



# **Introducing ConvTek**

**April 10, 2006**

# Modernizing Legacy Applications

## ***Conversion and Reengineering of IBM Mainframe Application***

- VSE to MVS (OS/390, z/OS) migration
- MVS JCL reengineering
- Language conversion: COBOL upgrade, SAS/COBOL conversion, etc
- Field expansion
- DB2 migration
- Web-Enabling

## ***Small “Niche” Business***

- A dozen of consultants: specialists + project leaders/coordinators
- 4-6 projects per year, 60+ in past 15 years, 110+ since 1982
- Nationwide U.S. + Europe + Asia
- Developers of automated conversion tools and solutions
- Mass conversion experts since 1982
- 20+ years experience
- Core team has worked together for 15+ years
- Combining on-site / off-site intervention

# VSE/MVS Migration Experts

## ***Preferred IBM Business Partner for VSE/MVS Migrations***

- Over 30 projects as IBM sub-contractor in past 16 years alone
- Co-authored IBM's VSE to OS/390 Migration Workbook (SG24-2043-00)
- Received IBM Project Management Award for ADP's multi-sites migration
- Subject of IBM success story for VSE/MVS migration at Kern County

## ***Experienced with large, complex, multi-sites VSE/MVS migrations***

- ADP: 9,000 Assembler and COBOL programs, 30+ sites, 11 years
- Southern Farm Bureau: over 10,000 programs, 7 sites, 5 years
- Swiss Colony: fairly simple JCL but over 45,000 JCL steps, 18 months
- Reader's Digest: very complex CA-Driver JCL, transatlantic switchover
- DATALINE: unsupported home grown disk access method
- Dah Sing + Mevas Banks: 25,000 JCL steps, 6,000 programs, CARDLINK package, challenging logistics and security requirements



# Using the Mass Conversion Approach to Migrate from VSE to z/OS

April 10, 2006

# Typical Justification

## **Performance ... Simplify and Upgrade the HW/SW Configuration**

- Consolidate several smaller CPUs and / or VSE machines
- Eliminate dual VSE + z/OS production environments
- Upgrade to larger processing capacity
- Generate scale cost savings

## **Reorganization ... Adapt to New Host Configuration**

- Business growth, acquisition or merger
- Data center consolidation
- Data processing reorganization
- Operations outsourcing, facilities management

## **Limitations ... Avoid the Growing VSE Obsolescence**

- Can't find or keep skilled VSE staff
- Migrate away from VSE instability to z/OS "industrial-strength" platform
- Vendors freezing VSE product developments/improvements
- Vendors dropping support of their VSE products

## **Modernization ... Position for Future**

- Production management and automated operations
- Strategic z/OS products: DB2, DFSMS, WebSphere, ...
- Strategic new applications: industry-specific, e-business, ...

# Migration Sub-Projects

## Technical Support

- HW configuration upgrade: CPU, DASD, TAPE, PRINTERS
- z/OS software selection and installation: system & products
- From startup-system to production-ready: sizing, performance, SMS
- CICS subsystems and network
- Security: RACF (source code, data, databases, CICS)
- DBMS: data dictionary, DB definition and migration, etc

## Applications

- Convert in-house developed VSE code, JCL and data to z/OS
- Replace VSE purchased applications by z/OS version

## Operations and Production Control

- Job scheduling, back-out, restart and rerun procedures
- Report management
- Automated console
- Backups, disaster recovery
- Help Desk
- Source management and change control

## z/OS Retraining

- Systems programmers
- Applications and Operations support staff

# Needs and Requirements

## Operational Needs

- End-user transparency
- Minimal disruption of operations and applications support
- No overlap of dual VSE + z/OS operations
- Standardized and automated target z/OS production

## Cost/Benefit Requirements

- Reasonable and predictable timeframe
- Reduced staff participation → focused on learning z/OS
- Minimal delay/postponement of development and maintenance
- Controlled costs turned into investment
- Low risk

# Scope of Work and Challenges

## Application Inventory

- Determination, collection, and supply
- Elimination of missing and unreferenced elements

Difficulty

\* \* \*

## Program Conversion

- Syntax modification
- Device independence
- Elimination of VSE-only features
- Feed JCL conversion with file OPEN information

\* to \*\*

## JCL Conversion

- Retrieve application flowcharts
- Identify and classify data flows
- Define new z/OS standards
- Generate standardized z/OS JCL
- Utility step conversion
- Building blocks and conditional JCL

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# Scope of Work and Challenges (Cont.)

## Difficulty

\* \* \*

### File Migration

- File identification and classification (by-product of JCL conversion)
- z/OS file cataloging
- VSAM to non-VSAM migration
- Device migration: tape to disk
- Tape file migration
- Database migration

### Project Management

- Planning, coordination and follow-up - resource availability

\* \*

### Production Management

- Job scheduler
- Report manager
- Tape manager
- Source management and change control
- [Help desk, automated console, ...]

\* \* \*

# Mass Conversion Methodology

## **Mass Conversion**

Single Switchover Weekend

- No overlap of VSE and z/OS
- Minimal disruption of operations
- Shorter project timeframe

## **Automated Conversion**

Enhance process to enhance deliverables

- Reduced labor and cost
- Improved quality of deliverables

## **Repetitive Conversion**

Repeat trial conversion from refreshed inventory

- Minimal maintenance freeze or duplication
- Minimal disruption of applications support

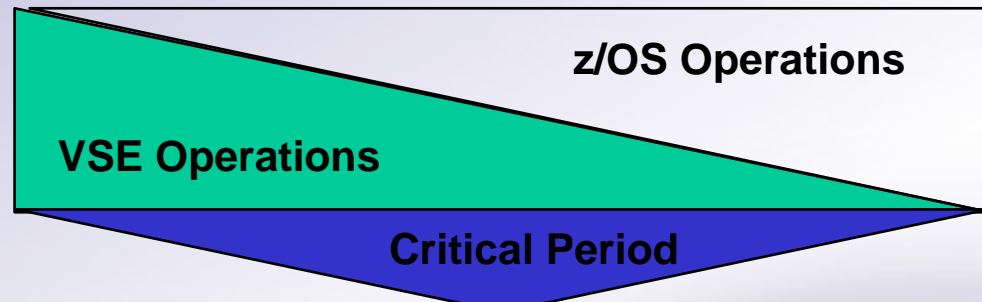
## **Phased Conversion**

Proven project plan

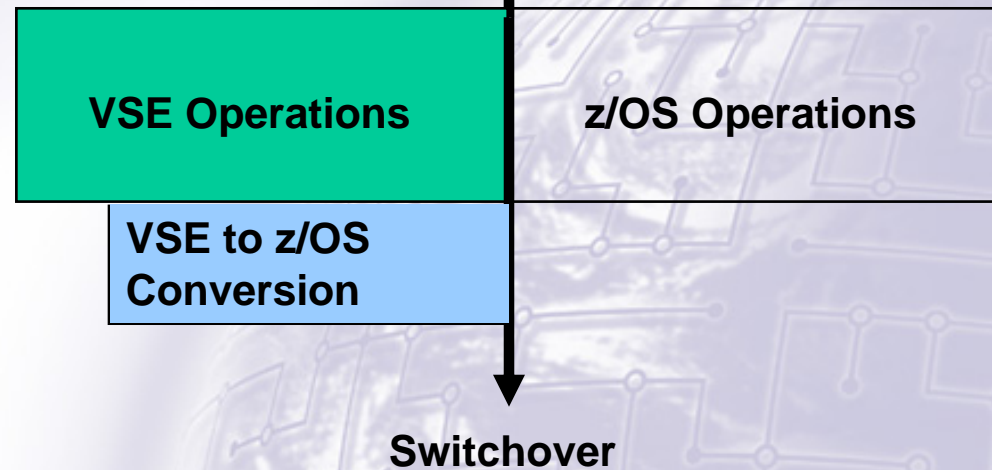
- Improved project management
- Greater visibility and control
- On-time completion

# Progressive versus Mass Conversion

Progressive Conversion

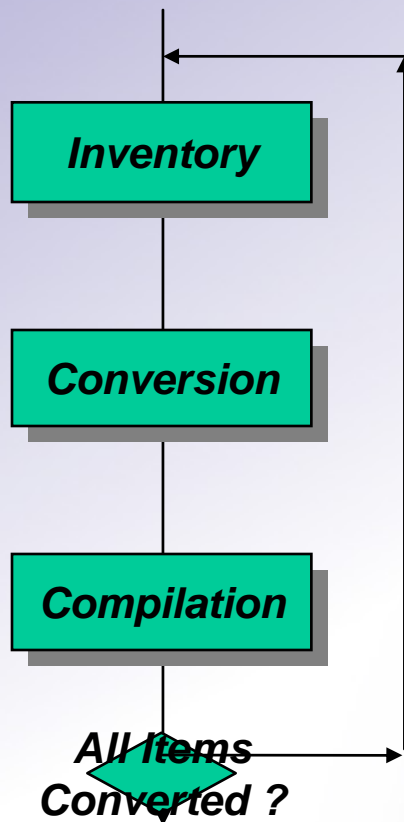


Mass Conversion

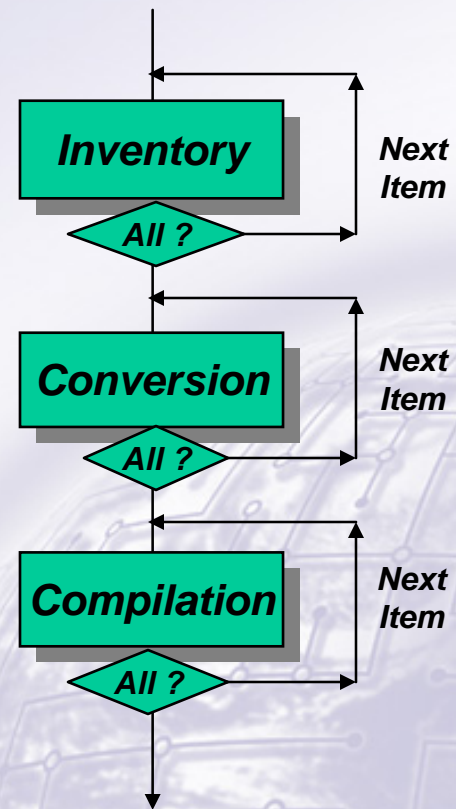


# Mass Conversion

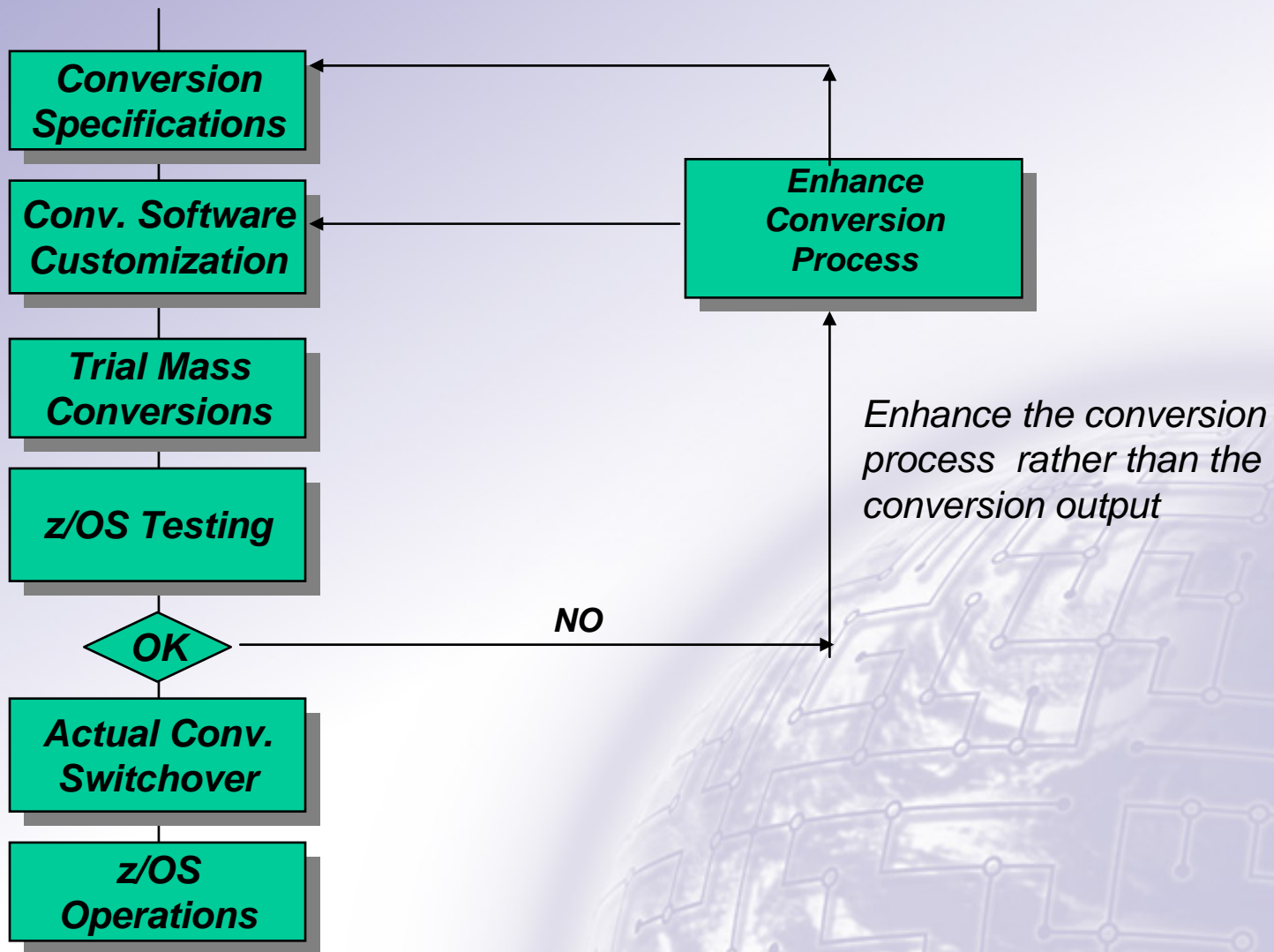
## Item by Item Conversion



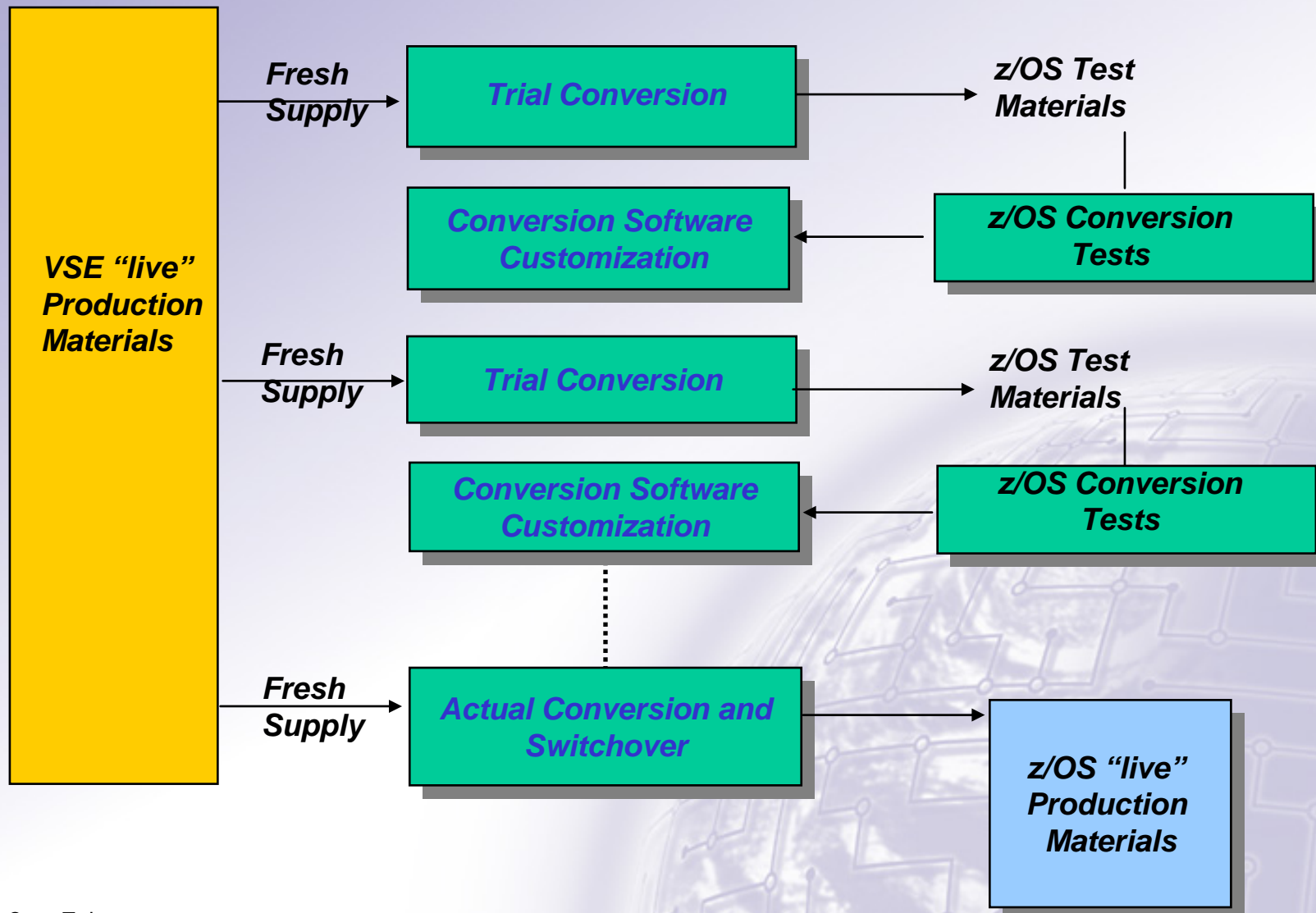
## Mass Conversion



# Automated Conversion



# Repetitive Conversion



# Project Phases

## Preparation Phase

Planning: Application Conversion + Other Migration Sub-Projects

Application Inventory: Eliminate Missing-Duplicates-Unreferenced

Specifications: Conversion Requirements → Solutions

Customization: Adapt Conversion Tools to Conversion Specifications

## Conversion & Testing Phase

Trial Conversions

Regression Testing

Online: initialization → Sample → Functional → Stress

Batch: Sample → Functional → Simulated Production

Switchover Rehearsals

## Implementation Phase

Actual Conversion

Switchover

Initial z/OS Operations

# Mass Conversion Software

## Automate

- Application inventory verification
- Code conversion / upgrade / compilation-linkedit
- JCL conversion
- File migration

## Designed for Mass Conversion

- One submission to convert all items
- Fast and resource-thrifty
- Summarized result review + detailed cross-references

## Customizable

- All generic modifications included
- Options, commands, and tables
- Plug-ins and exit routines
- Pre/post-processors

# Mass Conversion Software (Cont.)

## Application Inventory

- Acceptance of any VM or VSE format
- Separation of elements per type
- Identification of duplicate, missing and unreferenced elements
- Cross-references between elements, statistics and counts

## Language Conversion

- COBOL conversion and upgrade to COBOL for z/OS
- Other languages conversion: Assembler, RPG II
- 4GL conversion: Easytrieve[-plus], DYL260/280, QUICKJOB, etc.
- Optional elimination of non-COBOL languages: SAS, RPG II, GENER/OL
- Mass compilation and linkedit

## JCL Conversion

- Understanding of VSE JCL streams, JCL building blocks, and conditional JCL
- Utility step conversion
- File classification based on data flows (global JCL/files cross-references)
- Generation of z/OS JCL to local standards

## File Migration

- Generate file migration procedures from JCL conversion data
- Read VSE-created tapes: FAVER2, SORT, IDCAMS, ...

# z/OS Standards

## Naming Conventions

- Including datasets, jobs, procs, includes, steps, parameter libraries
- Excluding programs, entry-points, copybooks, includes, ddnames

## JCL Streams

- Including JCL stream structure: run JCL, JCL procedures, JCL includes
- Excluding job/jobset re-definition
- Simplified DFSMS/DFPv3-type DD statements

## Utility Steps

- File management steps: sort, copy, backup
- DBMS
- Service steps

## Automated Operations

- Job scheduler
- Report manager

# DFSMS/DFPv3 Simplified JCL

## Attribute Removed from DD Statements

- VOLSER z/OS catalog
- RECL z/OS at open (except IDCAMS/REPRO output)
- BLKSIZE z/OS at open
- RECFM z/OS at open
- ORG z/OS at open
- DSCB ACS routine provides pattern DSCB for tape files
- SPACE Replaced by DFSMS' data class (DC)
- UNIT (disk files) ACS routine provides default value

## Attributes Kept in DD Statements

- DSN Appl. + standard + file-id + class or job (&&work)
- DISP 9 basic cases identified automatically
- UNIT (tape files) Can be further reduced by using HSM

## Attribute Added to DD Statements

- DATACLAS S/M/L/XL file sizes

# Conversion Team

## ConvTek

### Experience:

- z/OS
- Conversion software
- VSE to z/OS conversion
- Project planning & management

### Responsibilities:

- Identify & address conv. issues
- Convert in-house applications
- z/OS standards recommendation
- Follow methodology and plan

## Customer

### Experience:

- Current VSE operations
- Current VSE applications

### Responsibilities:

- z/OS system resources
- Application inventory
- Regression testing
- Automated Operations tools

# Shared Project Responsibilities

**Project Management**  
**HW/SW/Office Space**  
**System Resources**  
**Project Planning**  
**Application Inventory**  
**Conversion Specifications**  
**Conversion Software**  
**Automated Conversion**  
**Manual Conversion or Positioning**  
**Online Application Tests**  
**Batch Application Tests**  
**z/OS Production Mgmt Tools**  
**Switchover**  
**Initial z/OS Operations**

## ConvTek

## Customer

ConvTek	Customer, Overall Provide
PC-Based	z/OS: Install-Support-Operate
Project, Switchover	Online and Batch Tests
Receive, Verify	Supply
Develop	Review, Accept
Provide, Customize	
Perform	
z/OS, VSE	VSE
Correct, Assist	Run, Validate
Correct, Assist	Run, Validate
TBD	Install, Set-up
Prepare, Support	Run, Support
Support	Run, Support

# Approach Benefits

## Fast and Predictable

- Reasonable timeframe
- Switchover date and cost known up-front
- Proven approach

## Less Disruptive

- Single production switchover
- Minimal freeze of VSE application changes
- Minimal disruption to operations and applications support

## Turn Cost Into Investment

- Internal staff focused on reusable z/OS skills
- Complete and consistent application inventory
- State-of-the-art z/OS production environment
- Positioning for future growth