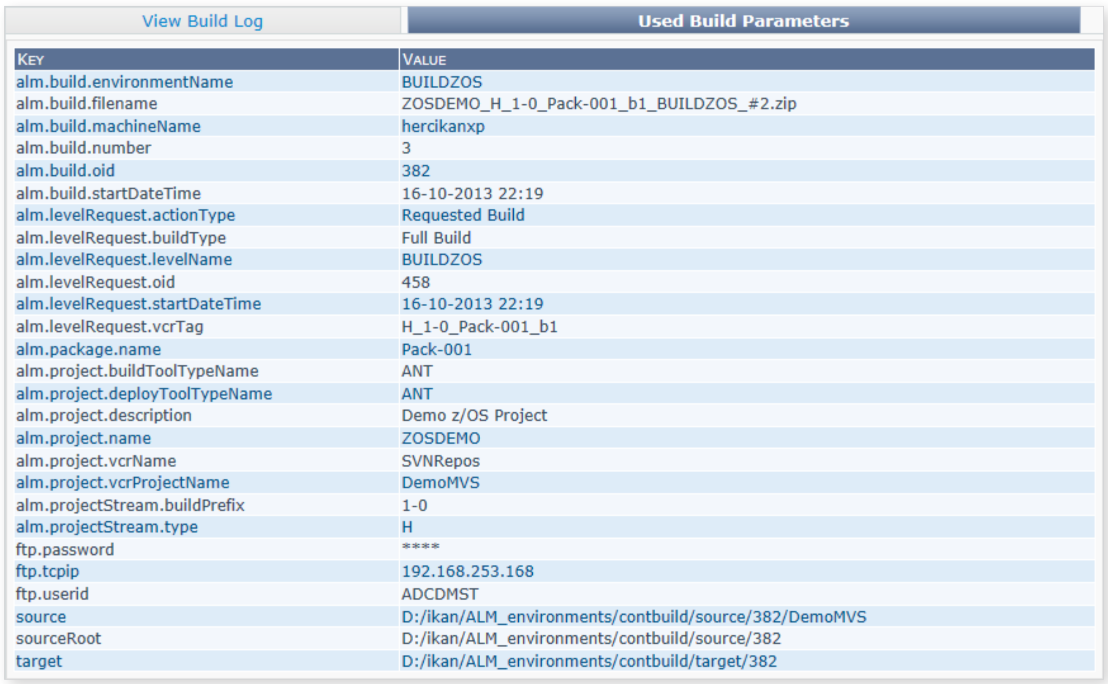
Status SUCCESSFUL

Total Time 1 minute 5 seconds

Events

Target	Task	Message
callFilesProperties	[mkdir]	Created dir: D:\ikan\ALM_environments\contbuild\source\382\DemoMVS\com.ikanalm.phases.ant.scripting.zosCompilation_2\tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\source\382\DemoMVS\com.ikanalm.phases.ant.scripting.zosCompilation_2 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\source\382\DemoMVS\com.ikanalm.phases.ant.scripting.zosCompilation_2 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\source\382\DemoMVS\com.ikanalm.phases.ant.scripting.zosCompilation_2 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\source\382\DemoMVS\com.ikanalm.phases.ant.scripting.zosCompilation_2 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\source\382\DemoMVS\com.ikanalm.phases.ant.scripting.zosCompilation_2 \tempfiles
callFilesProperties	[delete]	Deleting directory D:\ikan\ALM_environments\contbuild\source\382\DemoMVS\com.ikanalm.phases.ant.scripting.zosCompilation_2 \tempfiles
findSpecialProperties	[move]	Moving 1 file to D:\ikan\ALM_environments\contbuild\source\382\DemoMVS\com.ikanalm.phases.ant.scripting.zosCompilation_2
projectPropertiesError	[echo]	"WARNING: No D:/ikan/ALM_environments/contbuild/source/382/DemoMVS/DemoMVS.properties file found for this project.
projectPropertiesError	[echo]	Default project properties are used.
startingConfiguration	[echo]	Level: BUILDZOS Config: ZOS - Action: Requested Build START
startingConfiguration	[delete]	Deleting: D:\ikan\ALM_environments\contbuild\source\382\DemoMVS\com.ikanalm.phases.ant.scripting.zosCompilation_2 \alm_ant.properties.extended
execCompileZos	[mkdir]	Created dir: D:\ikan\ALM_environments\contbuild\target\382\jclwork
execCompileZos	[mkdir]	Created dir: D:\ikan\ALM_environments\contbuild\target\382\srcwork
execCompileZos	[delete]	Deleting directory D:\ikan\ALM_environments\contbuild\target\382\jclwork
execCompileZos	[delete]	Deleting directory D:\ikan\ALM_environments\contbuild\target\382\srcwork
execCompileZos	[mkdir]	Created dir: D:\ikan\ALM_environments\contbuild\target\382\jclwork
execCompileZos	[mkdir]	Created dir: D:\ikan\ALM_environments\contbuild\target\382\srcwork
getPropertyFile	[echo]	==>> Properties found for DEMO21
setCompileProperties	[delete]	Deleting: D:\ikan\ALM_environments\contbuild\target\382\resources\DEMO21.properties
generateJclForCompilation	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382\jclwork
addJclForCompileIbm	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382\jclwork
addJclForCompileIbm	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382\jclwork
addJclForCompileIbm	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382\jclwork
addJclForCompileIbm	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382\jclwork
addJclForCompileIbm	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382\jclwork
addJclForCompileIbm	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382\jclwork
generateJclForCompilation	[move]	Moving 1 file to D:\ikan\ALM_environments\contbuild\target\382
submitFileFTP	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382
submitFileFTP.active	[echo]	File D:/ikan/ALM_environments/contbuild/target/382/DEMO21.subftp was successful on ZOS.
getListingsFromCompile	[mkdir]	Created dir: D:\ikan\ALM_environments\contbuild\target\382\list
getListingsFromCompile	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382\list
getLoadFile	[mkdir]	Created dir: D:\ikan\ALM_environments\contbuild\target\382\load
getLoadFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\contbuild\target\382\load
loadFilesFromCompile	[echo]	Generated Files are copied from ZOS.
loadFilesFromCompile	[delete]	Deleting: D:\ikan\ALM_environments\contbuild\target\382\DEMO21.jcl
execCompileZos	[delete]	Deleting directory D:\ikan\ALM_environments\contbuild\target\382\jclwork
execCompileZos	[delete]	Deleting directory D:\ikan\ALM_environments\contbuild\target\382\srcwork

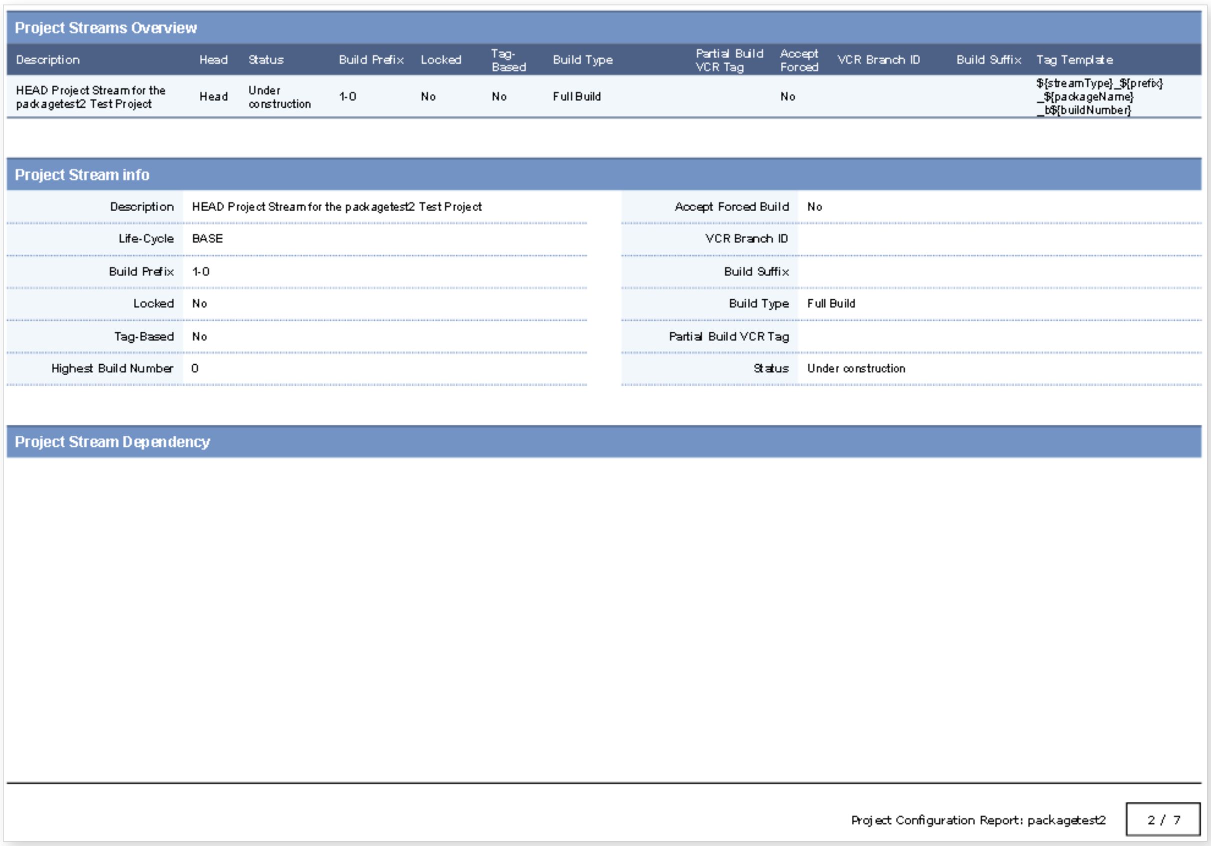
Build log



View Build Log | **Used Build Parameters**

Key	Value
alm.build.environmentName	BUILDZOS
alm.build.filename	ZOSDEMO_H_1-0_Pack-001_b1_BUILDZOS_#2.zip
alm.build.machineName	hercikanxp
alm.build.number	3
alm.build.oid	382
alm.build.startDateTime	16-10-2013 22:19
alm.levelRequest.actionType	Requested Build
alm.levelRequest.buildType	Full Build
alm.levelRequest.levelName	BUILDZOS
alm.levelRequest.oid	458
alm.levelRequest.startDateTime	16-10-2013 22:19
alm.levelRequest.vcrTag	H_1-0_Pack-001_b1
alm.package.name	Pack-001
alm.project.buildToolTypeName	ANT
alm.project.deployToolTypeName	ANT
alm.project.description	Demo z/OS Project
alm.project.name	ZOSDEMO
alm.project.vcrName	SVNRepos
alm.project.vcrProjectName	DemoMVS
alm.projectStream.buildPrefix	1-0
alm.projectStream.type	H
ftp.password	****
ftp.tcpip	192.168.253.168
ftp.userid	ADCDMST
source	D:/ikan/ALM_environments/contbuild/source/382/DemoMVS
sourceRoot	D:/ikan/ALM_environments/contbuild/source/382
target	D:/ikan/ALM_environments/contbuild/target/382

Used parameters



Project Streams Overview

Description	Head	Status	Build Prefix	Locked	Tag-Based	Build Type	Partial Build VCR Tag	Accept Forced	VCR Branch ID	Build Suffix	Tag Template
HEAD Project Stream for the packagetest2 Test Project	Head	Under construction	1-0	No	No	Full Build		No			${streamType}_${prefix}_${packageName}_b${buildNumber}

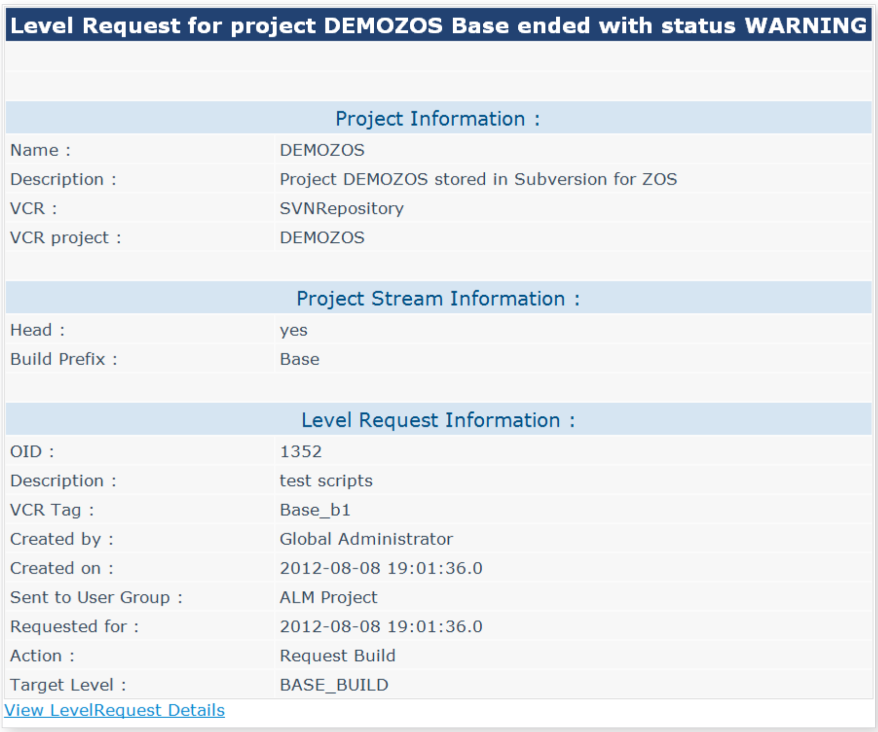
Project Stream info

Description	HEAD Project Stream for the packagetest2 Test Project	Accept Forced Build	No
Life-Cycle	BASE	VCR Branch ID	
Build Prefix	1-0	Build Suffix	
Locked	No	Build Type	Full Build
Tag-Based	No	Partial Build VCR Tag	
Highest Build Number	0	Status	Under construction

Project Stream Dependency

Project Configuration Report: packagetest2 2 / 7

Kobee Report sample, Project stream overview



Level Request for project DEMOZOS Base ended with status WARNING

Project Information :

Name :	DEMOZOS
Description :	Project DEMOZOS stored in Subversion for ZOS
VCR :	SVNRepository
VCR project :	DEMOZOS

Project Stream Information :

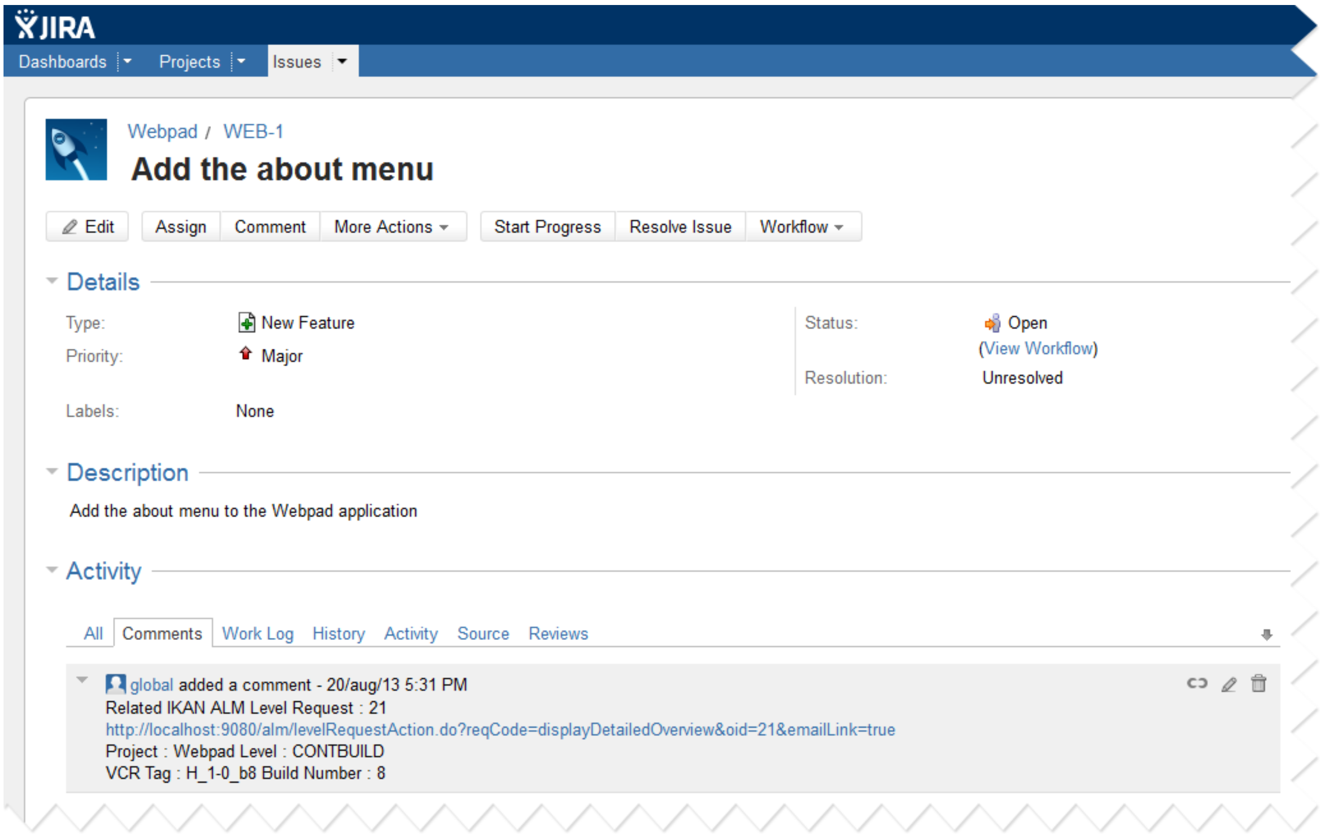
Head :	yes
Build Prefix :	Base

Level Request Information :

OID :	1352
Description :	test scripts
VCR Tag :	Base_b1
Created by :	Global Administrator
Created on :	2012-08-08 19:01:36.0
Sent to User Group :	ALM Project
Requested for :	2012-08-08 19:01:36.0
Action :	Request Build
Target Level :	BASE_BUILD

View LevelRequest Details

Email received after successful Level Request



Webpad / WEB-1

Add the about menu

Details

Type: New Feature

Priority: Major

Labels: None

Status: Open (View Workflow)

Resolution: Unresolved

Description

Add the about menu to the Webpad application

Activity

global added a comment - 20/aug/13 5:31 PM
Related IKAN ALM Level Request : 21
http://localhost:9080/alm/levelRequestAction.do?reqCode=displayDetailedOverview&oid=21&emailLink=true
Project : Webpad Level : CONTBUILD
VCR Tag : H_1-0_b8 Build Number : 8

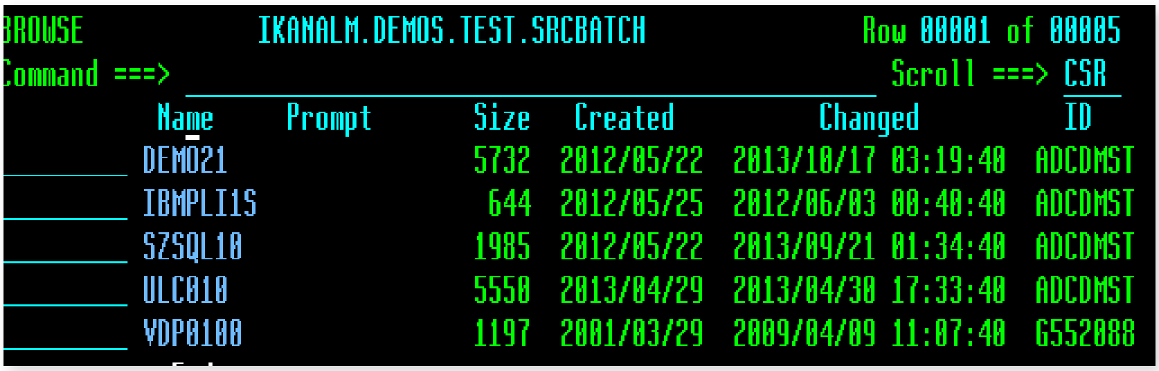
Integration with Issue Tracking: JIRA issue

What happens behind the scene?

The following z/OS screens show the corresponding actions on the mainframe.

The first z/OS Phase copies the copybook(s) and the programs (and, if existing, also the special components for compiling) to the z/OS environment.

The following screen shows the files that have been collected from the VCR and that are transferred via FTP to the mainframe in a PDS with IKAN ALM.DEMOS.TEST.SRCBATCH as PDS name.



```
BROWSE           IKANALM.DEMOS.TEST.SRCBATCH              Row 00001 of 00005
Command ===>                                               Scroll ===> CSR
           Name      Prompt       Size   Created        Changed              ID
_________  DEMO21                 5732  2012/05/22  2013/10/17 03:19:40  ADCDMST
_________  IBMPLI1S                644  2012/05/25  2012/06/03 00:40:40  ADCDMST
_________  SZSQL10                1985  2012/05/22  2013/09/21 01:34:40  ADCDMST
_________  ULC010                 5550  2013/04/29  2013/04/30 17:33:40  ADCDMST
_________  VDP0100                1197  2001/03/29  2009/04/09 11:07:40  G552088
```

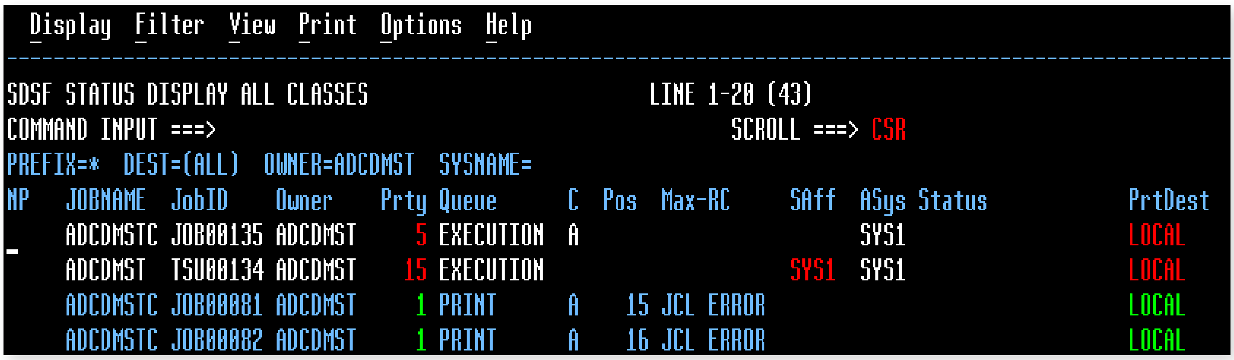
DEMO21 project

After this FTP Phase, the second phase, Z/OS program compile, is executed.

This phase creates the JCL (See Appendix V: Sample of z/OS compilation JCL), transfers that JCL via FTP to the mainframe and submits the job.

The results will also be available in the Kobee Phase log. That log will list all executed events, step by step, and will tell if the compile has been executed successfully or not.

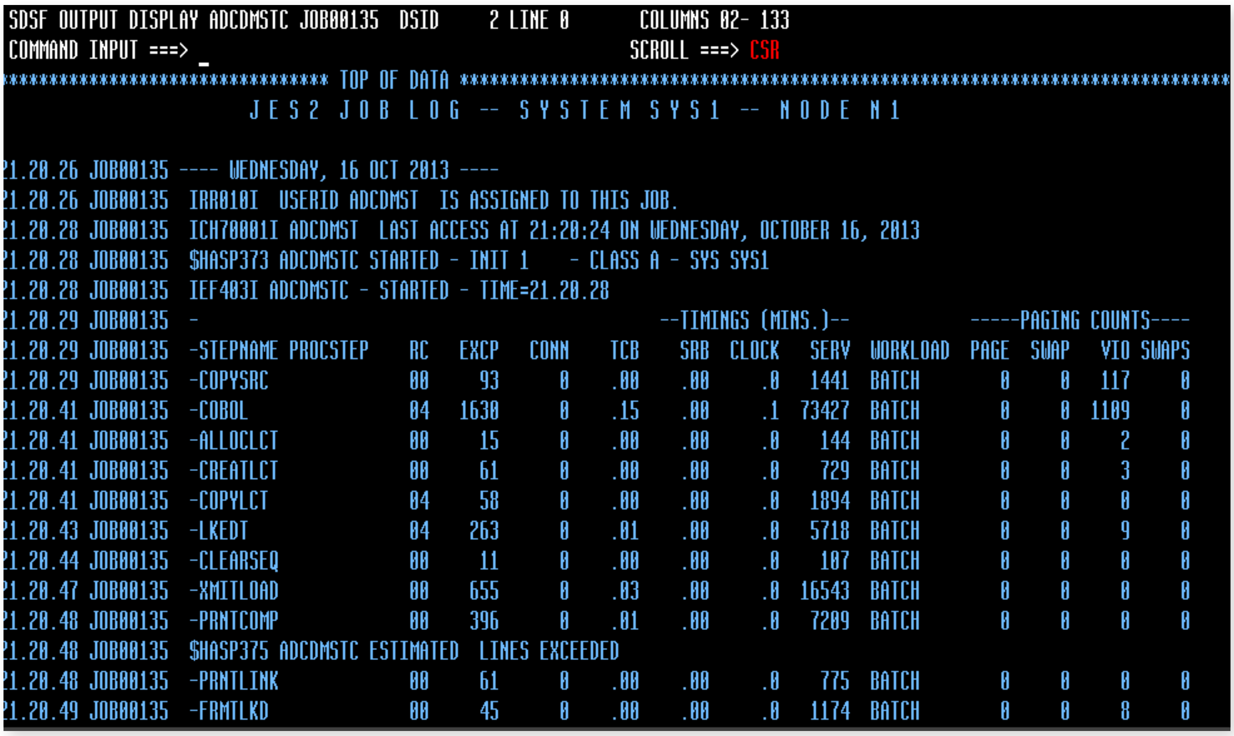
The following screen shows the JCL jobs that have been submitted and that are executed.



```
 Display  Filter  View  Print  Options  Help
-------------------------------------------------------------------------------
SDSF STATUS DISPLAY ALL CLASSES                  LINE 1-20 (43)
COMMAND INPUT ===>                                      SCROLL ===> CSR
PREFIX=*  DEST=(ALL)  OWNER=ADCDMST  SYSNAME=
NP   JOBNAME  JobID    Owner    Prty Queue      C  Pos  Max-RC     SAff  ASys Status         PrtDest
     ADCDMSTC JOB00135 ADCDMST     5 EXECUTION  A                        SYS1                LOCAL
_    ADCDMST  TSU00134 ADCDMST    15 EXECUTION                     SYS1  SYS1                LOCAL
     ADCDMSTC JOB00081 ADCDMST     1 PRINT      A    15 JCL ERROR                            LOCAL
     ADCDMSTC JOB00082 ADCDMST     1 PRINT      A    16 JCL ERROR                            LOCAL
```

SDSF Status Display

The following screen shows the result of the execution on the mainframe:

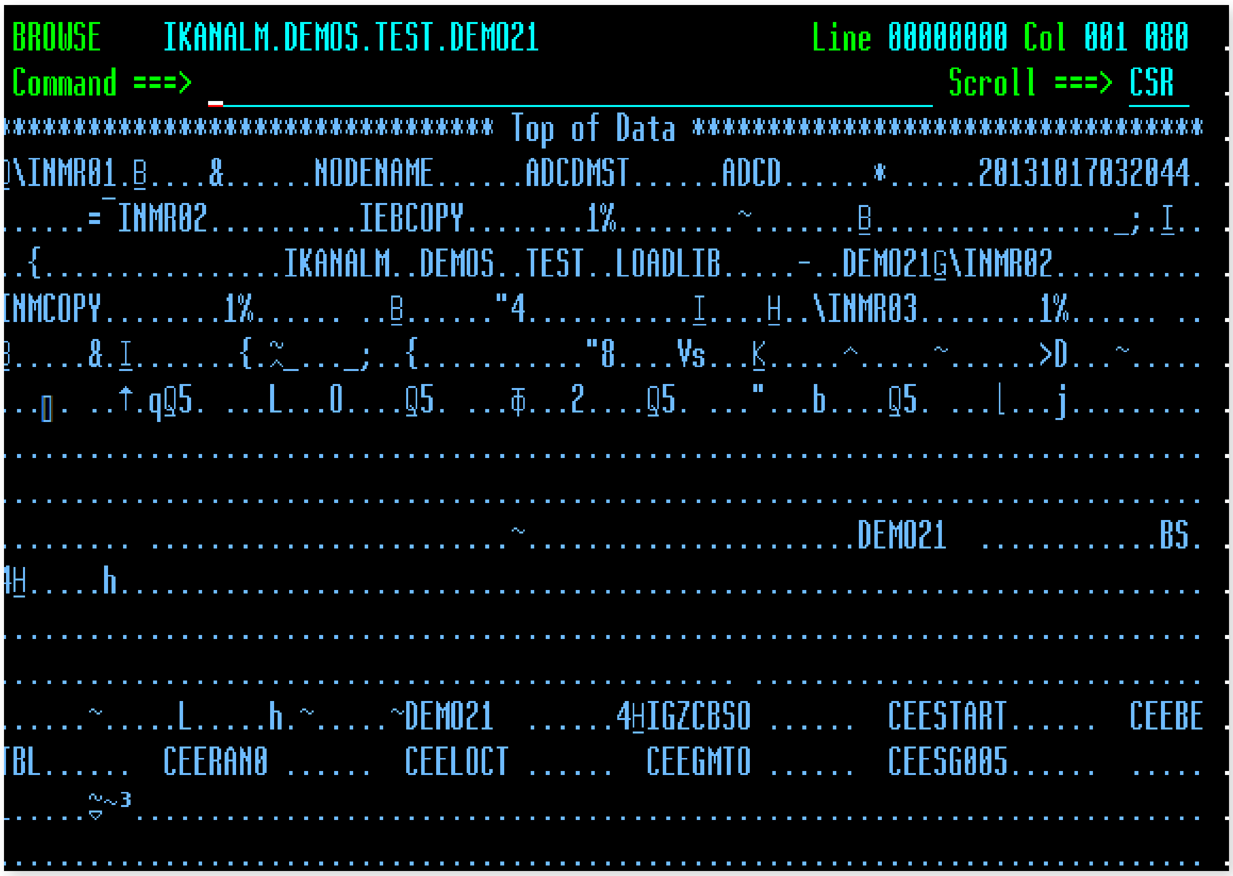


```
SDSF OUTPUT DISPLAY ADCDMSTC JOB00135  DSID     2 LINE 0       COLUMNS 02- 133
COMMAND INPUT ===> _                                   SCROLL ===> CSR
********************************* TOP OF DATA **********************************************
                        J E S 2  J O B  L O G  --  S Y S T E M  S Y S 1  --  N O D E  N 1

1.20.26 JOB00135 ---- WEDNESDAY, 16 OCT 2013 ----
1.20.26 JOB00135  IRR010I  USERID ADCDMST  IS ASSIGNED TO THIS JOB.
1.20.28 JOB00135  ICH70001I ADCDMST  LAST ACCESS AT 21:20:24 ON WEDNESDAY, OCTOBER 16, 2013
1.20.28 JOB00135  $HASP373 ADCDMSTC STARTED - INIT 1    - CLASS A - SYS SYS1
1.20.28 JOB00135  IEF403I ADCDMSTC - STARTED - TIME=21.20.28
1.20.29 JOB00135  -                                         --TIMINGS (MINS.)--          -----PAGING COUNTS----
1.20.29 JOB00135  -STEPNAME PROCSTEP    RC   EXCP   CONN    TCB    SRB  CLOCK   SERV  WORKLOAD  PAGE  SWAP   VIO SWAPS
1.20.29 JOB00135  -COPYSRC              00     93      0    .00    .00     .0   1441  BATCH        0     0   117     0
1.20.41 JOB00135  -COBOL                04   1630      0    .15    .00     .1  73427  BATCH        0     0  1109     0
1.20.41 JOB00135  -ALLOCLCT             00     15      0    .00    .00     .0    144  BATCH        0     0     2     0
1.20.41 JOB00135  -CREATLCT             00     61      0    .00    .00     .0    729  BATCH        0     0     3     0
1.20.41 JOB00135  -COPYLCT              04     58      0    .00    .00     .0   1894  BATCH        0     0     0     0
1.20.43 JOB00135  -LKEDT                04    263      0    .01    .00     .0   5718  BATCH        0     0     9     0
1.20.44 JOB00135  -CLEARSEQ             00     11      0    .00    .00     .0    107  BATCH        0     0     0     0
1.20.47 JOB00135  -XMITLOAD             00    655      0    .03    .00     .0  16543  BATCH        0     0     0     0
1.20.48 JOB00135  -PRNTCOMP             00    396      0    .01    .00     .0   7209  BATCH        0     0     0     0
1.20.48 JOB00135  $HASP375 ADCDMSTC ESTIMATED  LINES EXCEEDED
1.20.48 JOB00135  -PRNTLINK             00     61      0    .00    .00     .0    775  BATCH        0     0     0     0
1.20.49 JOB00135  -FRMTLKD              00     45      0    .00    .00     .0   1174  BATCH        0     0     8     0
```

SDSF Output Display

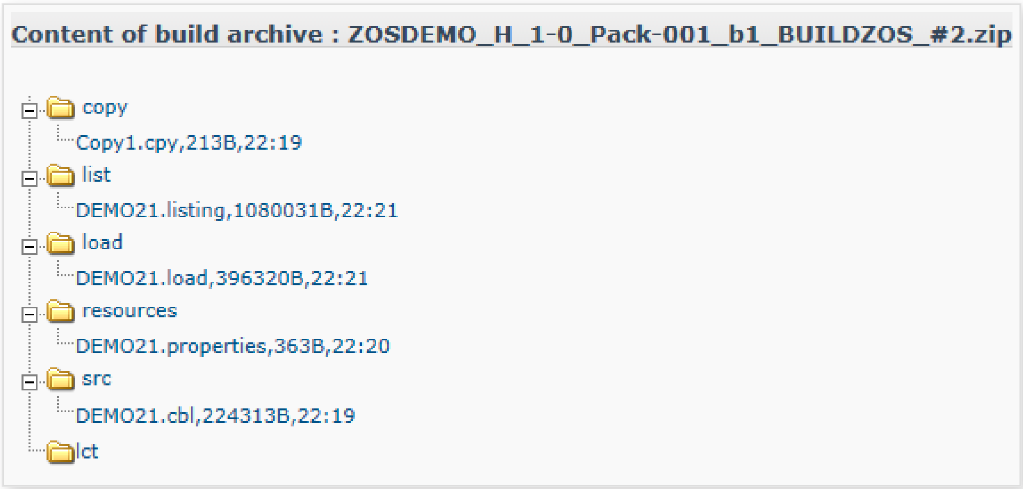
When the Job is completed with success, the listing and the load module are transferred via FTP to the Kobee target environment. The following screen shows the sequential file generated by the Xmit step for transfering the load module to the Kobee target environment.



```
BROWSE    IKANALM.DEMOS.TEST.DEMO21                      Line 00000000 Col 001 080
Command ===> _                                                    Scroll ===> CSR
********************************* Top of Data **********************************
@\INMR01.B....&......NODENAME......ADCDMST......ADCD......*......20131017032044.
......= INMR02..........IEBCOPY........1%........~.......B................_;.I..
..{...............IKANALM..DEMOS..TEST..LOADLIB.....-..DEMO21G\INMR02..........
INMCOPY........1%...... ..B......"4...........I....H..\INMR03........1%...... ..
B.....&.I.......{.~_..._;..{..........."8....Vs...K.....^.....~......>D...~.....
...▯. ..↑.qQ5. ...L...0....Q5. ...Φ...2....Q5. ..."...b....Q5. ...|...j.........
................................................................................
................................................................................
....... .......................~....................DEMO21 ............BS.
4H.....h........................................................................
................................................................................
................................................................................
.....~.....L.....h.~.....~DEMO21 .....4HIGZCBSO ......  CEESTART......  CEEBE
TBL......  CEERAN0 ......  CEELOCT ......  CEEGMTO ......  CEESG005......  .....
......~~3.......................................................................
................................................................................
```

Sequential Xmit file

As a result, Kobee has the listing and the load module in his archive. At this point, Kobee is in full control of the remainder of the steps in the lifecycle.



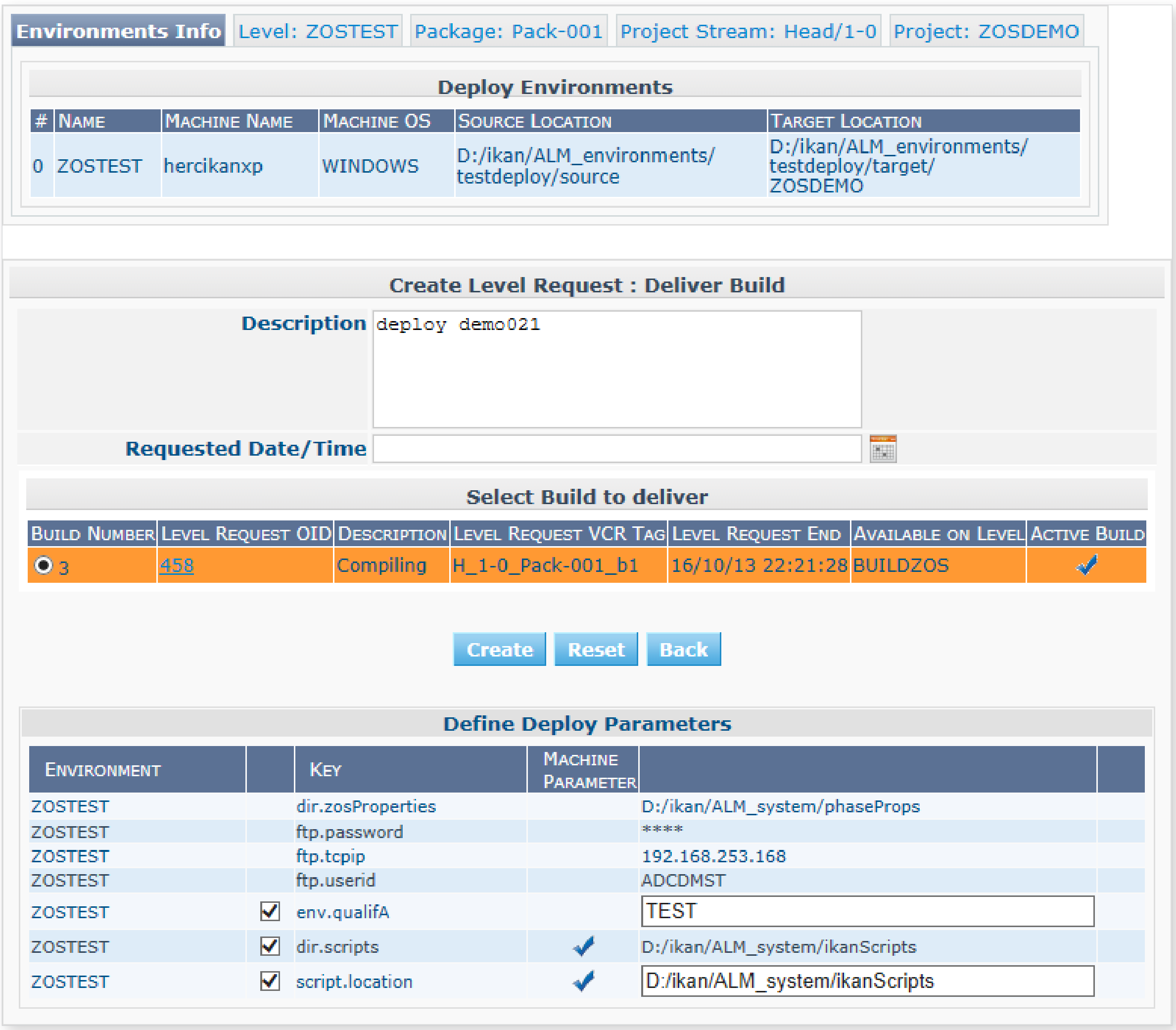
Content of build archive : ZOSDEMO_H_1-0_Pack-001_b1_BUILDZOS_#2.zip

```
copy
    Copy1.cpy,213B,22:19
list
    DEMO21.listing,1080031B,22:21
load
    DEMO21.load,396320B,22:21
resources
    DEMO21.properties,363B,22:20
src
    DEMO21.cbl,224313B,22:19
lct
```

Content of Build Archive

From the Kobee archive, the load module can be deployed or promoted to a test or production level by simple starting a Deploy (promote) Level Request that executes a receive step.

The next step is the Deploy or Promote of the compile results. The following screen starts the Deploy.



Environments Info | Level: ZOSTEST | Package: Pack-001 | Project Stream: Head/1-0 | Project: ZOSDEMO

Deploy Environments

#	Name	Machine Name	Machine OS	Source Location	Target Location
0	ZOSTEST	hercikanxp	WINDOWS	D:/ikan/ALM_environments/ testdeploy/source	D:/ikan/ALM_environments/ testdeploy/target/ ZOSDEMO

Create Level Request : Deliver Build

Description	deploy demo021
Requested Date/Time	

Select Build to deliver

Build Number	Level Request OID	Description	Level Request VCR Tag	Level Request End	Available on Level	Active Build
● 3	458	Compiling	H_1-0_Pack-001_b1	16/10/13 22:21:28	BUILDZOS	✓

Create Reset Back

Define Deploy Parameters

Environment		Key	Machine Parameter		
ZOSTEST		dir.zosProperties		D:/ikan/ALM_system/phaseProps	
ZOSTEST		ftp.password		****	
ZOSTEST		ftp.tcpip		192.168.253.168	
ZOSTEST		ftp.userid		ADCDMST	
ZOSTEST	☑	env.qualifA		TEST	
ZOSTEST	☑	dir.scripts	✓	D:/ikan/ALM_system/ikanScripts	
ZOSTEST	☑	script.location	✓	D:/ikan/ALM_system/ikanScripts	

Starting a deploy

For the Deploy, Kobee is using the same process as for a Compile/Build: **A Deploy Level and Environment with its related z/OS phases must be created.**

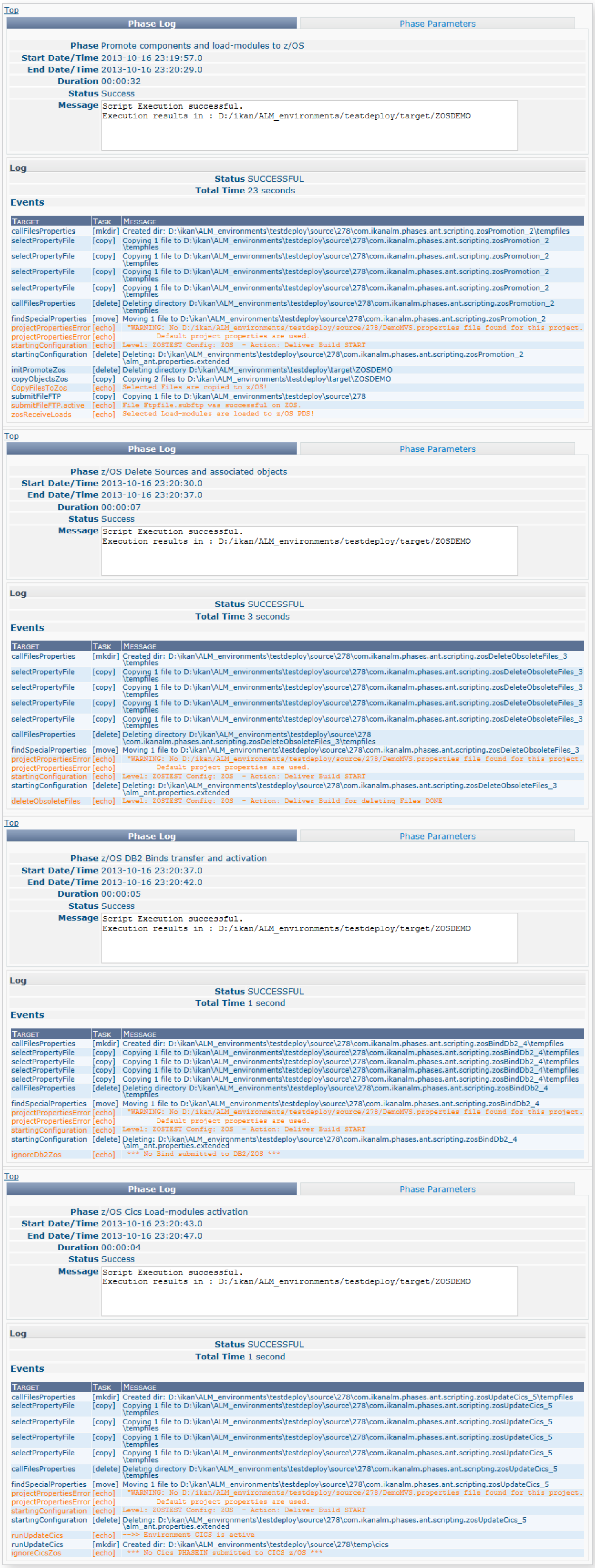
The z/OS phases defined here are:

- The promote (FTP) of load-modules and other components to the mainframe
- Delete obsolete files and associated components (such as load modules, listings)
- The DB2 Bind statements, transfer (FTP) and DB2 Job execution
- The activation of the CICS load-modules

During this Level Request, the files are copied via FTP to their respective PDS(s) and special jobs can be created and executed on z/OS The Load-modules are received through a transmitted sequential file to the PDS.

The FTP and Job results are analyzed for validating the executed deployment actions. In case of errors, messages are transmitted to the Kobee log and the deployment is stopped.

Kobee log



Top

Phase Log | Phase Parameters

Phase Promote components and load-modules to z/OS
Start Date/Time 2013-10-16 23:19:57.0
End Date/Time 2013-10-16 23:20:29.0
Duration 00:00:32
Status Success
Message

```
Script Execution successful.
Execution results in : D:/ikan/ALM_environments/testdeploy/target/ZOSDEMO
```

Log

Status SUCCESSFUL
Total Time 23 seconds

Events

Target	Task	Message
callFilesProperties	[mkdir]	Created dir: D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosPromotion_2\tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosPromotion_2 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosPromotion_2 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosPromotion_2 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosPromotion_2 \tempfiles
callFilesProperties	[delete]	Deleting directory D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosPromotion_2 \tempfiles
findSpecialProperties	[move]	Moving 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosPromotion_2
projectPropertiesError	[echo]	"WARNING: No D:/ikan/ALM_environments/testdeploy/source/278/DemoMVS.properties file found for this project.
projectPropertiesError	[echo]	Default project properties are used.
startingConfiguration	[echo]	Level: ZOSTEST Config: ZOS - Action: Deliver Build START
startingConfiguration	[delete]	Deleting: D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosPromotion_2 \alm_ant.properties.extended
initPromoteZos	[delete]	Deleting directory D:\ikan\ALM_environments\testdeploy\target\ZOSDEMO
copyObjectsZos	[copy]	Copying 2 files to D:\ikan\ALM_environments\testdeploy\target\ZOSDEMO
CopyFilesToZos	[echo]	Selected Files are copied to z/OS!
submitFileFTP	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278
submitFileFTP.active	[echo]	File Ftpfile.subftp was successful on ZOS.
zosReceiveLoads	[echo]	Selected Load-modules are loaded to z/OS PDS!

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Phase Log | Phase Parameters

Phase z/OS Delete Sources and associated objects
Start Date/Time 2013-10-16 23:20:30.0
End Date/Time 2013-10-16 23:20:37.0
Duration 00:00:07
Status Success
Message

```
Script Execution successful.
Execution results in : D:/ikan/ALM_environments/testdeploy/target/ZOSDEMO
```

Log

Status SUCCESSFUL
Total Time 3 seconds

Events

Target	Task	Message
callFilesProperties	[mkdir]	Created dir: D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosDeleteObsoleteFiles_3 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosDeleteObsoleteFiles_3 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosDeleteObsoleteFiles_3 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosDeleteObsoleteFiles_3 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosDeleteObsoleteFiles_3 \tempfiles
callFilesProperties	[delete]	Deleting directory D:\ikan\ALM_environments\testdeploy\source\278 \com.ikanalm.phases.ant.scripting.zosDeleteObsoleteFiles_3\tempfiles
findSpecialProperties	[move]	Moving 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosDeleteObsoleteFiles_3
projectPropertiesError	[echo]	"WARNING: No D:/ikan/ALM_environments/testdeploy/source/278/DemoMVS.properties file found for this project.
projectPropertiesError	[echo]	Default project properties are used.
startingConfiguration	[echo]	Level: ZOSTEST Config: ZOS - Action: Deliver Build START
startingConfiguration	[delete]	Deleting: D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosDeleteObsoleteFiles_3 \alm_ant.properties.extended
deleteObsoleteFiles	[echo]	Level: ZOSTEST Config: ZOS - Action: Deliver Build for deleting Files DONE

Top

Phase Log | Phase Parameters

Phase z/OS DB2 Binds transfer and activation
Start Date/Time 2013-10-16 23:20:37.0
End Date/Time 2013-10-16 23:20:42.0
Duration 00:00:05
Status Success
Message

```
Script Execution successful.
Execution results in : D:/ikan/ALM_environments/testdeploy/target/ZOSDEMO
```

Log

Status SUCCESSFUL
Total Time 1 second

Events

Target	Task	Message
callFilesProperties	[mkdir]	Created dir: D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosBindDb2_4\tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosBindDb2_4\tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosBindDb2_4\tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosBindDb2_4\tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosBindDb2_4\tempfiles
callFilesProperties	[delete]	Deleting directory D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosBindDb2_4 \tempfiles
findSpecialProperties	[move]	Moving 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosBindDb2_4
projectPropertiesError	[echo]	"WARNING: No D:/ikan/ALM_environments/testdeploy/source/278/DemoMVS.properties file found for this project.
projectPropertiesError	[echo]	Default project properties are used.
startingConfiguration	[echo]	Level: ZOSTEST Config: ZOS - Action: Deliver Build START
startingConfiguration	[delete]	Deleting: D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosBindDb2_4 \alm_ant.properties.extended
ignoreDb2Zos	[echo]	*** No Bind submitted to DB2/ZOS ***

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Phase Log | Phase Parameters

Phase z/OS Cics Load-modules activation
Start Date/Time 2013-10-16 23:20:43.0
End Date/Time 2013-10-16 23:20:47.0
Duration 00:00:04
Status Success
Message

```
Script Execution successful.
Execution results in : D:/ikan/ALM_environments/testdeploy/target/ZOSDEMO
```

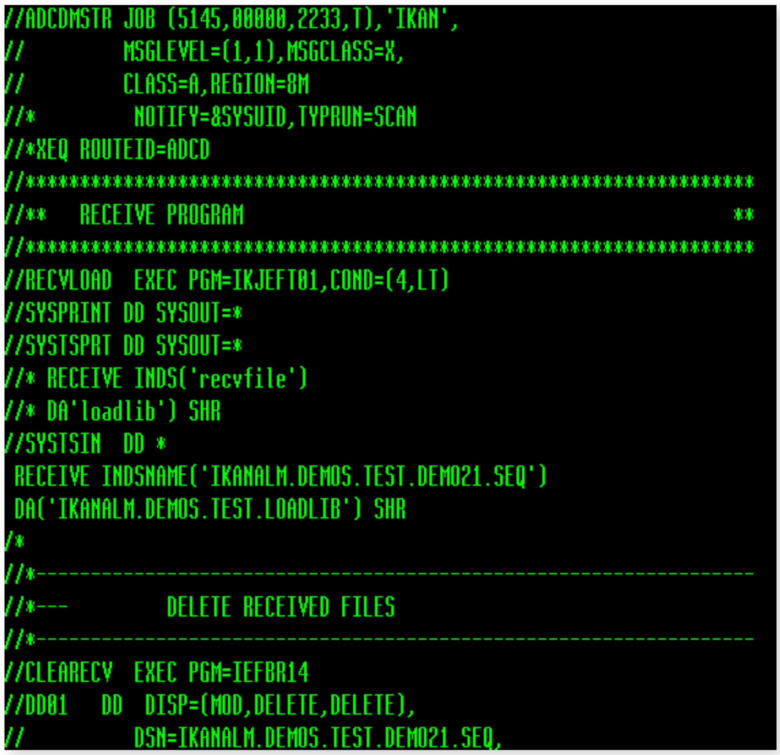
Log

Status SUCCESSFUL
Total Time 1 second

Events

Target	Task	Message
callFilesProperties	[mkdir]	Created dir: D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosUpdateCics_5\tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosUpdateCics_5 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosUpdateCics_5 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosUpdateCics_5 \tempfiles
selectPropertyFile	[copy]	Copying 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosUpdateCics_5 \tempfiles
callFilesProperties	[delete]	Deleting directory D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosUpdateCics_5 \tempfiles
findSpecialProperties	[move]	Moving 1 file to D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosUpdateCics_5
projectPropertiesError	[echo]	"WARNING: No D:/ikan/ALM_environments/testdeploy/source/278/DemoMVS.properties file found for this project.
projectPropertiesError	[echo]	Default project properties are used.
startingConfiguration	[echo]	Level: ZOSTEST Config: ZOS - Action: Deliver Build START
startingConfiguration	[delete]	Deleting: D:\ikan\ALM_environments\testdeploy\source\278\com.ikanalm.phases.ant.scripting.zosUpdateCics_5 \alm_ant.properties.extended
runUpdateCics	[echo]	-->> Environment CICS is active
runUpdateCics	[mkdir]	Created dir: D:\ikan\ALM_environments\testdeploy\source\278\temp\cics
ignoreCicsZos	[echo]	*** No Cics PHASEIN submitted to CICS z/OS ***

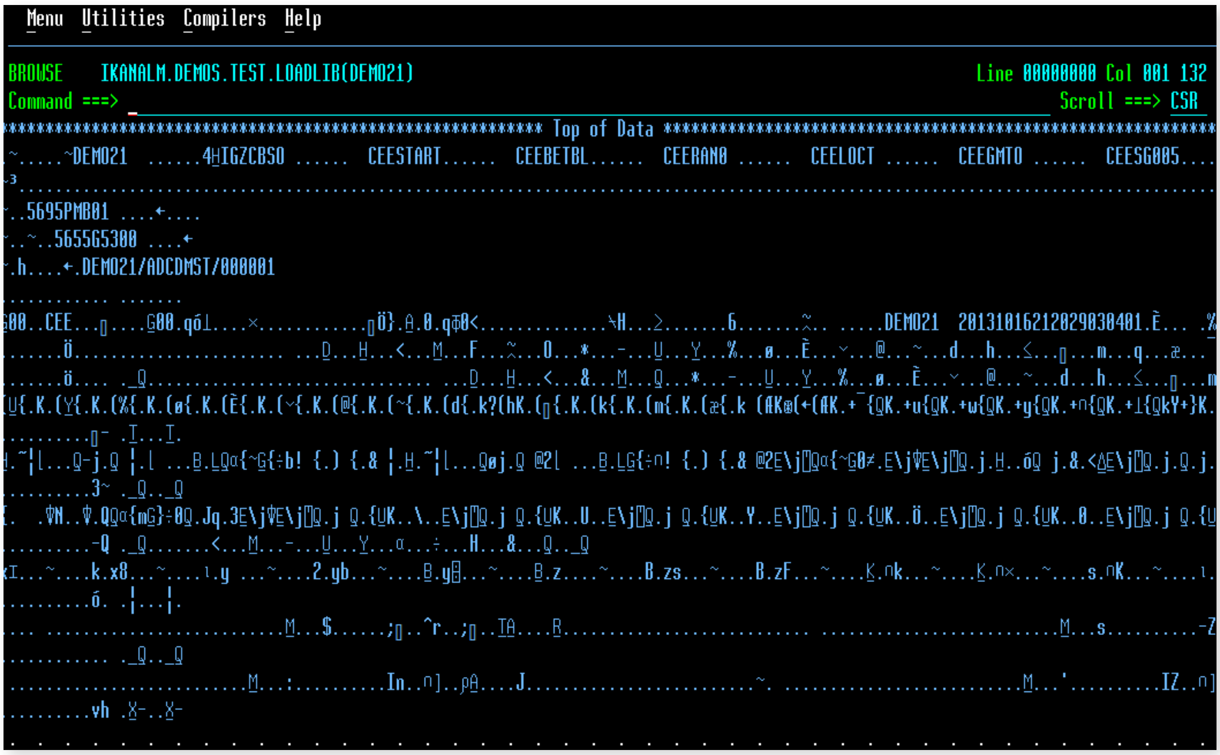
The following screen shows the JCL for receiving this transmitted sequential file.



```
//ADCDMSTR JOB (5145,00000,2233,T),'IKAN',
//         MSGLEVEL=(1,1),MSGCLASS=X,
//         CLASS=A,REGION=8M
//*         NOTIFY=&SYSUID,TYPRUN=SCAN
//*XEQ ROUTEID=ADCD
//*********************************************************************
//**   RECEIVE PROGRAM                                               **
//*********************************************************************
//RECVLOAD  EXEC PGM=IKJEFT01,COND=(4,LT)
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//* RECEIVE INDS('recvfile')
//* DA'loadlib') SHR
//SYSTSIN  DD *
 RECEIVE INDSNAME('IKANALM.DEMOS.TEST.DEMO21.SEQ')
 DA('IKANALM.DEMOS.TEST.LOADLIB') SHR
/*
//*-------------------------------------------------------------------
//*---         DELETE RECEIVED FILES
//*-------------------------------------------------------------------
//CLEARECV  EXEC PGM=IEFBR14
//DD01    DD  DISP=(MOD,DELETE,DELETE),
//           DSN=IKANALM.DEMOS.TEST.DEMO21.SEQ,
```

Receive program

The following screen shows the load modules after FTP from the Kobee archive to the mainframe in a PDS:



```
  Menu  Utilities  Compilers  Help

BROWSE    IKANALM.DEMOS.TEST.LOADLIB(DEMO21)                                          Line 00000000 Col 001 132
Command ===> _                                                                          Scroll ===> CSR
*************************************************** Top of Data ***************************************************
.~.....~DEMO21  ......4HIGZCBSO ......  CEESTART......  CEEBETBL......  CEERAN0 ......  CEELOCT ......  CEEGMTO ......  CEESG005....
.3
 ..........................................................................................................................
..5695PMB01 ....←....
..~..5655G5300 ....←
.h....←.DEMO21/ADCDMST/000001

........... .......
G00..CEE....G00.qó⊥....×............ö}.A.0.qφ0<..............H...≥.......6.......~.. .....DEMO21  20131016212029030401.È.... .%
......ö........................ ...D...H...<...M...F...~...0...*...-...U...Y...%...ø...È...ˇ...@...~...d...h...≤......m...q...æ...
......ö....  ._Q.......................... ...D...H...<...&...M...Q...*...-...U...Y...%...ø...È...ˇ...@...~...d...h...≤.......m
```

PDS with load modules

At this moment our programs are available for testing in the z/OS Test environment.

The deployment to another z/OS Environment, be it another LPAR or Production environment, is a similar process.

Kobee –Administrator's Point of View

Before Users can start working in Kobee, the Kobee Administrator needs to set up and configure Kobee. Next, he will take care of creating the Kobee projects and specifying the required parameters for the environments and phases.

To make his task as easy as possible, Kobee has introduced the concept of Phases. Phases allow the Kobee Administrator to customize the workflow of the projects by using highly reusable building blocks. Phases can be shared between different Projects, but also between different Kobee installations.

He will use and customize the Kobee pre-defined "Core" phases to transfer the required components to the mainframe, to create the necessary JCL, to submit the JCL and to transfer the results back to Kobee.
If needed, he can also create his own "Custom" Phases.

Step 1

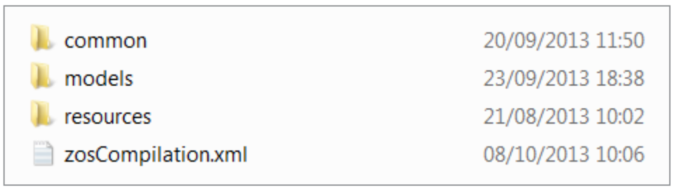
Step1: Create the global Phases

The Phase concept

To compile or deploy programs one or more phases are executed via Kobee.

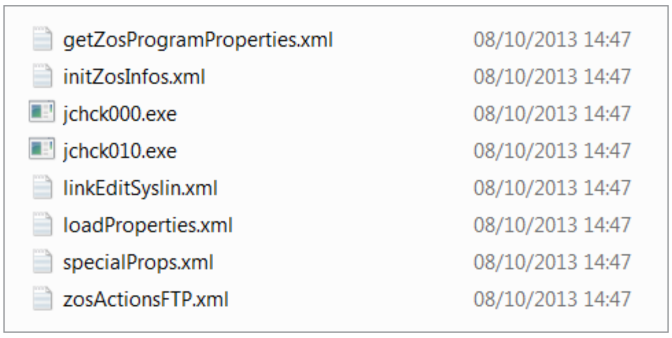
In this section, we will first explain the different components of the phases and, next, we will show how a phase is represented and used in Kobee.

The Kobee Phase Structure



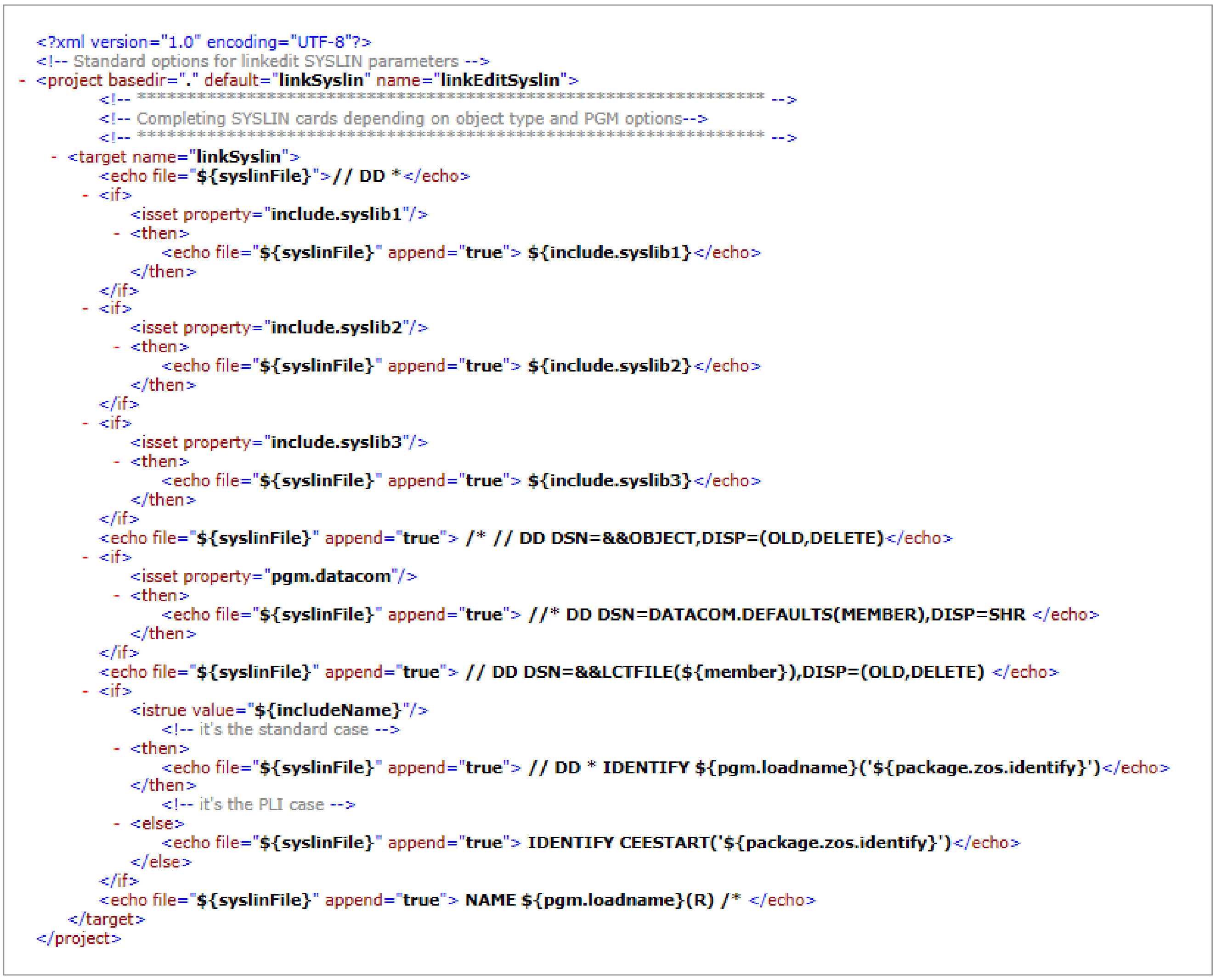
common	20/09/2013 11:50
models	23/09/2013 18:38
resources	21/08/2013 10:02
zosCompilation.xml	08/10/2013 10:06

The Common Files



getZosProgramProperties.xml	08/10/2013 14:47
initZosInfos.xml	08/10/2013 14:47
jchck000.exe	08/10/2013 14:47
jchck010.exe	08/10/2013 14:47
linkEditSyslin.xml	08/10/2013 14:47
loadProperties.xml	08/10/2013 14:47
specialProps.xml	08/10/2013 14:47
zosActionsFTP.xml	08/10/2013 14:47

As an example, we have here a common script file that is used for linking a COBOL program. This common file will be used as a template to finally generate the correct and complete JCL step for linking a program.

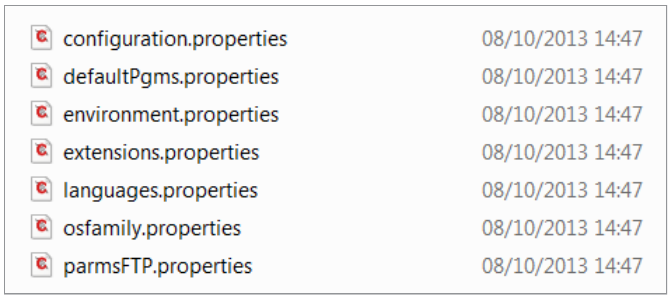


```
  <?xml version="1.0" encoding="UTF-8"?>
  <!-- Standard options for linkedit SYSLIN parameters -->
- <project basedir="." default="linkSyslin" name="linkEditSyslin">
        <!-- ****************************************************************** -->
        <!-- Completing SYSLIN cards depending on object type and PGM options-->
        <!-- ****************************************************************** -->
  - <target name="linkSyslin">
        <echo file="${syslinFile}">// DD *</echo>
      - <if>
            <isset property="include.syslib1"/>
          - <then>
                <echo file="${syslinFile}" append="true"> ${include.syslib1}</echo>
            </then>
        </if>
      - <if>
            <isset property="include.syslib2"/>
          - <then>
                <echo file="${syslinFile}" append="true"> ${include.syslib2}</echo>
            </then>
        </if>
      - <if>
            <isset property="include.syslib3"/>
          - <then>
                <echo file="${syslinFile}" append="true"> ${include.syslib3}</echo>
            </then>
        </if>
        <echo file="${syslinFile}" append="true"> /* // DD DSN=&&OBJECT,DISP=(OLD,DELETE)</echo>
      - <if>
            <isset property="pgm.datacom"/>
          - <then>
                <echo file="${syslinFile}" append="true"> //* DD DSN=DATACOM.DEFAULTS(MEMBER),DISP=SHR </echo>
            </then>
        </if>
        <echo file="${syslinFile}" append="true"> // DD DSN=&&LCTFILE(${member}),DISP=(OLD,DELETE) </echo>
      - <if>
            <istrue value="${includeName}"/>
                <!-- it's the standard case -->
          - <then>
                <echo file="${syslinFile}" append="true"> // DD * IDENTIFY ${pgm.loadname}('${package.zos.identify}')</echo>
            </then>
                <!-- it's the PLI case -->
          - <else>
                <echo file="${syslinFile}" append="true"> IDENTIFY CEESTART('${package.zos.identify}')</echo>
            </else>
        </if>
        <echo file="${syslinFile}" append="true"> NAME ${pgm.loadname}(R) /* </echo>
    </target>
  </project>
```

Link file template

The Resource Files

Resource files are used to define specific, reusable properties



configuration.properties	08/10/2013 14:47
defaultPgms.properties	08/10/2013 14:47
environment.properties	08/10/2013 14:47
extensions.properties	08/10/2013 14:47
languages.properties	08/10/2013 14:47
osfamily.properties	08/10/2013 14:47
parmsFTP.properties	08/10/2013 14:47

As an example, the COBOL2 language definitions from the languages.properties file:

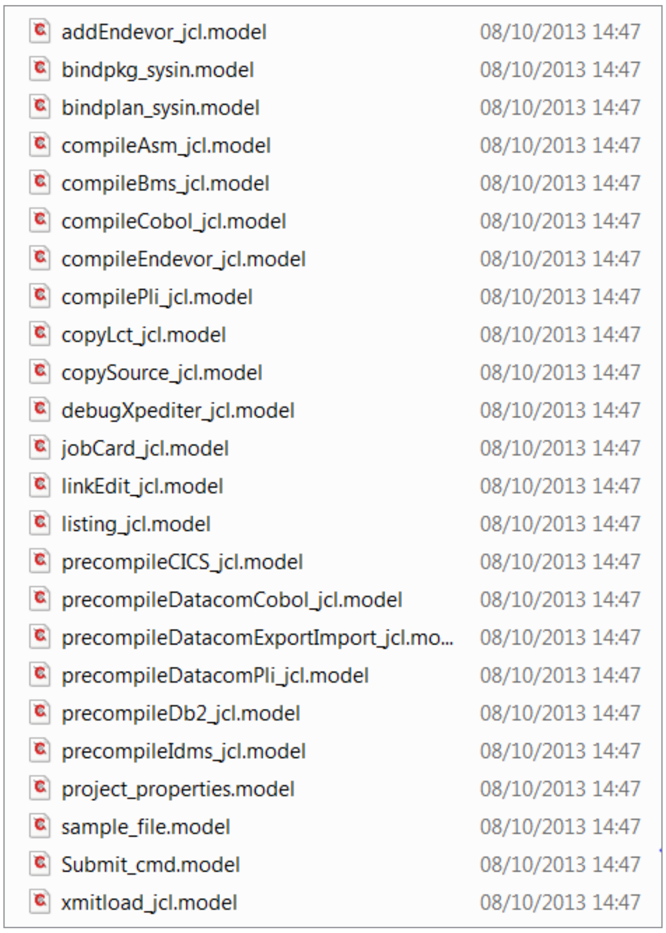
```
# ---------------------------------------------------
# Properties for ZOS Languages
# - called after (Environment).properties
# - property format: (language).parameter
# ---------------------------------------------------
# env.prefix=
# env.qualifA=
# COBOL2 compilation parameters
COBOL2.program=IGYCRCTL
COBOL2.parms=LIST,LIB,NOSEQ,NOCMPR2,MAP
COBOL2.parmlib=${env.prefix}.${env.qualifA}.PARMLIB
COBOL2.prefix=SYS1.CEE
COBOL2.loadlib=${COBOL2.prefix}.SIGYCOMP
COBOL2.suffix=SCEELKED
COBOL2.link.parms=LIST,MAP,XREF,NCAL
COBOL2.cics.program=DFHECP1$
COBOL2.cics.parms=COBOL2,LANGLVL(2),NODEBUG,NOSOURCE,SP,NOOPT
COBOL2.cics.linkModule=DFHECI
COBOL2.cics.db2.linkModule=DSNCLI
COBOL2.db2.program=DSNHPC
COBOL2.db2.parms=HOST(COB2),APOST
COBOL2.db2.linkModule=DSNCLI
COBOL2.dtcm.program=DBXMMPR
COBOL2.dtcm.parms=DBOPTBAC
COBOL2.dtcm.parms.cics=DBOPTCIC
COBOL2.dtcm.linkModule=DBXHVPR
COBOL2.idms.program=IDMSC
COBOL2.idms.parms=(COBOL)
COBOL2.idms.linkModule=IDMSCBL
COBOL2.ims.program=DSNIPC
COBOL2.ims.parms=(COBOL2)
COBOL2.ims.linkModule=DSNILI
COBOL2.linkedit.program=HEWL
COBOL2.ndvr.type=COBOL
```

The example below shows the generated properties to use the COBOL2 language definitions in a COBOL program:

```
#Ant properties
#Mon Sep 30 10:57:09 CEST 2013
pgm.amode=31
pgm.cics=true
pgm.compile.parms=DATA(31),${RENT}
pgm.compilerType=IBM
pgm.db2=true
pgm.db2.collection=xxxxIKAN1
pgm.db2.path=xxxxFUNC
pgm.db2.plan=ULC010
pgm.db2.sql=true
pgm.debugger=true
pgm.language=COBOL2
pgm.link.parms=
pgm.loadname=ULC010
pgm.name=ULC010
pgm.noname=true
pgm.os=ZOS
pgm.reus=RENT
pgm.rmode=ANY
pgm.type=program
```

The Model files

Model files are used as templates for JCL steps.
As an example, we added a model for a JCL to compile a COBOL program, with a COBOL2 compiler.



addEndevor_jcl.model	08/10/2013 14:47
bindpkg_sysin.model	08/10/2013 14:47
bindplan_sysin.model	08/10/2013 14:47
compileAsm_jcl.model	08/10/2013 14:47
compileBms_jcl.model	08/10/2013 14:47
compileCobol_jcl.model	08/10/2013 14:47
compileEndevor_jcl.model	08/10/2013 14:47
compilePli_jcl.model	08/10/2013 14:47
copyLct_jcl.model	08/10/2013 14:47
copySource_jcl.model	08/10/2013 14:47
debugXpediter_jcl.model	08/10/2013 14:47
jobCard_jcl.model	08/10/2013 14:47
linkEdit_jcl.model	08/10/2013 14:47
listing_jcl.model	08/10/2013 14:47
precompileCICS_jcl.model	08/10/2013 14:47
precompileDatacomCobol_jcl.model	08/10/2013 14:47
precompileDatacomExportImport_jcl.mo...	08/10/2013 14:47
precompileDatacomPli_jcl.model	08/10/2013 14:47
precompileDb2_jcl.model	08/10/2013 14:47
precompileIdms_jcl.model	08/10/2013 14:47
project_properties.model	08/10/2013 14:47
sample_file.model	08/10/2013 14:47
Submit_cmd.model	08/10/2013 14:47
xmitload_jcl.model	08/10/2013 14:47

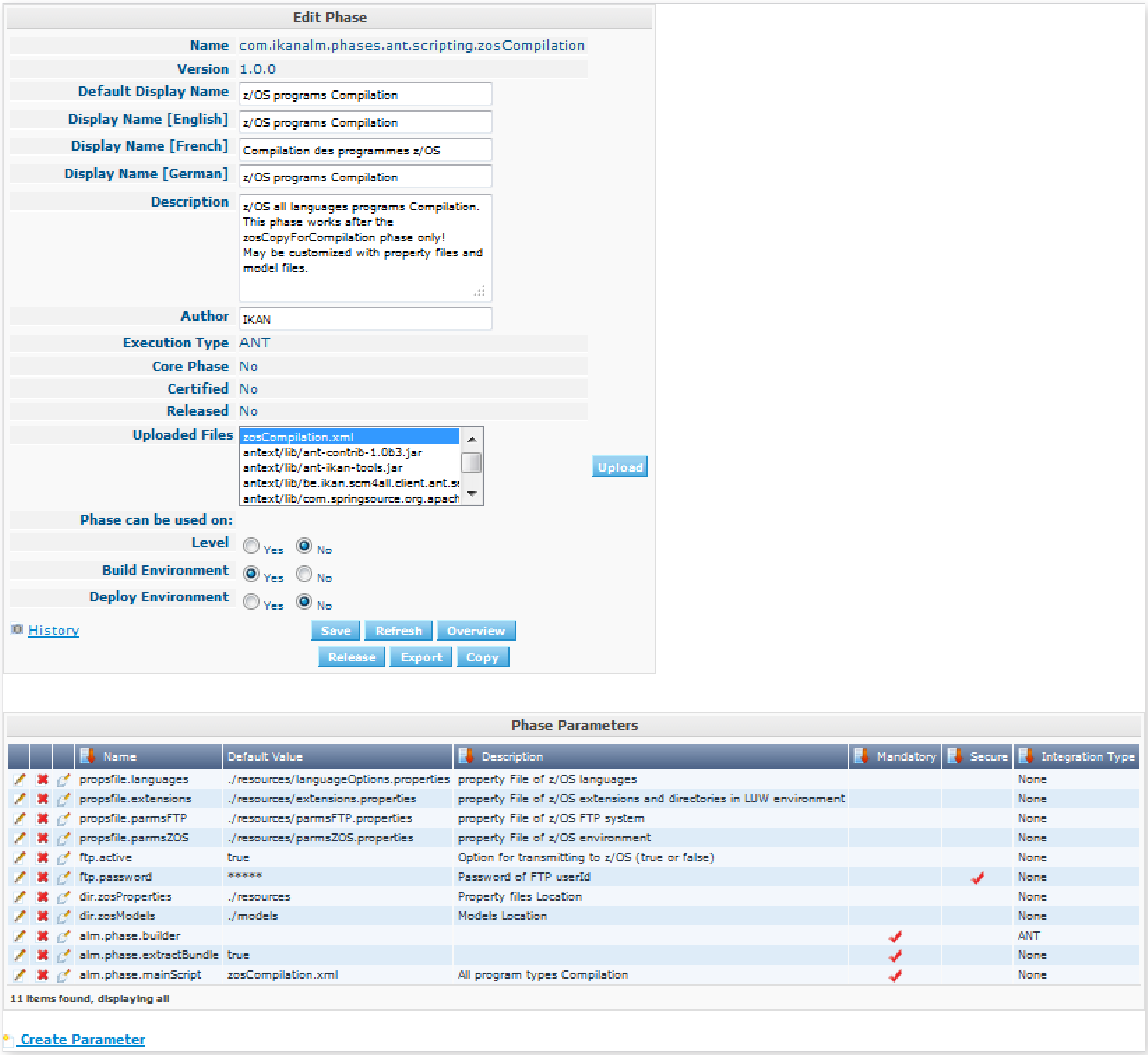
The compileCobol_jcl.model

```
//*****************************************************************
//**    COMPILE COBOL2, store object in objlib if compile=ok
//**    compile listing is stored in ${env.lib.listA}
//*****************************************************************
//         SET PARMCOB='${lang.parms}'
//         SET PARMCOB0='${pgm.compile.parms}'
//*****************************************************************
//**    COMPILE THE ELEMENT                                        **
//*****************************************************************
//${pgm.language}  EXEC PGM=${lang.program},COND=(4,LT),
//    PARM='&PARMCOB0,&PARMCOB',MAXRC=4
//STEPLIB   DD  DISP=SHR,DSN=${lang.loadlib}
//SYSIN     DD  DISP=(OLD,PASS),DSN=&&&SRCOMPIL
//SYSLIN    DD  DISP=(,PASS),DSN=&&OBJECT,
//              UNIT=SYSDA,SPACE=(CYL,(2,2)),
//              DCB=(RECFM=FB,LRECL=80,BLKSIZE=0)
//SYSUT1    DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT2    DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT3    DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT4    DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT5    DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT6    DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT7    DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSPRINT DD  DISP=(,PASS),DSN=&&COMPLIST,
//             UNIT=SYSDA,SPACE=(TRK,(10,10),RLSE)
//*             DCB=(RECFM=FBA,LRECL=133,BLKSIZE=0)
//*
//SYSLIB    DD  DISP=SHR,DSN=${copylib}
//${copylib1}
//${copylib2}
//${copylib3}
//${copylib4}
//${inc2lib0}
//${inc2lib1}
//${inc2lib2}
//${inc2lib3}
//${inc2lib4}
```

JCL model for COBOL compile step

An Kobee phase and its usage: the z/OS compile phase

The figure below shows the z/OS compile phase.



Edit Phase

Name	com.ikanalm.phases.ant.scripting.zosCompilation
Version	1.0.0
Default Display Name	z/OS programs Compilation
Display Name [English]	z/OS programs Compilation
Display Name [French]	Compilation des programmes z/OS
Display Name [German]	z/OS programs Compilation
Description	z/OS all languages programs Compilation. This phase works after the zosCopyForCompilation phase only! May be customized with property files and model files.
Author	IKAN
Execution Type	ANT
Core Phase	No
Certified	No
Released	No
Uploaded Files	zosCompilation.xml antext/lib/ant-contrib-1.0b3.jar antext/lib/ant-ikan-tools.jar antext/lib/be.ikan.scm4all.client.ant.s antext/lib/com.springsource.org.apach
Phase can be used on:	
Level	Yes [✓ No]
Build Environment	[✓ Yes] No
Deploy Environment	Yes [✓ No]

Phase Parameters

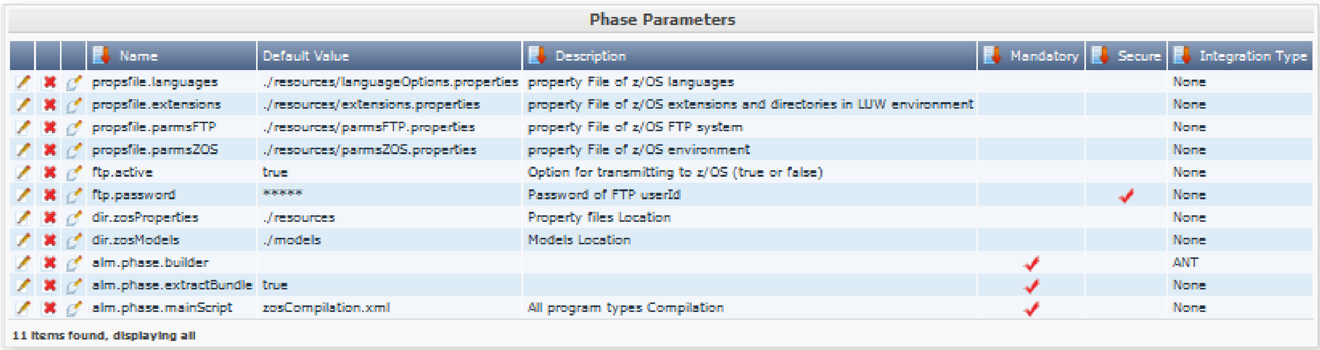
Name	Default Value	Description	Mandatory	Secure	Integration Type
propsfile.languages	./resources/languageOptions.properties	property File of z/OS languages			None
propsfile.extensions	./resources/extensions.properties	property File of z/OS extensions and directories in LUW environment			None
propsfile.parmsFTP	./resources/parmsFTP.properties	property File of z/OS FTP system			None
propsfile.parmsZOS	./resources/parmsZOS.properties	property File of z/OS environment			None
ftp.active	true	Option for transmitting to z/OS (true or false)			None
ftp.password	*****	Password of FTP userId		✓	None
dir.zosProperties	./resources	Property files Location			None
dir.zosModels	./models	Models Location			None
alm.phase.builder			✓		ANT
alm.phase.extractBundle	true		✓		None
alm.phase.mainScript	zosCompilation.xml	All program types Compilation	✓		None

11 items found, displaying all

The objective of the z/OS compile Phase is to compile z/OS programs with, mainly, Assembler, COBOL and PL/1, BMS map languages, and working with CICS and Databases as DB2, Datacom, IDMS or IMS. The Phase will also control the results of the JCL submit and it will collect all files generated by the compile Jobs. Also, when applicable, the DB2 Bind Files will be generated.

This phase assumes that the files for compiling sources and the source program files have already been transferred to the mainframe in the correct PDSs. Normally, this would be done by a dedicated phase.

It is the task of the Kobee Administrator to make sure that the default values for the parameters are set to the company standards. He can easily do that by changing the parameter values in the Kobee web interface.



Phase Parameters

Name	Default Value	Description	Mandatory	Secure	Integration Type
propsfile.languages	./resources/languageOptions.properties	property File of z/OS languages			None
propsfile.extensions	./resources/extensions.properties	property File of z/OS extensions and directories in LUW environment			None
propsfile.parmsFTP	./resources/parmsFTP.properties	property File of z/OS FTP system			None
propsfile.parmsZOS	./resources/parmsZOS.properties	property File of z/OS environment			None
ftp.active	true	Option for transmitting to z/OS (true or false)			None
ftp.password	*****	Password of FTP userId		✓	None
dir.zosProperties	./resources	Property files Location			None
dir.zosModels	./models	Models Location			None
alm.phase.builder			✓		ANT
alm.phase.extractBundle	true		✓		None
alm.phase.mainScript	zosCompilation.xml	All program types Compilation	✓		None

11 items found, displaying all

The execution of the z/OS Compile phase will use the z/OS compile script to finally generate a complete JCL, taking into account all JCL steps to be executed.

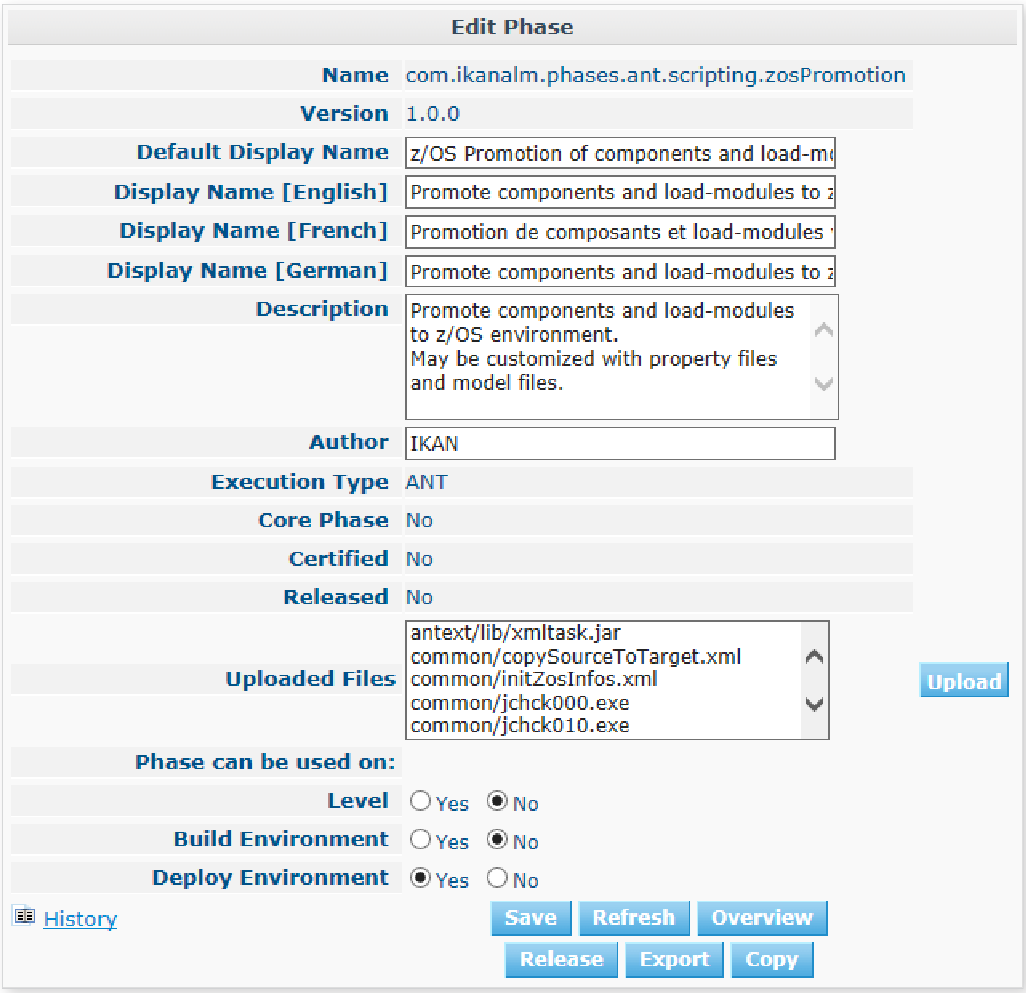
The figure below shows the generated JOB card and the STEP card to compile the COBOL program. The complete generated JCL can be found in Appendix V: Sample of z/OS compilation JCL.

```
...
//*********************************************************************
//**     COMPILE COBOL2, store object in objlib if compile=ok
//**     compile listing is stored in IKAN ALM.DEMOS.TEST.LSTALIB
//*********************************************************************
//          SET PARMCOB='LIST,LIB,NOSEQ,NOCMPR2,MAP'
//          SET PARMCOB0='DATA(31)'
//*********************************************************************
//**     COMPILE THE ELEMENT                                          **
//*********************************************************************
//COBOL2   EXEC PGM=IGYCRCTL,COND=(4,LT),
//    PARM='&PARMCOB0,&PARMCOB'
//STEPLIB   DD   DISP=SHR,DSN=SYS1.COB2COMP
//SYSIN     DD   DISP=(OLD,PASS),DSN=&&&SRCOMPIL       (ULC010)
//SYSLIN    DD   DISP=(,PASS),DSN=&&OBJECT,
//               UNIT=SYSDA,SPACE=(CYL,(2,2)),
//               DCB=(RECFM=FB,LRECL=80,BLKSIZE=0)
//SYSUT1    DD   UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT2    DD   UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT3    DD   UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT4    DD   UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT5    DD   UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT6    DD   UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT7    DD   UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSPRINT DD   DISP=(,PASS),DSN=&&COMPLIST,
//              UNIT=SYSDA,SPACE=(TRK,(10,10),RLSE)
//*             DCB=(RECFM=FBA,LRECL=133,BLKSIZE=0)
//*
//SYSLIB    DD   DISP=SHR,DSN=IKAN ALM.DEMOS.TEST.COPYLIB
//          DD   DISP=SHR,DSN=IKAN ALM.DEMOS.INTG.COPYLIB
//          DD   DISP=SHR,DSN=IKAN ALM.DEMOS.QUAL.COPYLIB
//          DD   DISP=SHR,DSN=IKAN ALM.DEMOS.PROD.COPYLIB
//*
```

The Kobee Administrator will do this for all the phases required for the mainframe Build (compile) and deploy processes (probably for several z/OS projects).

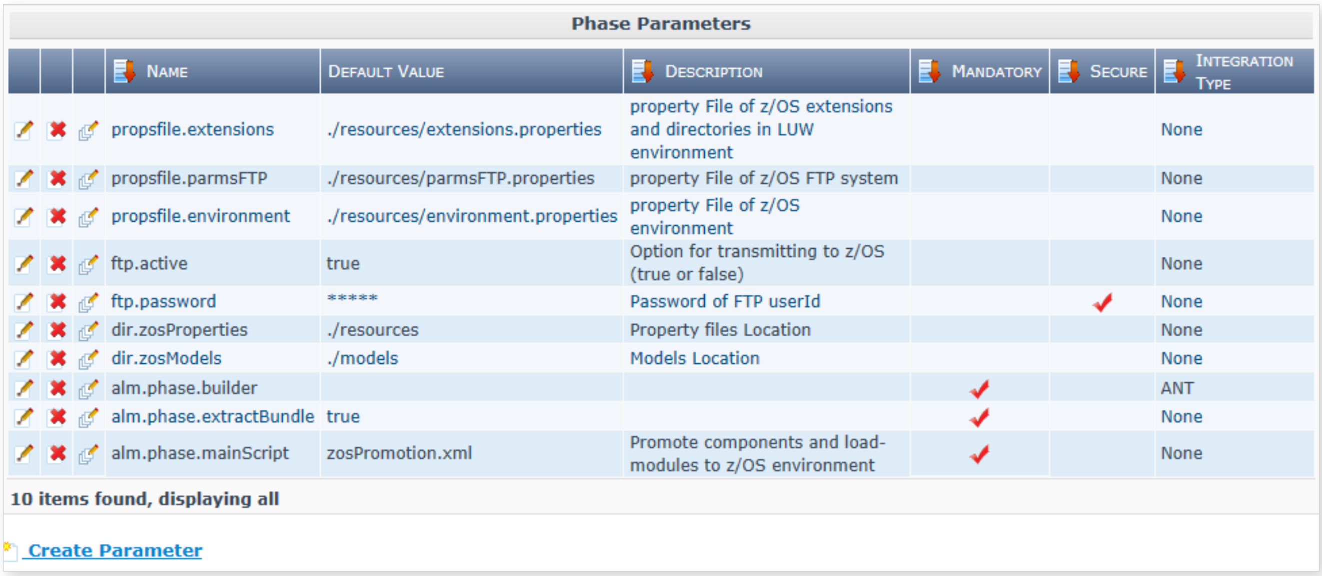
An Kobee phase and its usage: the z/OS deployment phase

Next, we will show you an example of a Deployment Phase.
The main phase of the z/OS deployment with Kobee is the z/OS Promotion of components and load-modules' Phase.



Edit Phase

Name	com.ikanalm.phases.ant.scripting.zosPromotion
Version	1.0.0
Default Display Name	z/OS Promotion of components and load-m
Display Name [English]	Promote components and load-modules to z
Display Name [French]	Promotion de composants et load-modules
Display Name [German]	Promote components and load-modules to z
Description	Promote components and load-modules to z/OS environment. May be customized with property files and model files.
Author	IKAN
Execution Type	ANT
Core Phase	No
Certified	No
Released	No
Uploaded Files	antext/lib/xmltask.jar common/copySourceToTarget.xml common/initZosInfos.xml common/jchck000.exe common/jchck010.exe
Phase can be used on:	
Level	Yes [✓ No]
Build Environment	Yes [✓ No]
Deploy Environment	[✓ Yes] No



Phase Parameters

Name	Default Value	Description	Mandatory	Secure	Integration Type
propsfile.extensions	./resources/extensions.properties	property File of z/OS extensions and directories in LUW environment			None
propsfile.parmsFTP	./resources/parmsFTP.properties	property File of z/OS FTP system			None
propsfile.environment	./resources/environment.properties	property File of z/OS environment			None
ftp.active	true	Option for transmitting to z/OS (true or false)			None
ftp.password	*****	Password of FTP userId		✓	None
dir.zosProperties	./resources	Property files Location			None
dir.zosModels	./models	Models Location			None
alm.phase.builder			✓		ANT
alm.phase.extractBundle	true		✓		None
alm.phase.mainScript	zosPromotion.xml	Promote components and load-modules to z/OS environment	✓		None

10 items found, displaying all

Typically, the parameters are very similar, but you can specify another property file for the target environment during the project setup if required.

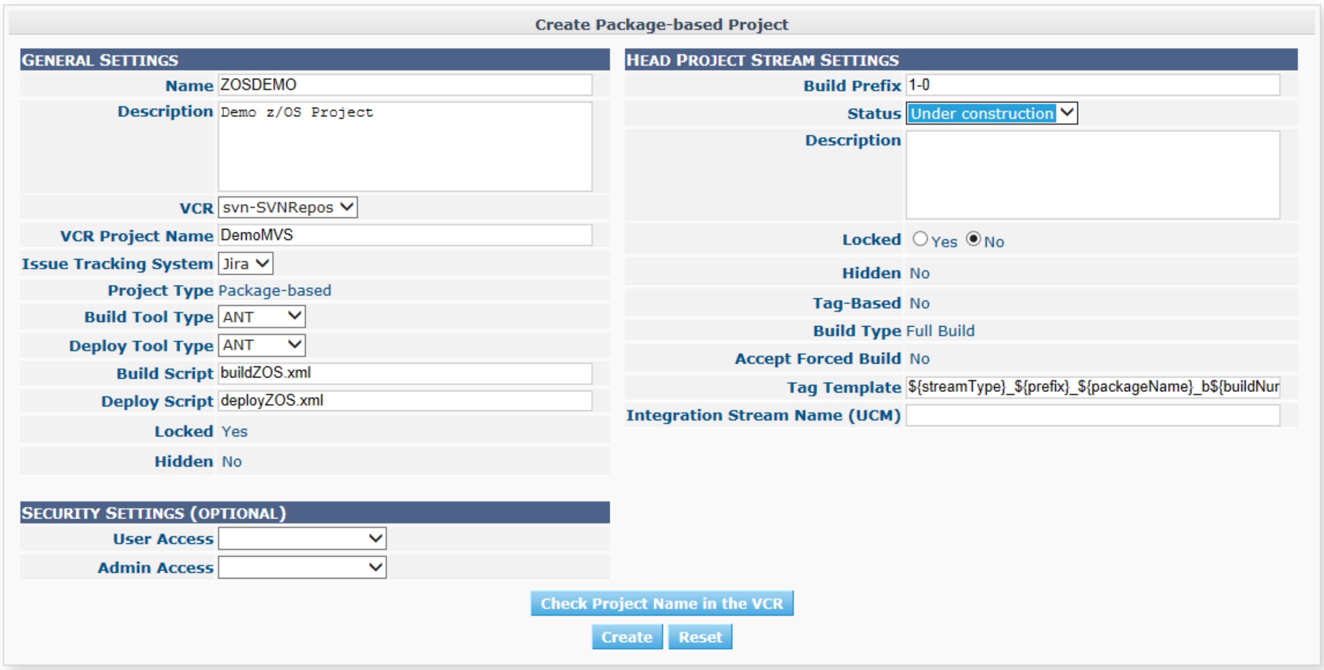
Step 2

Step 2: Create the Kobee project(s)

Once the global phases have been defined, the Kobee Administrator creates a release-based or package-based mainframe project.

In this example we will show the creation of a package-based mainframe project: ZOSDEMO.

First he needs to define the General settings and the Project Stream (Baseline) settings on the following screen.



Create Package-based Project

GENERAL SETTINGS

Name	ZOSDEMO
Description	Demo z/OS Project
VCR	svn-SVNRepos
VCR Project Name	DemoMVS
Issue Tracking System	Jira
Project Type	Package-based
Build Tool Type	ANT
Deploy Tool Type	ANT
Build Script	buildZOS.xml
Deploy Script	deployZOS.xml
Locked	Yes
Hidden	No

HEAD PROJECT STREAM SETTINGS

Build Prefix	1-0
Status	Under construction
Description	
Locked	Yes [✓ No]
Hidden	No
Tag-Based	No
Build Type	Full Build
Accept Forced Build	No
Tag Template	${streamType}_${prefix}_${packageName}_b${buildNur
Integration Stream Name (UCM)	

SECURITY SETTINGS (OPTIONAL)

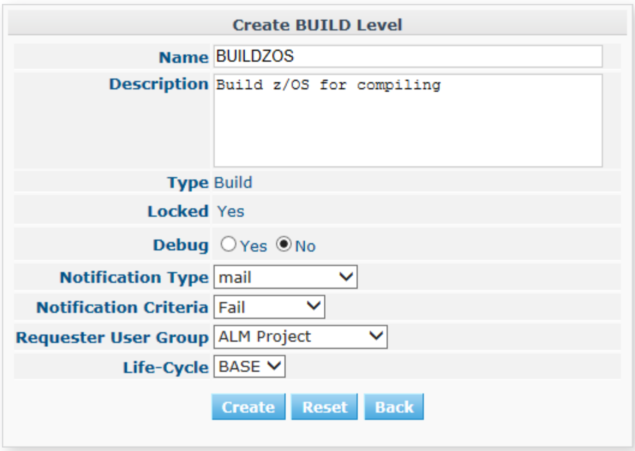
User Access	
Admin Access	

During this creation step, Kobee will also automatically create the “Head” Project Stream and the “Base” lifecycle.

Step 3: Adapt the lifecycle (if necessary)

By default, a "Base" lifecycle is created for the Project, which can be used for defining the required Build and Deploy Levels (i.e., the logical environments). If that lifecycle is not sufficient for the project, the Kobee Administrator needs to define a new lifecycle.

The following screen shows how, for example, a Build/Compile level is created.

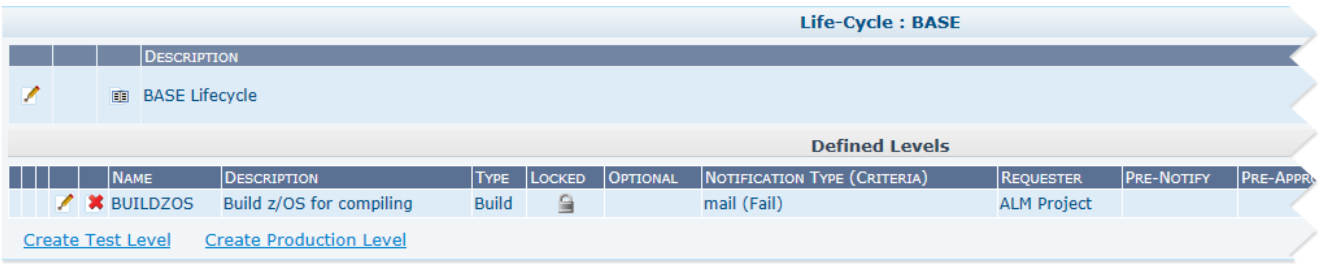


Create BUILD Level

Name	BUILDZOS
Description	Build z/OS for compiling
Type	Build
Locked	Yes
Debug	Yes [✓ No]
Notification Type	mail
Notification Criteria	Fail
Requester User Group	ALM Project
Life-Cycle	BASE

Create Build Level

Once the Build/Compile level is created, it will be displayed on the Life-Cycles Overview screen.



Life-Cycle : BASE

Description
BASE Lifecycle

Defined Levels

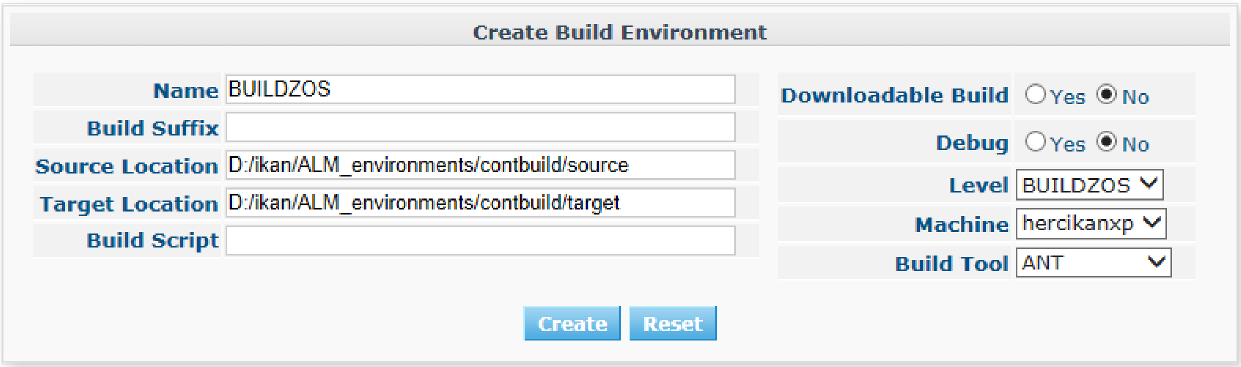
Name	Description	Type	Locked	Optional	Notification Type (Criteria)	Requester	Pre-Notify	Pre-Appr
BUILDZOS	Build z/OS for compiling	Build	🔒		mail (Fail)	ALM Project		

Life-Cycles Overview

Step 4

Step 4: Define the environments and the necessary parameters

For each (logical) Level (Build, Test or Production), one or more (physical) environments can be defined. The following screen shows the definition of a Build Environment.

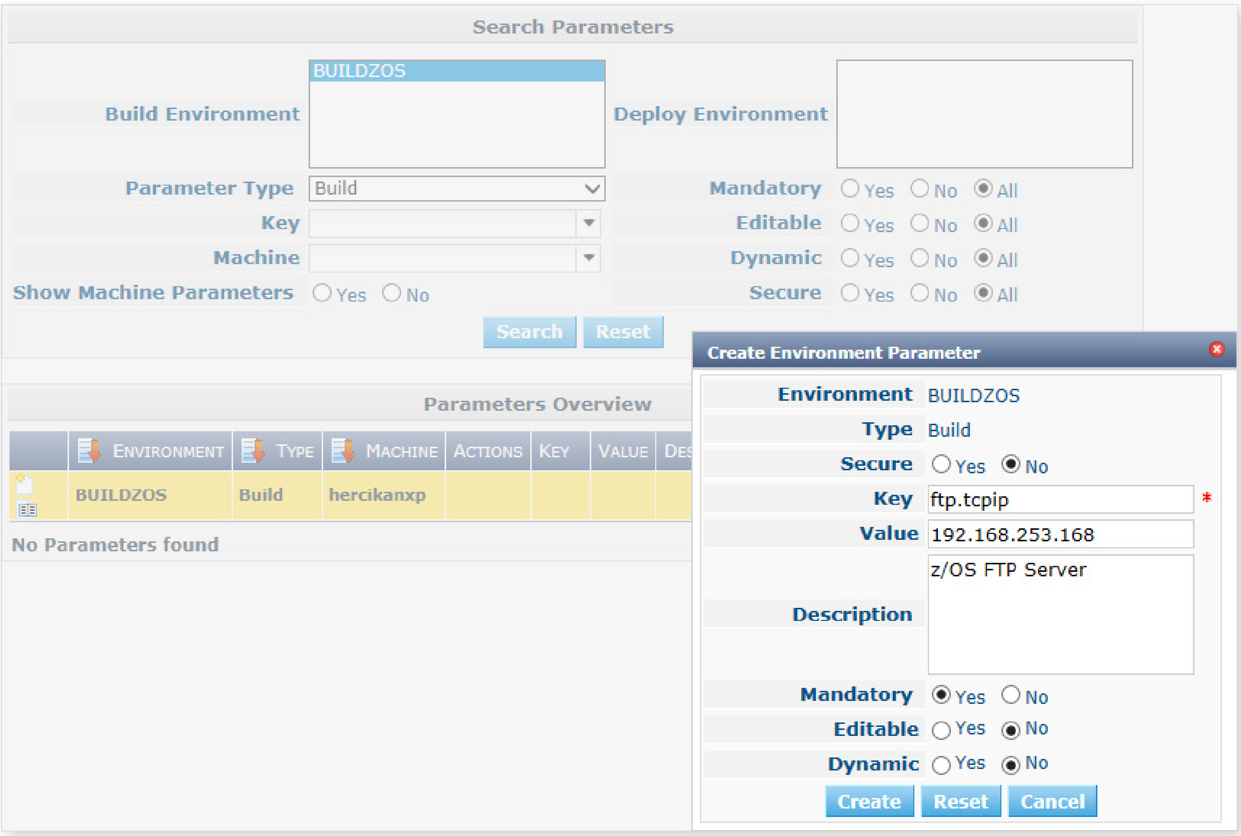


Create Build Environment

Name	BUILDZOS
Build Suffix	
Source Location	D:/ikan/ALM_environments/contbuild/source
Target Location	D:/ikan/ALM_environments/contbuild/target
Build Script	
Downloadable Build	Yes [✓ No]
Debug	Yes [✓ No]
Level	BUILDZOS
Machine	hercikanxp
Build Tool	ANT

Create Build Environment

Once the Environment is created, the Kobee Administrator can define the necessary parameters for this environment. Examples of parameters for the BUILDZOS environment are: the z/OS FTP Server address, the User ID and Password for connecting with the z/OS LPAR.



Search Parameters

Build Environment	BUILDZOS
Deploy Environment	
Parameter Type	Build
Key	
Machine	
Show Machine Parameters	Yes No
Mandatory	Yes No [✓ All]
Editable	Yes No [✓ All]
Dynamic	Yes No [✓ All]
Secure	Yes No [✓ All]

Parameters Overview

	Environment	Type	Machine	Actions	Key	Value	Des
	BUILDZOS	Build	hercikanxp				

No Parameters found

Create Environment Parameter

Environment	BUILDZOS
Type	Build
Secure	Yes [✓ No]
Key	ftp.tcpip *
Value	192.168.253.168
Description	z/OS FTP Server
Mandatory	[✓ Yes] No
Editable	Yes [✓ No]
Dynamic	Yes [✓ No]

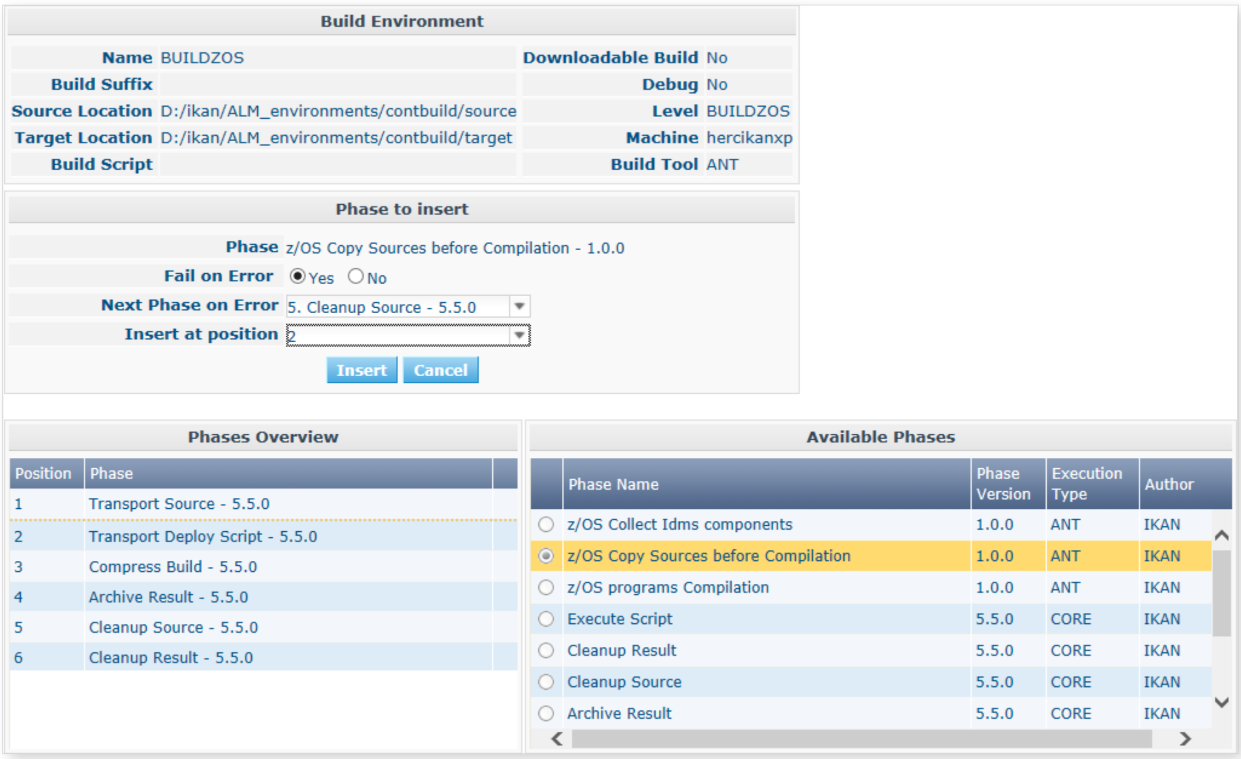
Environment, Parameters

Step 5

Step 5: Add phases

Once the Levels and Environments have been created, the Kobee Administrator can define the Build or Deploy process by adding Phases. When an Environment is being created, Kobee adds, by default, the Kobee core Phases.

For the z/OS platform, the applicable z/OS Phases have to be added in the correct order for execution. Two z/OS Phases need to be inserted: z/OS Copy Sources before Compilation and z/OS programs Compilation.



Build Environment

Name	BUILDZOS	Downloadable Build	No
Build Suffix		Debug	No
Source Location	D:/ikan/ALM_environments/contbuild/source	Level	BUILDZOS
Target Location	D:/ikan/ALM_environments/contbuild/target	Machine	hercikanxp
Build Script		Build Tool	ANT

Phase to insert

Phase	z/OS Copy Sources before Compilation - 1.0.0
Fail on Error	[✓ Yes] No
Next Phase on Error	5. Cleanup Source - 5.5.0
Insert at position	2

Insert Cancel

Phases Overview

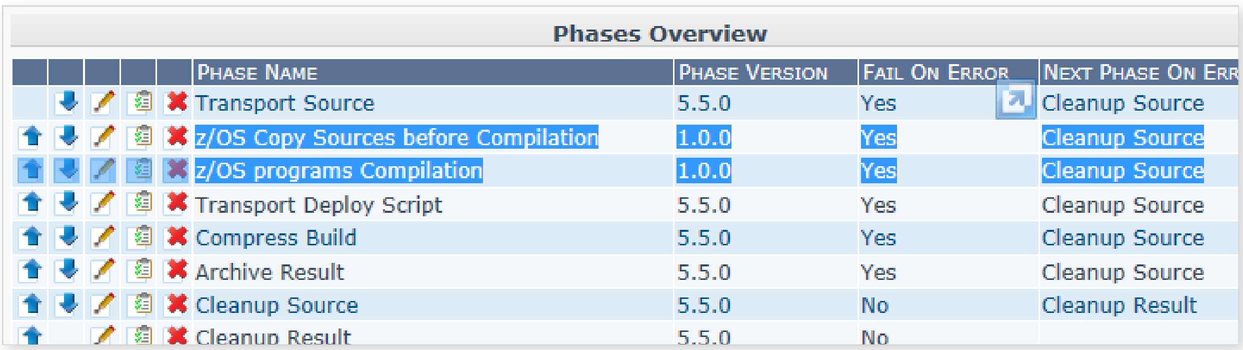
Position	Phase
1	Transport Source - 5.5.0
2	Transport Deploy Script - 5.5.0
3	Compress Build - 5.5.0
4	Archive Result - 5.5.0
5	Cleanup Source - 5.5.0
6	Cleanup Result - 5.5.0

Available Phases

	Phase Name	Phase Version	Execution Type	Author
○	z/OS Collect Idms components	1.0.0	ANT	IKAN
●	z/OS Copy Sources before Compilation	1.0.0	ANT	IKAN
○	z/OS programs Compilation	1.0.0	ANT	IKAN
○	Execute Script	5.5.0	CORE	IKAN
○	Cleanup Result	5.5.0	CORE	IKAN
○	Cleanup Source	5.5.0	CORE	IKAN
○	Archive Result	5.5.0	CORE	IKAN

Phase to insert

Once inserted, they need to be put in the right order of execution: first the sources to be compiled have to be transferred to the mainframe and after that the compile process can be started.



Phases Overview

					Phase Name	Phase Version	Fail On Error	Next Phase On Err
	↓	✎	▤	✖	Transport Source	5.5.0	Yes	Cleanup Source
↑	↓	✎	▤	✖	z/OS Copy Sources before Compilation	1.0.0	Yes	Cleanup Source
↑	↓	✎	▤	✖	z/OS programs Compilation	1.0.0	Yes	Cleanup Source
↑	↓	✎	▤	✖	Transport Deploy Script	5.5.0	Yes	Cleanup Source
↑	↓	✎	▤	✖	Compress Build	5.5.0	Yes	Cleanup Source
↑	↓	✎	▤	✖	Archive Result	5.5.0	Yes	Cleanup Source
↑	↓	✎	▤	✖	Cleanup Source	5.5.0	No	Cleanup Result
↑		✎	▤	✖	Cleanup Result	5.5.0	No	

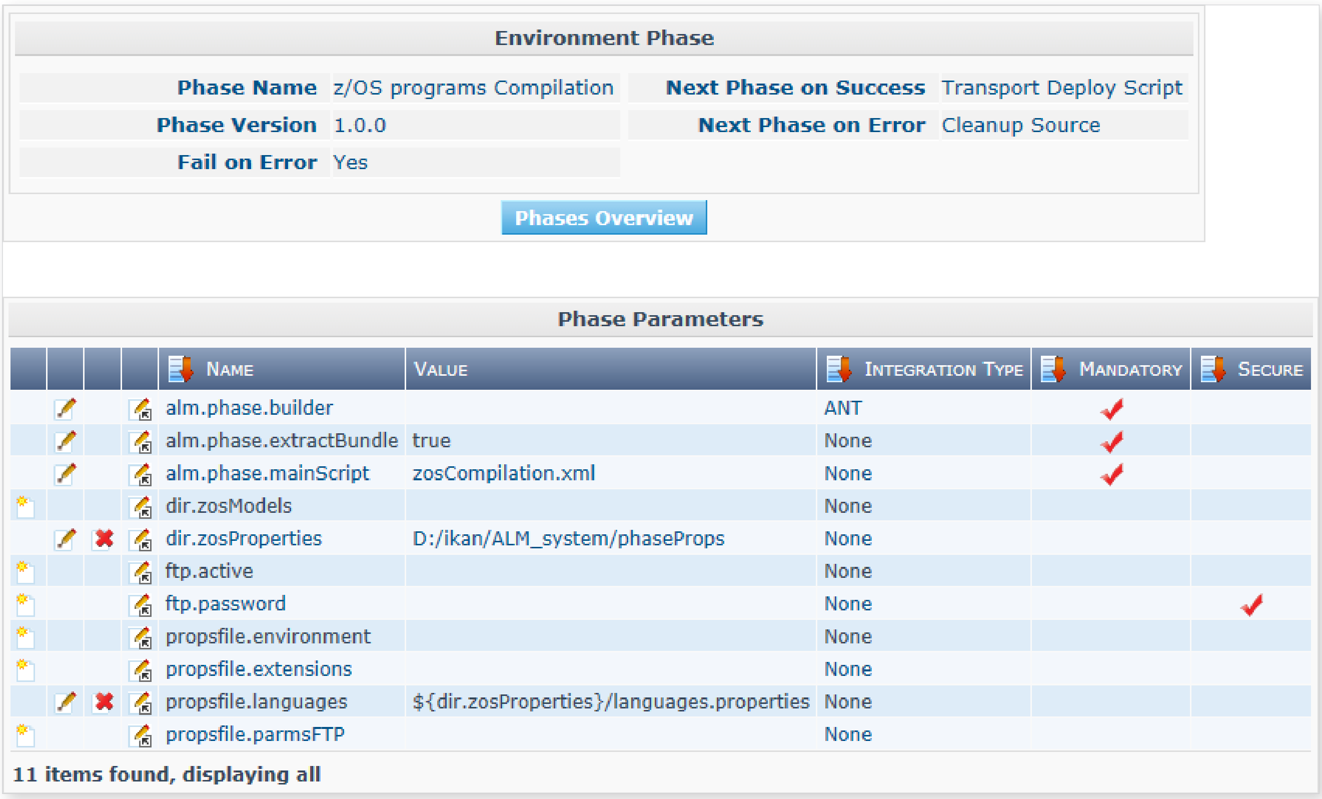
Phase Overview, right order

Step 6

Step 6: Modify the phase parameters

Each Phase comes with Default values, set by the Kobee Administrator at import.

If required, the default values of these parameters can be modified as shown on the Phase Parameters screen below.



Environment Phase

Phase Name	z/OS programs Compilation	**Next Phase on Success**	Transport Deploy Script
Phase Version	1.0.0	**Next Phase on Error**	Cleanup Source
Fail on Error	Yes		

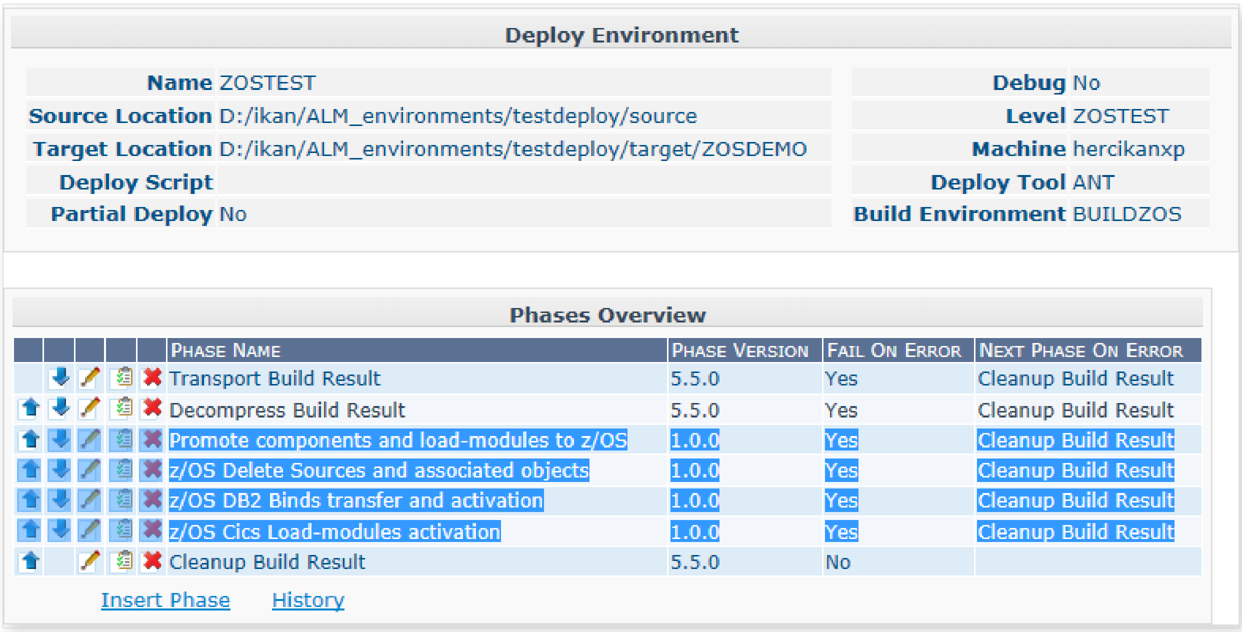
Phase Parameters

Name	Value	Integration Type	Mandatory	Secure
alm.phase.builder		ANT	✓	
alm.phase.extractBundle	true	None	✓	
alm.phase.mainScript	zosCompilation.xml	None	✓	
dir.zosModels		None		
dir.zosProperties	D:/ikan/ALM_system/phaseProps	None		
ftp.active		None		
ftp.password		None		✓
propsfile.environment		None		
propsfile.extensions		None		
propsfile.languages	${dir.zosProperties}/languages.properties	None		
propsfile.parmsFTP		None		

11 items found, displaying all

Phase parameters

Using the same method, the Deploy Environment is completed with the required z/OS deployment Phases such as: ‘Promote components and load-modules to z/OS’, ‘z/OS Delete Sources and associated files’, ‘z/OS DB2 Binds transfer and activation’, ‘z/OS Cics Load-modules activation’.



Deploy Environment

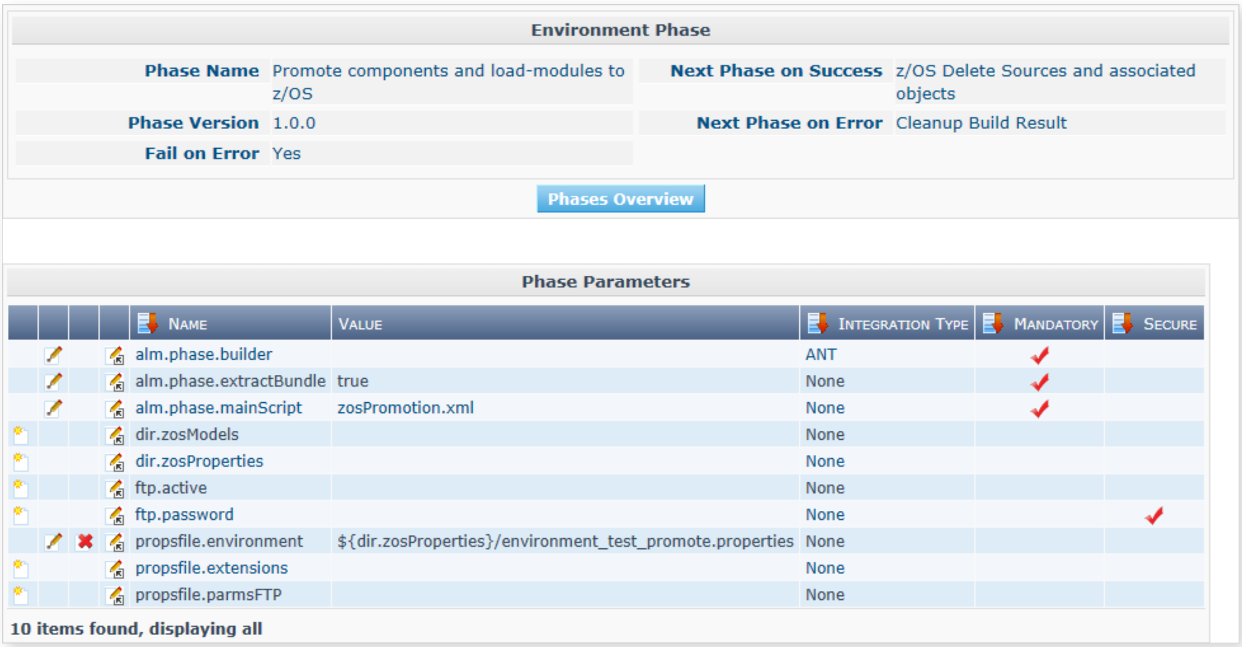
Name	ZOSTEST	**Debug**	No
Source Location	D:/ikan/ALM_environments/testdeploy/source	**Level**	ZOSTEST
Target Location	D:/ikan/ALM_environments/testdeploy/target/ZOSDEMO	**Machine**	hercikanxp
Deploy Script		**Deploy Tool**	ANT
Partial Deploy	No	**Build Environment**	BUILDZOS

Phases Overview

Phase Name	Phase Version	Fail On Error	Next Phase On Error
Transport Build Result	5.5.0	Yes	Cleanup Build Result
Decompress Build Result	5.5.0	Yes	Cleanup Build Result
Promote components and load-modules to z/OS	1.0.0	Yes	Cleanup Build Result
z/OS Delete Sources and associated objects	1.0.0	Yes	Cleanup Build Result
z/OS DB2 Binds transfer and activation	1.0.0	Yes	Cleanup Build Result
z/OS Cics Load-modules activation	1.0.0	Yes	Cleanup Build Result
Cleanup Build Result	5.5.0	No	

Insert Phase History

Next, the Kobee Administrator changes some default parameters for its target environment:



Environment Phase

Phase Name	Promote components and load-modules to z/OS	**Next Phase on Success**	z/OS Delete Sources and associated objects
Phase Version	1.0.0	**Next Phase on Error**	Cleanup Build Result
Fail on Error	Yes		

Phases Overview

Phase Parameters

Name	Value	Integration Type	Mandatory	Secure
alm.phase.builder		ANT	✓	
alm.phase.extractBundle	true	None	✓	
alm.phase.mainScript	zosPromotion.xml	None	✓	
dir.zosModels		None		
dir.zosProperties		None		
ftp.active		None		
ftp.password		None		✓
propsfile.environment	${dir.zosProperties}/environment_test_promote.properties	None		
propsfile.extensions		None		
propsfile.parmsFTP		None		

10 items found, displaying all

Now that the Kobee Administrator has done his job, the User can start using Kobee for building/compiling, promoting or deploying his programs.

Conclusion

Kobee offers an alternative for pure mainframe-based development by combining an Eclipse-based development environment with a distributed version control repository. On top of that Kobee complements the development process with Application Lifecycle Management and deploy services.

Kobee's major asset is its concept of Phases. JCL can be very complicated. By using Kobee Phases, you can generate and tailor any JCL step.

Thanks to the phase concept and the available models and resources we can also guarantee an easy and successful implementation (as an average, it will only take a few weeks).

The key element is for you to define your ALM process. Once that has been established, the implementation of Kobee is fast and straightforward.

If you are already using a mainframe solution like CA-Endevor or Serena ChangeMan and you would decide to migrate to Kobee, you will of course need to migrate your CA-Endevor or Serena ChangeMan legacy to Kobee. To do so, we have a standard migration procedure.

In a nutshell: by implementing Kobee, you can continue exploiting the full strengths of your mainframe and seamlessly combine them with new innovative tooling. This will help you cutting down the costs of maintaining different systems, and above all ease the work of your developers as Kobee will take care of the different steps in the lifecycle of your application including its deploy on the mainframe

For More Information

To know more, visit https://www.kobee.io
Contact IKAN Development: info@ikan.be

Related Document

Modern Mainframe Development and ALM

The following appendices explain the terminology used by the different ALM mainframe software providers.

Appendix I: Kobee Terminology

The following table explains the terms used by Kobee and provides a brief comment for each of them. This will help users of Kobee to have a better understanding of the terminology used.

Kobee	Remarks
VCR	A Version Control Repository contains the components to manage. Examples of VCRs are: CVS, Subversion, IBM ClearCase, Serena PVCS, Microsoft VisualSourceSafe.
Project	A tailored Lifecycle process including development, testing, quality assurance and production can be easily defined, implemented and enforced, offering a comprehensive framework across all major platforms including Windows, UNIX, Linux and IBM mainframe systems. Kobee also supports a stream-based project model allowing project managers to easily add Lifecycles to each version of a project, which makes it easy to differentiate between maintenance, "urgency fix" or release build and deploy processes.
Lifecycle	Defines the Lifecycle(s) from Development to Production Levels for Streams.
Project Stream	Each Kobee Project contains exactly one HEAD Project Stream and may contain one or more Branches. A Project Stream is a working entity within Kobee
Level	Defines every step of the Lifecycle from Development to Production, supporting physical Environments.
Environment	Kobee uses the (logical) Level concept in which (Build/Deploy) environments can be defined. Every environment represents a Machine (Server/OS) on the network where the Source and Target Locations are defined for executing Phases. This is a unique architectural Kobee feature, representing the true multi-platform aspect of Kobee.
Package	Instead of using a Release Project, Kobee may work with Packages in the Project. The required files must be added manually from the VCR to the Package Kobee does not contain the Sources. It only knows the link to the files in the VCR project.
Level Request	A Level Request in Kobee starts a Build, Deploy and Rollback in the Environment(s).
Build Request	The Build Level Request type in Kobee will usually take care of a compile procedure for components.
Phase	users can extensively customize the workflow of their projects, by using highly reusable building blocks, called Phases. By using the import/export features, Phases can not only be shared between different Projects, but also between different Kobee installations.
Script (Ant)	Runs the process (e.g., for build, compilation, deployment, copy, etc.) using the Source and Target locations on the Agent machine. A script can use property files, models and other scripts generally defined in a Phase.
Build#	Kobee generates a unique build number that can be used in several processes to identify the output from the (build/compile) procedures. Kobee is also able to put this information on members in a Partitioned Dataset on z/OS.

Approval	Kobee allows setting up a hierarchy in the Approval Groups. For example, Group2 may only approve if Group1 has approved first. Groups are based on the Enterprise Security System users.
Rollback	In Kobee, an automatic rollback can be executed for every kind of output, which will allow the customer to completely automate a rollback operation. Typically, it runs a previous version of your choice.
Machine	A machine runs an Kobee Agent which will take care of building/deploying the software components. Linux/UNIX (flavors) and Windows platforms. The Agent (LUW) machine can update more than one LPAR via FTP connections. Z/OS Phases might be reused with models and PDS definitions using several FTP connections.
Release Number/ Incident Number	Kobee has an ITS-plugin that allows you to easily link existing issue or defect tracking systems. Issues are accumulated along the Lifecycle and updated automatically.
Archive	Kobee compresses and saves all Build results in Archives and keeps them in a dedicated location. Archives are identified with the Build Tag.
Report	Kobee has a web interface to view per project and level request what happened. On top of that, an ALM-Reports tool allows creating more Reports about Global and Project Administration and Package activities.

Phase adds	Remarks
Extension/ Object-type	The extension/objtype determines the processing needed for a certain file type. This is defined by a property file and scripts. Object-types are used for z/OS activities.
Obsolete File	Kobee has no process for scratching individual files. This action is resolved with an Environment Phase which scratches the source component using the ".to_be_deleted" suffix in the VCR. Associated z/OS components are deleted in their PDS.

Appendix II: CA-ENDEVOR Terminology

The following table maps the terms used by Kobee and CA-Endevor and provides a brief comment for each of them. This will help the respective users of Kobee or CA-Endevor to have a better understanding of the terminology used.

Kobee	CA Endevor	Remarks
VCR	**Database/Delta**	CA-Endevor assumes VCR versions with the Image and Delta file(s).
Project	**System and/or Sub-system**	Within Kobee, the defined project needs attributes to tell Kobee to which CA-Endevor System/Sub-system the Software Items should be added in Environment parameters.
Lifecycle	**Map**	Defines the Lifecycle from Development to Production.
Stream	**Not available**	CA-Endevor works with a unique Project version.
Package	**Package**	CA-Endevor groups components in Batch packages.
Level	**Stage**	Defines every step of the Lifecycle from Development to Production.

Environment	**(Stage)**	This is a unique architectural Kobee feature, not known in CA-Endevor, representing the true multi-platform aspect of Kobee.
Level Request	**(Move) Action**	CA-Endevor distinguishes more actions, but they are not directly applicable to Kobee. For example, to delete a component from the Production environment, the components should be deleted from the VCR; the project should be built and deployed, and tested in all the Levels between Development and Production, ensuring that this deletion does not jeopardize the Production. This delete task may be activated with a SVN property on the component (don't delete). Next, Kobee may assume the deletion during the deployment by using the SVN property in a script.
Build Request	**(Add) Action**	The Build Level Request in Kobee will usually take care of populating CA- Endevor with the Software Components (ADD action).
Phase	**Processor group**	The processor group in CA-Endevor determines the ultimate process to run within a certain type. For example, the Processor Type COBOL might have processor groups for COBOL, DB2, CICS, BATCH, IMS etc.
Script (Ant)	**Processor**	Runs the process (e.g., for build or compilation).
Idrdata/Build#	**Footprint**	Build# or Build number: is an incremental number given after each software build. IDR DATA: Identification record data field. Identification records have a fixed format and fixed content, both defined by the program management binder. Is used by IBM Endevor footprints contain the following information: site ID, environment, system, subsystem, element, type, stage, version/level, and generate date/time.
Approval	**Approval**	CA-Endevor allows defining several Approval Groups which are in the same hierarchy. Every group may approve on any moment.
Rollback	**Backout**	CA-Endevor allows reversing the result from a promotion/delivery if it is a member(s) in a Partitioned Dataset (PDS). In the case of DB2 a (manual) rebind should be executed.
Machine	**Ship**	CA-Endevor only supports other z/OS Logical Partitions (LPARS).
Release Number/ Incident Number	**CCID**	The release/incident number within Kobee may be passed to CA-Endevor as the CCID (Change Control Identifiers) most often correspond to mechanisms such as work order requests or request-for-service numbers.
Archive	**Not available**	CA-Endevor keeps these components in Stage Level with CCID's.
Report	**Report**	CA-Endevor allows using Batch reports.
Extension/ Object-type	**Type**	The extension/objtype determines the processing needed for a certain type.

Appendix III: Serena ChangeMan ZMF terminology

The following table maps the terms used by Kobee and Serena ChangeMan ZMF and provides a brief comment for each of them. This will help the respective users of Kobee or ChangeMan to have a better understanding of the terminology used.

Kobee	ChangeMan ZMF	Remarks
VCR	Baseline/Delta/ Package	ChangeMan assumes VCR functionalities as Check-Out, Commit (Baseline Ripple), Check-In (Freeze) from the Package Lifecycle.
Project	Application	ChangeMan has the same concepts as Kobee but only for IBM main-frame systems. Also the stream-based project is not available.
Lifecycle	Stage/ Promotion Levels	Defines the Lifecycle from Development to Production.
Stream	Not available	ChangeMan works with a unique Project version.
Package	Package	ChangeMan uses the Package for the Development process up to the Stage action. Kobee leaves development actions to the customer IDE and the VCR. Both Kobee with Level Requests and ChangeMan with Staging, manage Build (Compile) requests, as well as Deployments with the Approval supervision for the Package. ChangeMan, however, needs to update the Baseline & Stacked Reverse Delta supports in dou-ble with the Production and the Package.
Level	Promotion Level	Defines every Level of the Lifecycle from Development to Production.
Environment	Site (Local or Remote)	The Local or Remote Site concept in ChangeMan is covered by the Kobee environment concept. An Kobee level (a logical step) can have one or more environments.
Phase	Procedures or skeletons	The skeletons in ChangeMan determine the process to run within a cer-tain type. For example, the Procedure CMNCOB2 might have process skeletons for COBOL, DB2, CICS, IMS, etc.. Depending on the Source options.
Level Request	Promotion/ Demotion	ChangeMan knows more actions, but they are not directly applicable to Kobee. For example, to delete a component from the Production environment, the components should be renamed into the VCR with the special ".to_be_deleted" suffix. Next, the project should be built and deployed, and tested in all the Levels between Development and Production, ensuring that this deletion does not jeopardize the Production. This delete task will be activated with the suffix of the com-ponent (don't delete). Next Kobee may assume the deletion during the deployment by using the suffix in the dedicated Phase.
Build Request	(ST) Action	ChangeMan takes care of the compile procedure the same way as Kobee.
Script (Ant)	Skeleton Procedure	Runs the process (e.g., for build or compilation or deploy).
Build#	Package Number	ChangeMan uses the Package number for versioning files.
Approval	Approval	ChangeMan allows defining several Approval Groups which are hierar-chical. Every group may approve one after the other.

Rollback	**Demotion**	ChangeMan allows reversing the result from a promotion/delivery if it is a member(s) in a Partitioned Dataset (PDS). In the case of DB2 a (automatic) rebind will be executed.
Machine	**Site**	ChangeMan only supports other z/OS Logical Partitions (LPARS). The ChangeMan site is the Local or a Remote LPAR.
Release Number/ Incident Number	**Not available**	ChangeMan does not use Incident numbers. In the Package description panel, a reason may be entered for all included components.
Archive	**Package**	ChangeMan contains components in the Package which is frozen before the deployment. It designs the version to deploy.
Report	**Report**	ChangeMan allows using Batch reports.
Obsolete File	**Scratch/ Rename**	ChangeMan assumes the Scratch and the Rename functionalities during the Promote. Will be supported through a custom phase.
Object-type	**Library type**	The objtype determines the processing needed for a certain type. Kobee can use the same codes.
IKAN Impact Analysis Tool	**Impact-Analysis**	ChangeMan Impact Analysis covers Source, Copy, JCL, Proc and DSN names relationships. The Impact Analysis solution from Kobee, permits you to create an Impact Analysis table, based on the information available in the Version Control Repository. Kobee reports are available to query that Impact Analysis table and as such you get the same and more results as with the Change Man Impact Analysis solution.
Not available	**Merge & Reconcile**	Kobee does not need to support this because it is a task of the VCR.
As Archive	**Freeze**	In relation to this ChangeMan concept, Kobee creates an Archive at the end of every Build containing all components to deploy. It is this Archive that used for the next.
Not available	**Baseline**	It is a ChangeMan concept that duplicates (or not) the Production Level used for future package developments considering it is the version 0 as Reference in Production.Kobee doesn't assume this concept because it is the VCR task to define the versions of components. Kobee creates or presents the Tag for a Build version.

Appendix IV: Available z/OS Kobee Phases

The following table maps the Phases used by Kobee for compiling and deploying components to Mainframe Environments. Note that for IDMS, a Phase collects the dictionary components and the next phase installs them into another one.

Phase	Action	Description
z/OS copy Source to Target	**Build/ Deploy**	A dedicated Phase for copying the z/OS Components (Sources or Objects) to the Kobee Target Environment. This Phase only transfers selected component types.
z/OS copy Sources before Compilation	**Build**	This Phase transfers via FTP Copybooks, Linkedit Control Cards (LCT cards) Assembler, COBOL PL/1 Programs and BMS/SDF2 Maps to PDS(s) in the Mainframe Environment.

z/OS Programs Compilation	**Build**	For each Map (firstly) and each Program (secondly), the Phase generates a compile JCL depending on the Source contents and language using included JCL models. Next, each JCL is executed by JES under FTP and the resulting Job is analyzed to know its status. Next, the generated compile Listing, Load-module and DB2 DBRM, Datacom Plan are transferred to the Kobee Target Environment. Optionally, DB2 Binds may be generated from models. Note that for CA-Endevor the Repository will be updated for compiling with it.
z/OS Promotion of components and load-modules	**Deploy**	z/OS components in the Kobee archive are transferred to their PDS(s) of the Mainframe Environment. Exception: the Load-modules which are transferred to flat files before a generated JCL using included JCL models is executed by JES under FTP for receiving them in their PDS(s).
z/OS Delete Sources and associated objects	**Deploy**	All Sources identified by the “to_be_deleted” suffix are deleted in PDS(s) of the Mainframe Environment by FTP. Also, the associated Listings, Load-modules, DBRMs, Plans and DB2 Binds are deleted in their PDS(s). No action in DB2 and Datacom Databases.
z/OS DB2 Binds transfers and activation	**Deploy**	If DB2 is used, Bind files are copied to their PDS(s) and a JCL is generated using included JCL models and executed by JES under FTP for running these Binds on the DB2 Database.
z/OS CICS Load-modules activation	**Deploy**	If there are CICS Maps or Programs, a JCL is generated using included JCL models, and executed by JES under FTP for running the PHASEIN commands on a CICS.
z/OS Update Datacom components Promotion	**Deploy**	If there are Plans, the Phase generates a JCL using included JCL models and executed by JES under FTP for importing Plans on the Datacom Database.
z/OS Update Endevor components Promotion	**Deploy**	If the CA-Endevor Repository is active on the Mainframe, the Phase generates a JCL using included JCL models and executed by JES under FTP for moving components from the Stage ID to the corresponding Level.
z/OS SQL DB2 updates Execution	**Deploy**	If DB2 is used, DDL and SQL statements may be applied with variable substitutions as owner, qualifier. After the transfer of DDL and SQL commands concatenated into 2 members, 2 JCLs are generated using included JCL models and executed by JES under FTP for running DDL and, next, SQL on the DB2 Database.
z/OS Update Debugger	**Deploy**	For instance, for the Xpediter tool, this phase copies Xpediter components from a FILEIO file to another FILEIO using the components list in the Kobee target environment.
z/OS Copy Pds Members	**Deploy**	This phase transfers components from PDS(s) of a z/OS environment to PDS(s) of another z/OS environment using the components list in the Kobee target environment.
z/OS Update QMF	**Deploy**	This phase imports QMF components to a QMF DB2 sub-system using the components list in the Kobee target environment.
z/OS Collect IDMS components	**Build**	For the first build, this Phase generates a JCL using included JCL models that is executed in the Mainframe Environment by JES under FTP. This one collects IDMS components and info about date and parent relations in the IDD of development. For the rebuild before deployment, the Phase controls the correlation with the target IDD with execution of another generated JCL.

z/OS IDMS components Promotion	**Deploy**	This phase transfers components to temporary files in the Mainframe Environment and she generates a JCL using included JCL models that is executed by JES under FTP for updating the target IDD.
... (on demand)		

Appendix V: Migration to Kobee

Before you can work with Kobee, components must be installed in a VCR. This is a big difference with CMN where the full VCR is included in Packages, Baseline and SRDeltas PDSs, or with Endevor where components are in workspace PDSs.

IKAN has developed an Ant solution for migrating components from the CMN versioning system to VCR projects (Subversion or Clearcase). The Tool supports the collect of versions in the SRDeltas, Baseline and Packages for all types of components based on the CMN project concept. The results are the same versioning levels in the VCR Projects and same Package definitions that you had in CMN.

The solution supports migrations from classic PDS.

IKAN also has developed an Ant solution for updating VCR Projects and Kobee Packages from other tools (z/OS tools or Windows/Unix tools) to automatically version and deploy some components using the package process.

Appendix VI: Sample of z/OS compilation JCL

The following JCL is fully generated by the z/OS Compilation Phase used by Kobee for compiling a component into the Mainframe Environment.

```
//ADCDMSTC JOB (5145,00000,2233,T),'IKAN',
//          MSGLEVEL=(1,1),MSGCLASS=X,
//          CLASS=A,REGION=8M
//*
//*XEQ ROUTEID=ADCD
//*****************************************************************
//**    COPYING THE PROGRAM IN SOURCE WORK FILE                    **
//*****************************************************************
//      SET SRCOMPIL=SOURCE
//COPYSRC   EXEC PGM=IEBGENER
//SYSTSIN    DD DUMMY
//SYSTSPRT   DD SYSOUT=*
//SYSPRINT   DD SYSOUT=*
//SYSUT1    DD  DISP=(SHR),
//               DSN=IKANALM.DEMOS.TEST.SRCBATCH(DEMO21)
//SYSUT2    DD  DISP=(,PASS),DSN=&&&SRCOMPIL,
//              UNIT=SYSDA,SPACE=(CYL,(10,10)),
//              DCB=(RECFM=FB,LRECL=80,BLKSIZE=0)
//SYSIN     DD  DUMMY
//*****************************************************************
//**     COMPILE COBOL2, store object in objlib if compile=ok
```

```
//**    compile listing is stored in IKANALM.DEMOS.TEST.LSTALIB
//*****************************************************************
//         SET PARMCOB='LIST,LIB,NOSEQ,NOCMPR2,MAP'
//         SET PARMCOB0='DATA(31)'
//*****************************************************************
//**    COMPILE THE ELEMENT                                          **
//*****************************************************************
//COBOL  EXEC PGM=IGYCRCTL,COND=(4,LT),
//   PARM='&PARMCOB0,&PARMCOB'
//STEPLIB  DD  DISP=SHR,DSN=SYS1.COB2COMP
//SYSIN    DD  DISP=(OLD,PASS),DSN=&&&SRCOMPIL
//SYSLIN   DD  DISP=(,PASS),DSN=&&OBJECT,
//              UNIT=SYSDA,SPACE=(CYL,(2,2)),
//              DCB=(RECFM=FB,LRECL=80,BLKSIZE=0)
//SYSUT1   DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT2   DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT3   DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT4   DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT5   DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT6   DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSUT7   DD  UNIT=SYSDA,SPACE=(CYL,(5,3))
//SYSPRINT DD  DISP=(,PASS),DSN=&&COMPLIST,
//             UNIT=SYSDA,SPACE=(TRK,(10,10),RLSE)
//*             DCB=(RECFM=FBA,LRECL=133,BLKSIZE=0)
//*
//SYSLIB   DD  DISP=SHR,DSN=IKANALM.DEMOS.TEST.COPYLIB
//          DD  DISP=SHR,DSN=IKANALM.DEMOS.INTG.COPYLIB
//          DD  DISP=SHR,DSN=IKANALM.DEMOS.QUAL.COPYLIB
//          DD  DISP=SHR,DSN=IKANALM.DEMOS.PROD.COPYLIB
//*
//*
//*
//*
//*
//*
//*****************************************************************
//**   COPYING THE LCT MEMBER IN A WORK FILE IF EXIST                **
//*****************************************************************
//ALLOCLCT EXEC PGM=IEFBR14
//SYSPRINT DD  SYSOUT=*
//LCTFILE  DD  DISP=(NEW,PASS,DELETE),DSN=&&LCTFILE,
//              UNIT=SYSDA,SPACE=(TRK,(1,1,1)),
//              DCB=(DSORG=PO,RECFM=FB,LRECL=80,BLKSIZE=0)
//CREATLCT EXEC PGM=IEBGENER
//SYSPRINT  DD SYSOUT=*
//SYSUT1   DD  *
/*
//SYSUT2   DD  DISP=(MOD,PASS),DSN=&&LCTFILE(DEMO21)
//SYSIN    DD  DUMMY
//COPYLCT EXEC PGM=IEBCOPY
```

```
//SYSPRINT  DD SYSOUT=*
//INDD00    DD DISP=SHR,DSN=IKANALM.DEMOS.TEST.LCTLIB
//INDD01    DD DISP=SHR,DSN=IKANALM.DEMOS.INTG.LCTLIB
//INDD02    DD DISP=SHR,DSN=IKANALM.DEMOS.QUAL.LCTLIB
//INDD03    DD DISP=SHR,DSN=IKANALM.DEMOS.PROD.LCTLIB
//*
//OUTDD1    DD  DISP=(MOD,PASS),DSN=&&LCTFILE
//SYSIN     DD  *
  COPY OUTDD=OUTDD1
       INDD=INDD00,INDD01,INDD02,INDD03
  SELECT MEMBER=DEMO21
/*
//*****************************************************************
//**   LINKEDIT PROGRAM                                          **
//*****************************************************************
//      SET PARMLNK='LIST,MAP,XREF,NCAL'
//      SET LINKOPT='RENT,AMODE(31),RMODE(ANY),'
//LKEDT     EXEC PGM=HEWL,COND=(4,LT),
//          PARM='&PARMLNK,&LINKOPT'
//SYSLMOD   DD DISP=SHR,DSN=IKANALM.DEMOS.TEST.LOADLIB(DEMO211)
//SYSDEFSD DD DUMMY
//SYSPRINT DD  DISP=(,PASS),DSN=&&LINKLIST,
//             UNIT=VIO,SPACE=(TRK,(10,10)),
//             DCB=(RECFM=FBA,LRECL=121,BLKSIZE=0)
//*         DD DISP=SHR,DSN=IKANALM.DEMOS.TEST.LOADLIB(DEMO211)
//SYSLIB    DD  DISP=SHR,DSN=IKANALM.DEMOS.TEST.LOADLIB
//          DD  DISP=SHR,DSN=IKANALM.DEMOS.INTG.LOADLIB
//          DD  DISP=SHR,DSN=IKANALM.DEMOS.QUAL.LOADLIB
//          DD  DISP=SHR,DSN=IKANALM.DEMOS.PROD.LOADLIB
//*
//          DD DISP=SHR,DSN=DFH320.CICS.SDFHLOAD
//          DD DISP=SHR,DSN=DSN810.SDSNLOAD
//          DD DISP=SHR,DSN=CEE.SCEELKED
//*          DD DISP=SHR,DSN=METASUIT.GEN813.LOADLIB
//*          DD DISP=SHR,DSN=SYS1.COB2LIB
//          DD DISP=SHR,DSN=SYS1.LINKLIB
//SYSLIN    DD  *
/*
//          DD  DSN=&&OBJECT,DISP=(OLD,DELETE)
//          DD  DSN=&&LCTFILE(DEMO21),DISP=(OLD,DELETE)
//          DD  *
  IDENTIFY DEMO211('DEMO21/ADCDMST/000003')
  NAME DEMO211(R)
/*
//*****************************************************************
//**   TRANSMIT PROGRAM                                          **
//*****************************************************************
//CLEARSEQ  EXEC PGM=IEFBR14
//DD01    DD DISP=(MOD,DELETE,DELETE),
//           DSN=IKANALM.DEMOS.TEST.DEMO211,
//           UNIT=SYSDA,SPACE=(TRK,(1)),
//           LRECL=80,BLKSIZE=3120,RECFM=FB
//*
//XMITLOAD  EXEC PGM=IKJEFT01,COND=(4,LT)
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
 XMIT (ADCD.*) -
 DSNAME('IKANALM.DEMOS.TEST.LOADLIB') MEM(DEMO211)-
 OUTDSNAME('IKANALM.DEMOS.TEST.DEMO211') NOLOG NONOTIFY
/*
//PRTCMPA  IF (COBOL.RUN EQ TRUE) THEN
//*****************************************************************
//**   PRINT THE COMPILE LISTING                                 **
//*****************************************************************
//PRNTCOMP EXEC PGM=IEBGENER
//SYSTSIN   DD DUMMY
//SYSTSPRT  DD SYSOUT=*
//SYSPRINT  DD SYSOUT=*
//SYSUT1   DD  DISP=(OLD,PASS),DSN=&&COMPLIST
//SYSUT2   DD  SYSOUT=*
//SYSIN    DD  DUMMY
//PRTCMPZ  ENDIF
//*
//PRTLNKA  IF (LKEDT.RUN EQ TRUE) THEN
//*****************************************************************
//**   PRINT THE LINKEDIT LISTING                                **
//*****************************************************************
//PRNTLINK EXEC PGM=IEBGENER
//SYSTSIN   DD DUMMY
//SYSTSPRT  DD SYSOUT=*
//SYSPRINT  DD SYSOUT=*
//SYSUT1   DD  DISP=(OLD,PASS),DSN=&&LINKLIST
//SYSUT2   DD  SYSOUT=*
//SYSIN    DD  DUMMY
//*****************************************************************
//**    FORMAT THE LINKEDIT LISTING                              **
//*****************************************************************
//IFSFTLKD IF (NOT ABEND) THEN
//FRMTLKD  EXEC PGM=SORT
//SORTSNAP DD  SYSOUT=*
//SORTWK01 DD  DISP=(,PASS),UNIT=SYSDA,SPACE=(CYL,(10,10),RLSE)
//SORTWK02 DD  DISP=(,PASS),UNIT=SYSDA,SPACE=(CYL,(10,10),RLSE)
//SORTWK03 DD  DISP=(,PASS),UNIT=SYSDA,SPACE=(CYL,(10,10),RLSE)
//SORTWK04 DD  DISP=(,PASS),UNIT=SYSDA,SPACE=(CYL,(10,10),RLSE)
//SORTIN   DD  DISP=(OLD,DELETE),DSN=&&LINKLIST
//SORTOUT  DD  DISP=(NEW,PASS,DELETE),DSN=&&LISTLKD,
//              UNIT=SYSDA,SPACE=(CYL,(5,5)),
//              DCB=(DSORG=PS,RECFM=FBA,LRECL=133,BLKSIZE=0)
//SYSIN    DD  *
```

```
  SORT FIELDS=COPY
  OUTREC FIELDS=(1,121,12X)
/*
//SYSOUT    DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//SYSMDUMP DD   SYSOUT=*
//SYSABEND DD   SYSOUT=*
//IFEFTLKD  ENDIF
//*****************************************************************
//**    COPY THE LISTINGS                                       **
//*****************************************************************
//IFSLST1   IF (NOT ABEND) THEN
//LIST     EXEC PGM=IEBGENER
//SYSPRINT  DD SYSOUT=*
//SYSUT2     DD DISP=SHR,
//               DSN=IKANALM.DEMOS.TEST.LSTALIB(DEMO21)
//SYSIN      DD DUMMY
//SYSUT1   DD  DISP=(NEW,DELETE,DELETE),DSN=&&NULLSEQ,
//               UNIT=SYSDA,SPACE=(TRK,(1,1)),
//               DCB=(DSORG=PS,RECFM=FBA,LRECL=133,BLKSIZE=0)
//*          DD DISP=(OLD,DELETE),DSN=&&PCMPLIST
//           DD DISP=(OLD,DELETE),DSN=&&COMPLIST
//           DD DISP=(OLD,DELETE),DSN=&&LISTLKD
//IFELST1   ENDIF
//*
//*
//IFSFAIL   IF (RC GT 4 OR ABEND) THEN
//FAILURE   EXEC PGM=IEBGENER,MAXRC=0
//SYSPRINT DD   SYSOUT=*
//SYSUT1    DD   *
  JOB 1626 FAILED
/*
//SYSUT2    DD   SYSOUT=*
//SYSIN     DD   DUMMY
//IFEFAIL   ENDIF
//PRTLKDZ   ENDIF
```

IKAN Development
Motstraat 30
2800 Mechelen, Belgium
Tel. +32 15 238427

info@kobee.io
www.kobee.io