Transforming Batch Resiliency through greater control using Analytics & Automation

Rebecca Levesque
21st Century Software
CEO and President
rebeccal@21csw.com

Chris Taylor
21st Century Software
Technical Sales Executive
christay@21csw.com

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15:15-16:15 Catalunya
Session NK

What we will cover today

IBM Strategic Partnership with 21st Century Software
Business Problem to be Solved
IBM Z Batch Resiliency Overview
Key Takeaways

IBM Strategic Partnership with 21st Century Software

Committed to driving continuous product improvement, focused on value to our clients

IBM – 21st Century Software: Strategic Partnership

- Headquartered in Wayne, Pennsylvania
  - 21st Century Software has over 30 years of expertise in developing innovative mainframe analytics solutions
- IZBR development based in the US
  - State-of-the-art batch resiliency solution announced May 2019
- IZDS/IZDS CP Development Lab is located in Perth, Australia
  - Re-established original team with expert knowledge and understanding of all key components.
  - To bring more value to IBM customers by accelerating product roadmap innovation of TDSz
- TDMF/zDMF development based in the US
  - Re-established original team with expert knowledge and understanding of all key components
  - TDMF and zDMF are the ‘gold standard’ for volume and data set level migrations, used for thousands of successful data movement engagements
  - In December 2018, released zDMF 3.4 to align with IBM’s Pervasive Encryption strategy to protect mainframe data by enabling clients to transparently encrypt data sets
- IBM will continue to sell these products as it does today
  - Customers will continue to access support through IBM, while all technical support and development will be performed by 21st Century Software
  - 21st Century Software will assist IBM with go-to-market and services

Business Problem to be Solved

Challenges clients are facing today

What's the overarching problem?

Year of Digital Disruption

CIOs are struggling to balance these two competing pressures, while managing Risk and Compliance

- Provide stable, secure, high-performance services
- Deliver, innovative, technology-intensive services quickly

http://www.gartner.com/smarterwithgartner/six-cio-responsibilities-for-digital-business-leadership/

IT Operations goals are to improve quality and reduce cost while supporting growth and change

But…

- 53% of IT Operations cite managing technology changes as their biggest challenge, especially in large legacy environments
- 43% feel that insufficient skills and resources are their biggest issue
- 34% are most concerned about having insufficient capacity to absorb more change

Source: Gartner Leadership Vision for 2019: Infrastructure and Operations Leader

Digital transformation is impacting all areas of the enterprise

Companies are spending $1.2-$2.5 billion annually due to unplanned application outages

- IT is held **accountable to maintain availability** while managing increasingly complex workloads
- There is **no margin of error for outages**; whether from batch abends, software upgrades gone wrong or disaster events

The mainframe is underlying 72% of customer facing apps, but challenges to manage it are mounting

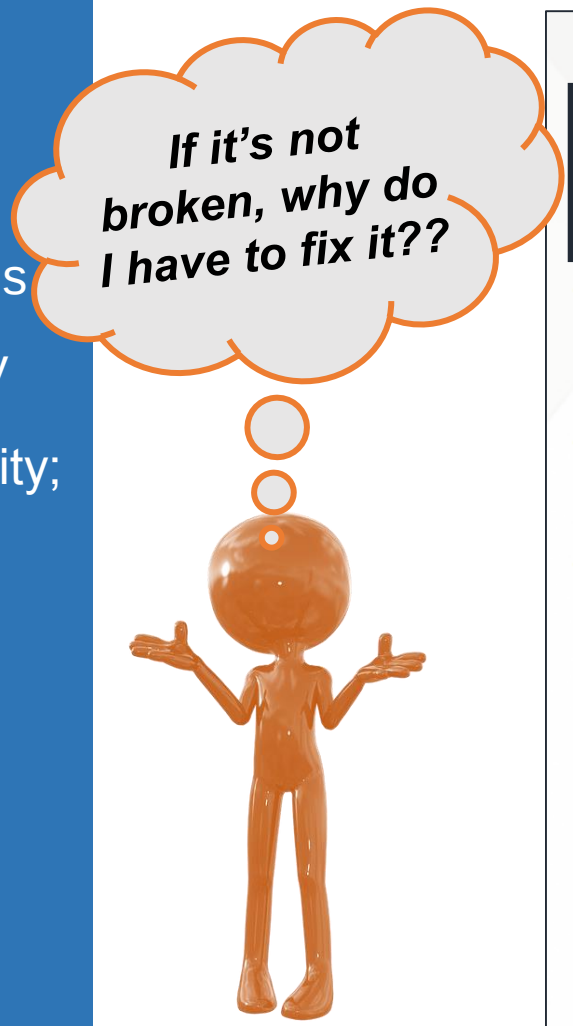
- **Access to insightful info** for managing workloads and problems is not timely
- Predictive analysis needed to make **quick decisions based on historical knowledge**
- '**Tribal knowledge' fading**, elongating time to identify and recover from problems

56% of customers have no succession plan for their mainframe skills

- Organizations face **skills issues** as they go through a generational shift
- **Manual processes place additional burden on staff and increase the risk of error**

Business Priorities in a Digital Economy

- Improved automation is a focus area for Application Availability
- 'Data Recovery' is a high priority; not just ability to recover, but speed up the time to business resumption



Top Priorities

+ Ensuring "**application availability**" is consistently a top priority and improvement focus areas most cited were faster problem determination, improved automation, visibility into end-to-end performance, and the elimination of planned outages.
+ Executives then rank **"application modernization"** and "data recovery" higher, while technical staff view "application availability" and "application modernization" as higher priorities.
+ Executives and technical staff agree that **"cost reduction/optimization"** and **"data privacy/ compliance/security"** are the top two priorities.
+ **"Staffing and skills"** are now tied for 5th with "implementing cloud technology" and "data recovery."

Priorities and challenges are aligned and show commitment to keeping the mainframe as the backbone of their digital environments.

Application availability

Application modernization

Cost reduction/optimization

Data privacy/compliance/security

Staffing/skills

2018 BMC Mainframe Survey

Here's why you have to fix it……

Digital transformation is challenging traditional views of business resilience. Digital transformation is the process through which technology is intertwined throughout the human experience.

If your data isn't available, it can no longer be productized and monetized - it can no longer be leveraged for business agility.

Data is critical to business survival.
This makes data integrity and accessibility sacrosanct.

IDC projects that study participants will realize ***average benefits worth more than 6x what they invest*** to transform their mainframe platforms.

Source: IDC 'Five Key Technologies for Enabling a Cyber-Resilience Framework' – August 2019 and IDC 'The Business Value of the Transformative Mainframe' – August 2019

IBM z15

The cloud you want – with the privacy and security you need

Encryption Everywhere

Industry-first solution to protect sensitive data across your multicloud

Instant Recovery

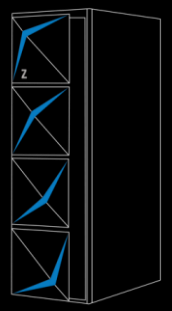
Industry's highest level of business uptime to meet SLA and regulatory compliance

Cloud Native Development

Integrate seamlessly into hybrid multicloud, blockchain and AI

Standardized & Flexible for the Cloud Data Center

Modular, scalable and proven cloud-ready infrastructure



Introducing
IBM Z Batch Resiliency (IZBR)

Resiliency for batch that meets business SLAs

Mainframe Batch Resiliency can’t continue the way you’ve been doing it

- Logs/Journals give databases a comprehensive view of applications - but sequential batch data does not!
- Sequential data not I/O dependent
- Scheduler restores to jobs, not to data

Why transform your batch?

IDC states that the overall outcome of delivering a "transformative mainframe" platform to businesses:

- Better integration across organizational IT operations
- Delivery of IT resources and services in a more timely and efficient manner
- A competitive advantage to grow the business by meeting, or exceeding, customer expectations

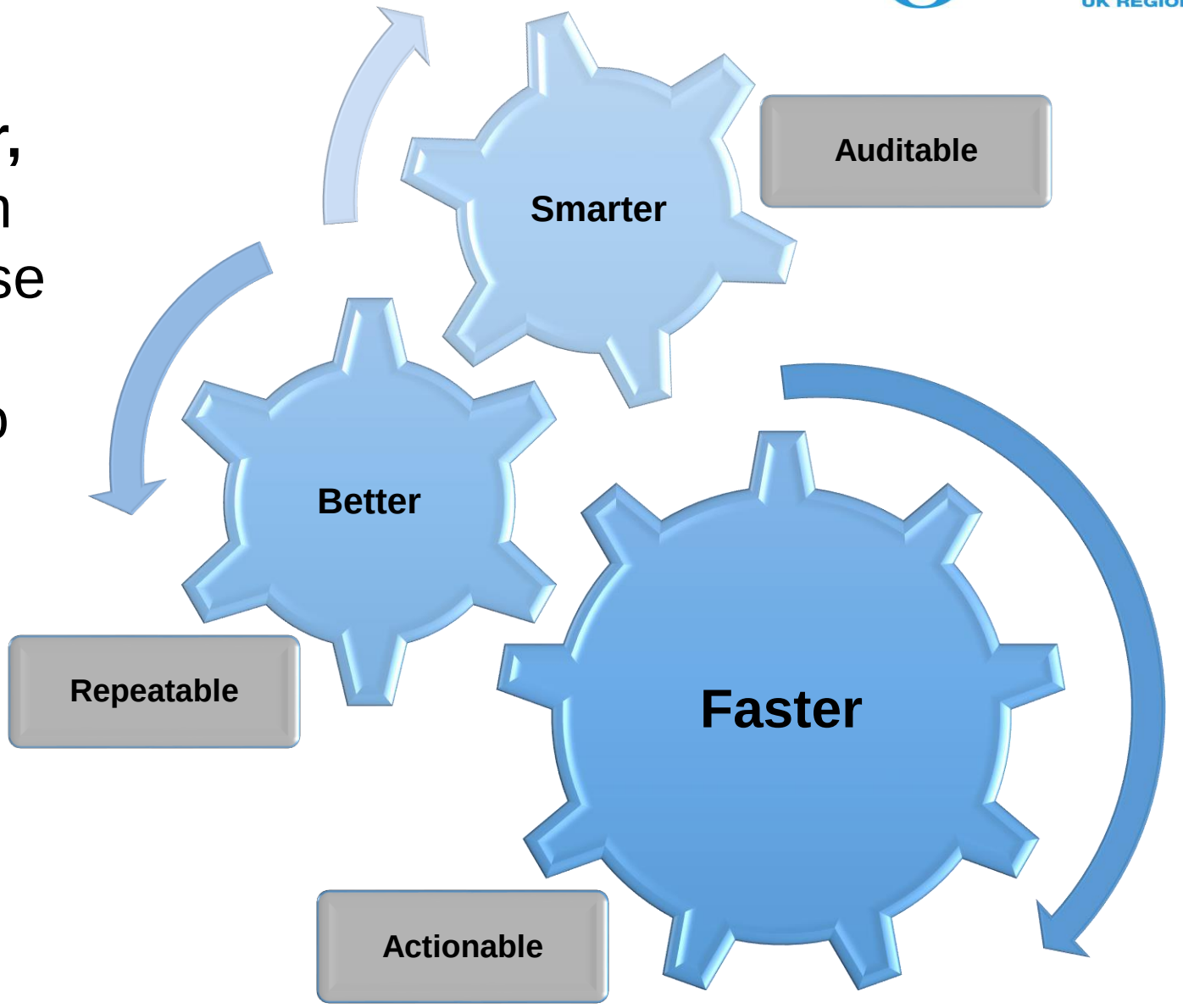
Are you juggling multiple tools and manual processes to do your job?

Take advantage of an end-to-end solution using Analytics with Automation!

IZBR in a nutshell

IZBR provides a **smarter, better, faster** recovery process that can **prove your compliance** because IZBR provides a **three-pronged data management approach** to know

1) How it's used
2) Who's using it
3) Where the data is located



Smarter + Better + Faster = Cheaper with Less Risk

IZBR functionality provides the knowledge to mitigate the risk to resiliency and compliance:

Auditable *(Smarter)*

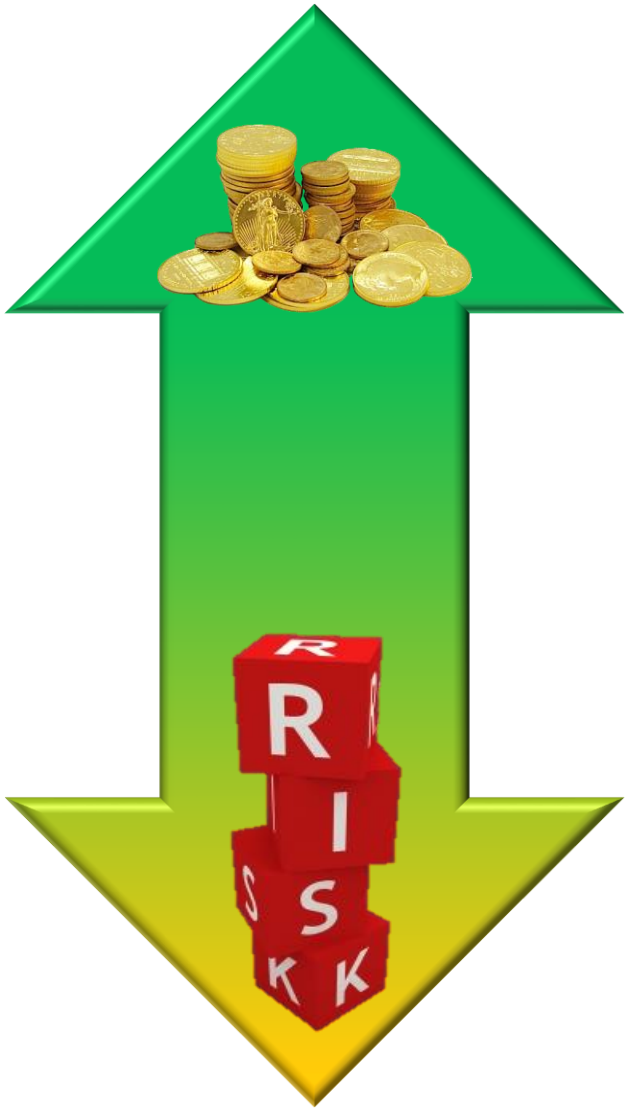
- Identify critical data that's not recoverable
- Validate viability of application recovery strategies
- Identify application data dependencies - Production and non-production data sharing

Repeatable *(Better)*

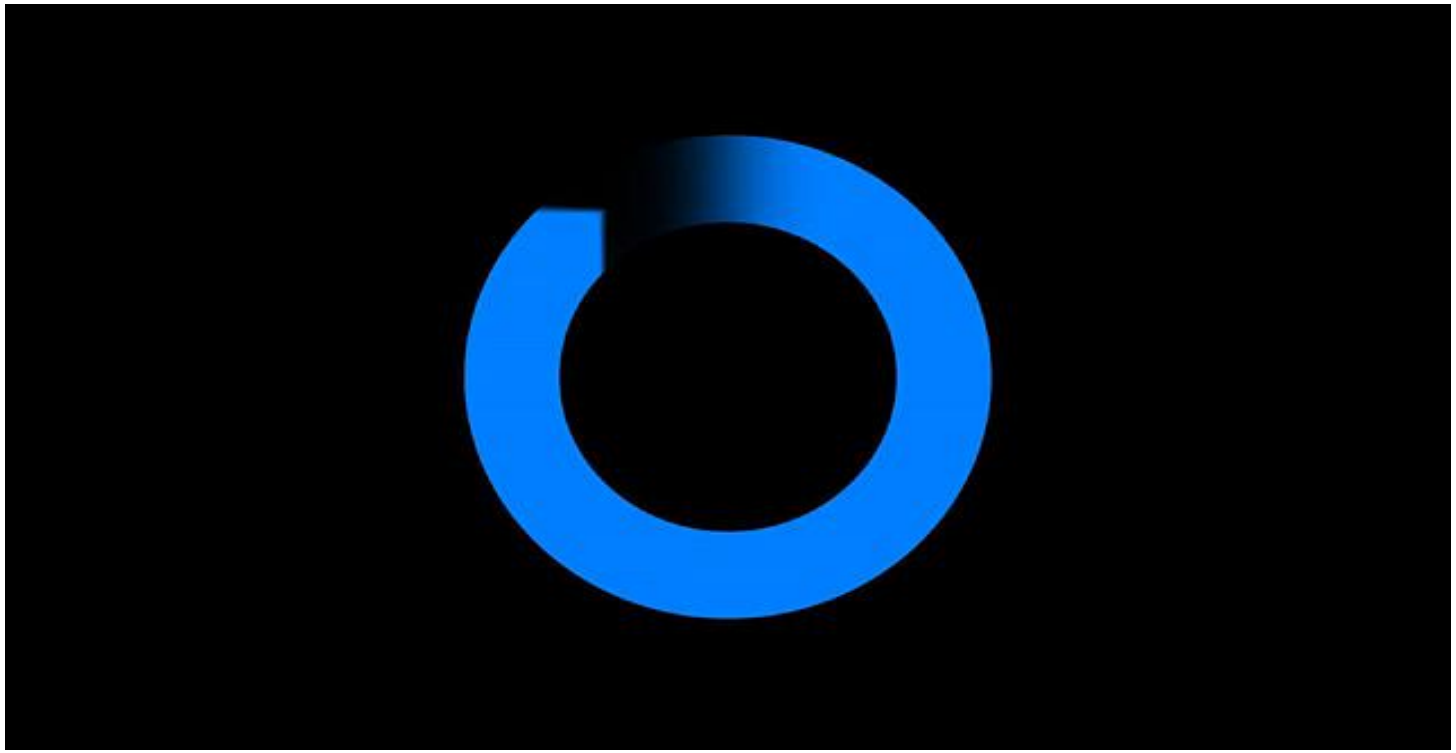
- Identify the best time to backup data, and schedule it
- Inventory all backup methodologies including homegrown utilities
- Recover from a panel with automated JCL creation

Actionable *(Faster)*

- Surgically Recover data sets from "full volume like backups"
- Identify out-of-synch tape replication
- Automatically schedule backups for critical data



Because batch applications have no truly automated means of recovery……



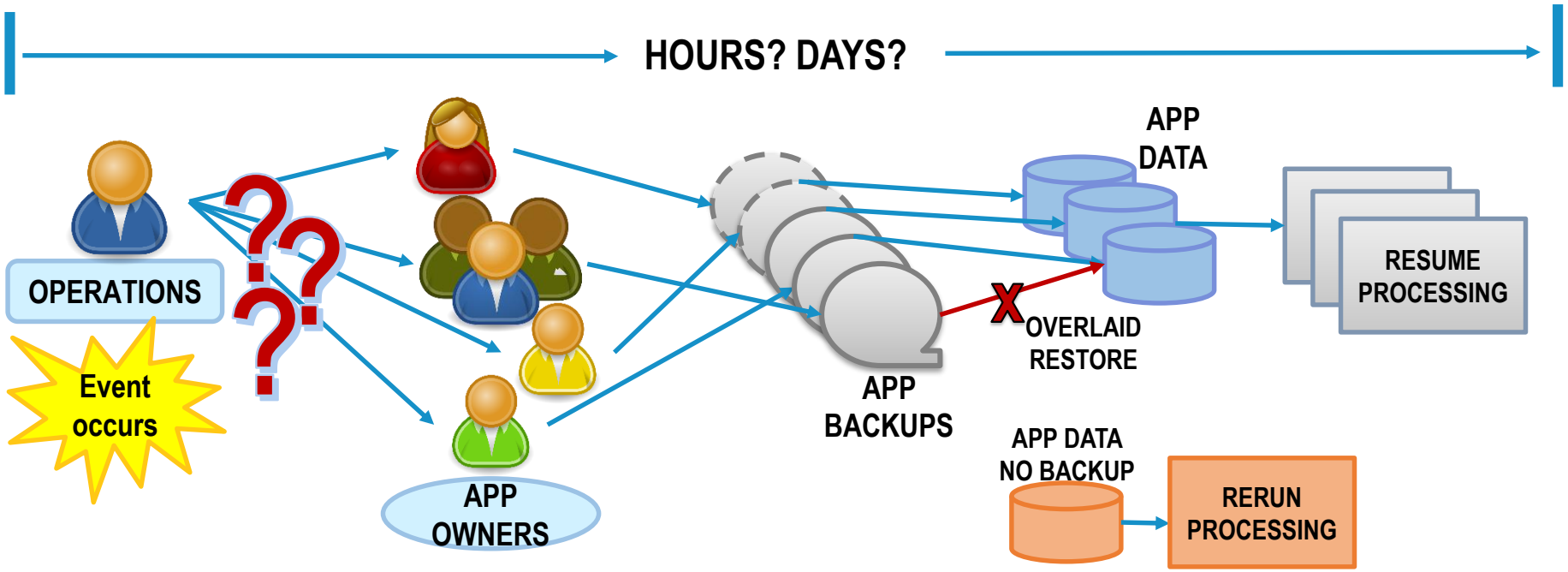
Time becomes the enemy

Root Causes of Application Outages & Downtime

Typical Fixes

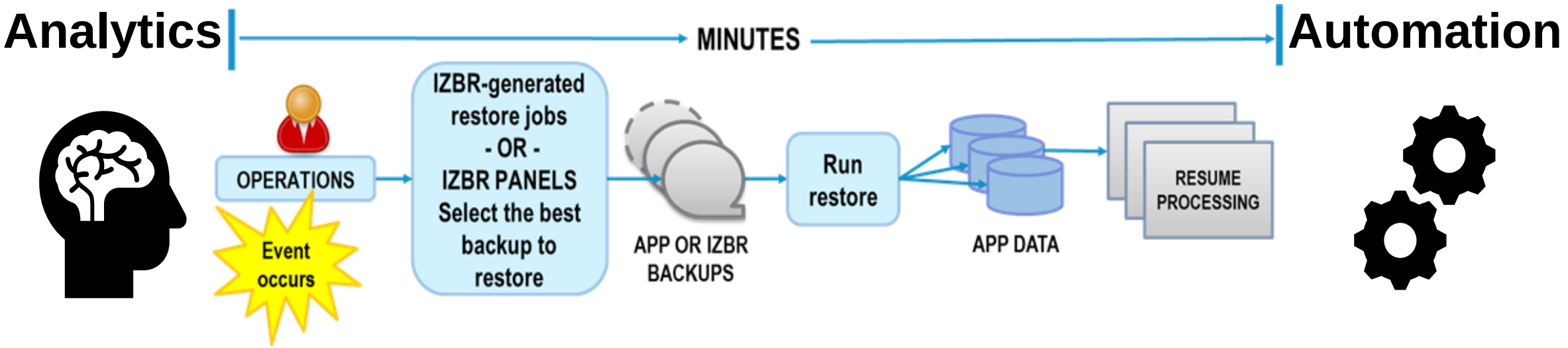
- **Ignore the problem** - hope outages do not happen - or it's someone else's job.
- **Patchwork approach** - attempt to use multiple tools that are often incompatible with one another
- **Over-redundancy approach** - backup everything multiple times unnecessarily causing confusion and disorganization and hope backups contain needed data

These approaches fail to reduce the risk and/or waste time, money, and resources.



IZBR Approach

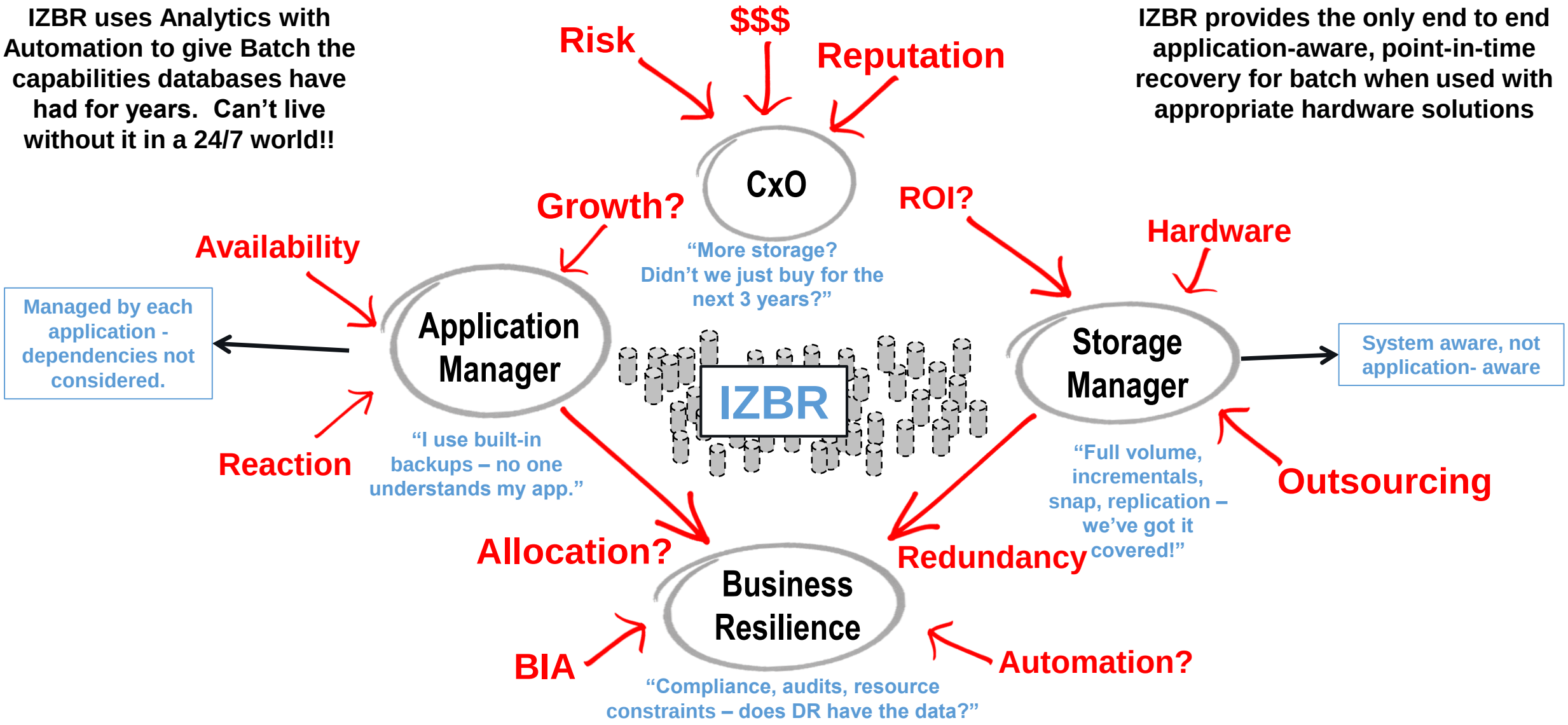
- ***AUDITABLE:*** Understanding of application **interdependencies** and **recovery points**
- ***ACTIONABLE:*** Real-time comprehensive **inventory of datasets and associated backups** – pseudo log of batch applications
- ***REPEATABLE:*** Point-in-time, **granular level** of application recovery of non-database systems



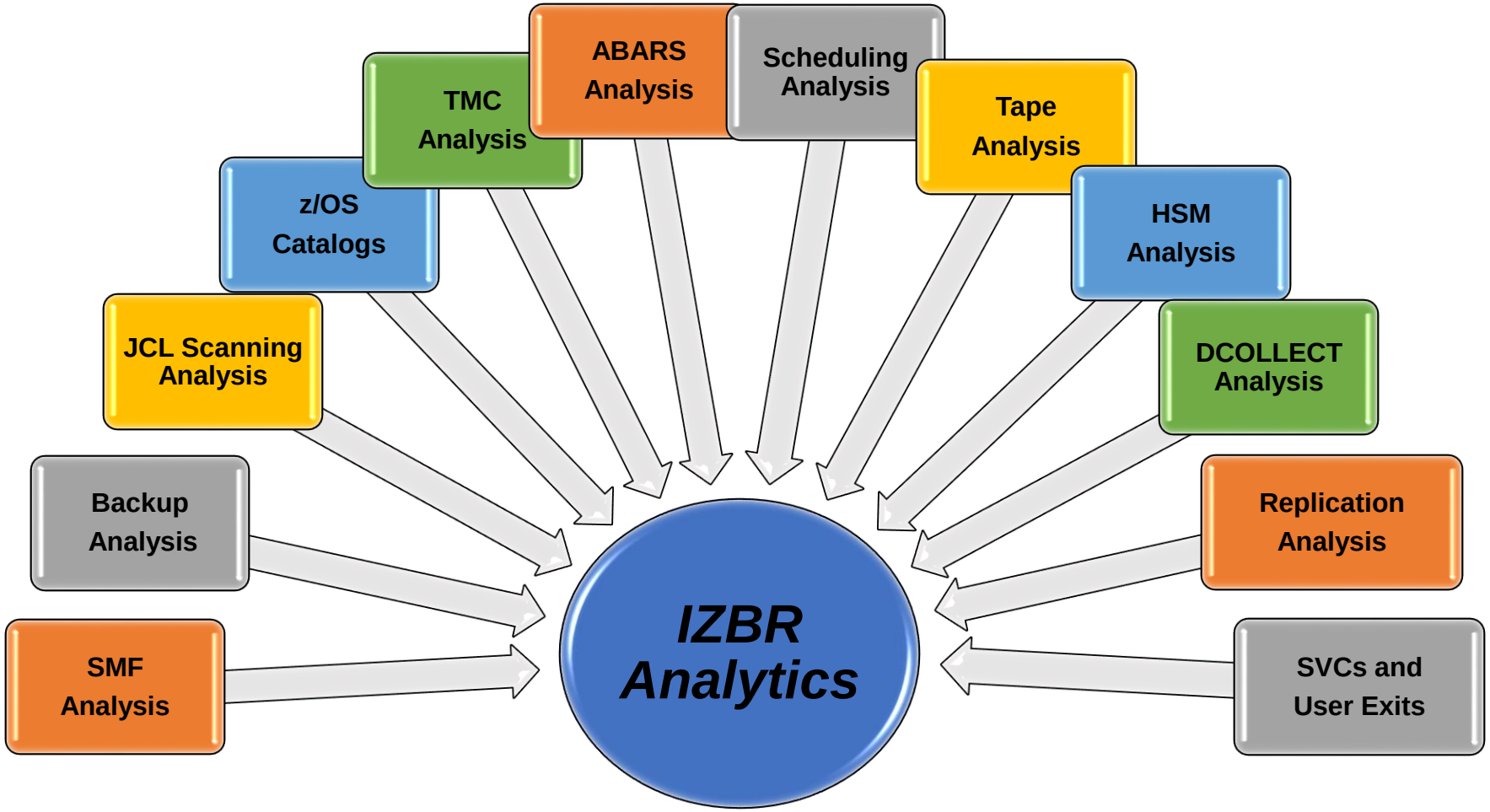
Managing the Risk of Batch with IZBR

IZBR uses Analytics with Automation to give Batch the capabilities databases have had for years. Can't live without it in a 24/7 world!!

IZBR provides the only end to end application-aware, point-in-time recovery for batch when used with appropriate hardware solutions



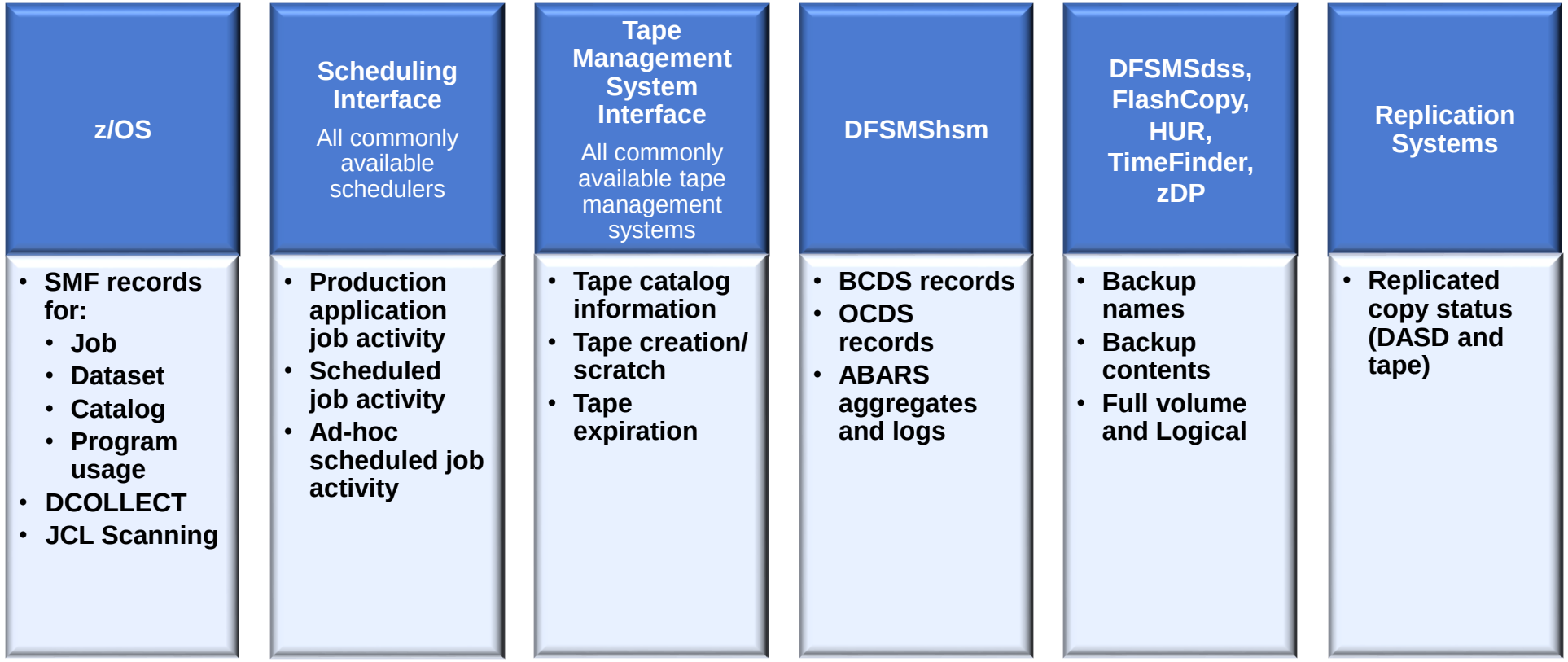
How does IZBR automate recovery?



Leverage the power of the Z environment for up-to-date information surrounding the current state and all for critical decision-making, automation, root cause analysis depending on product or client need

Intelligence Gathering

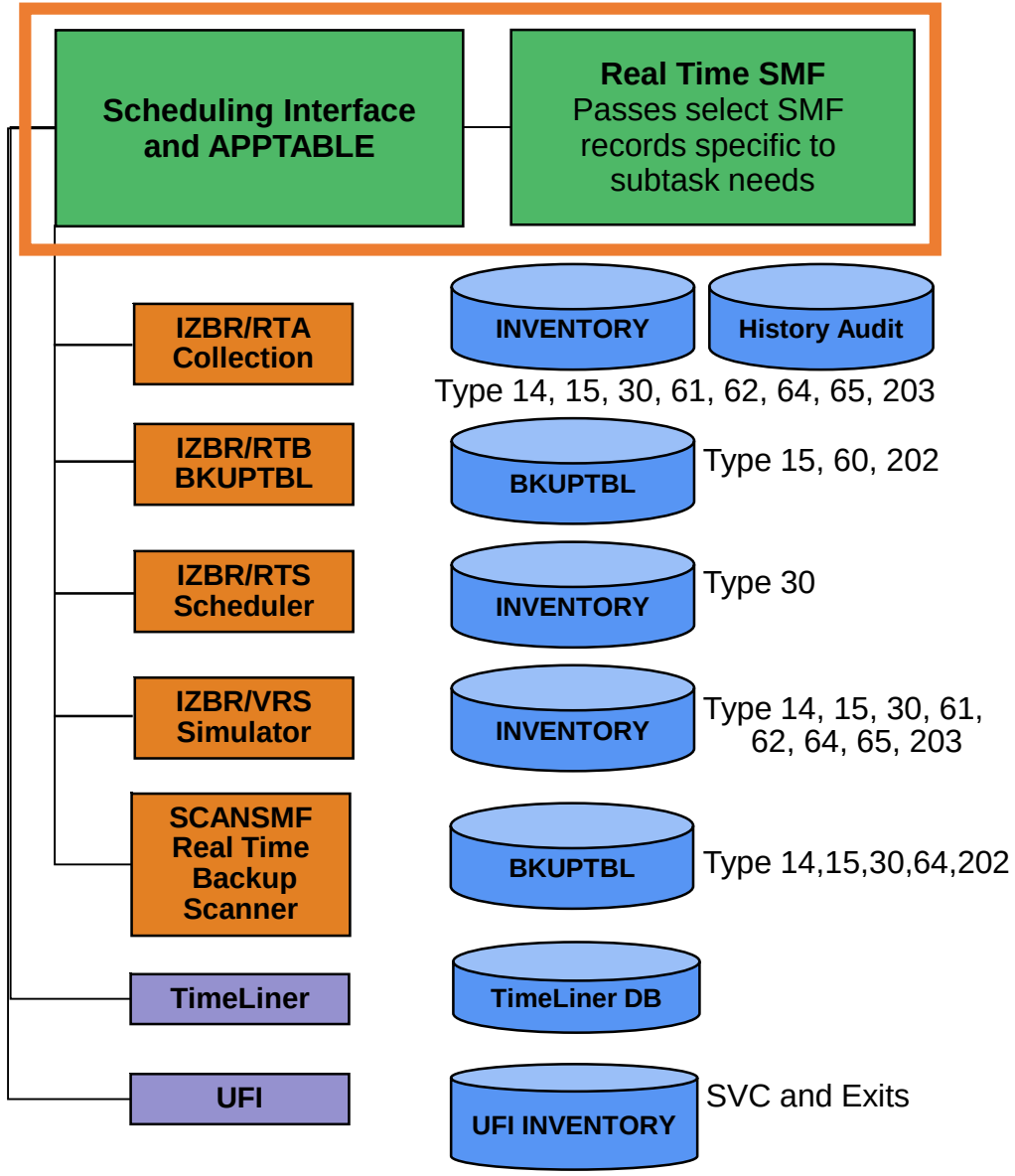
IZBR doesn't replace scheduling, tape management tools, or any of your existing processes… it leverages vendor-agnostic interfaces to correlate information about batch processing and data usage from multiple system components



IBM Z Batch Resiliency (IZBR) Technical Overview

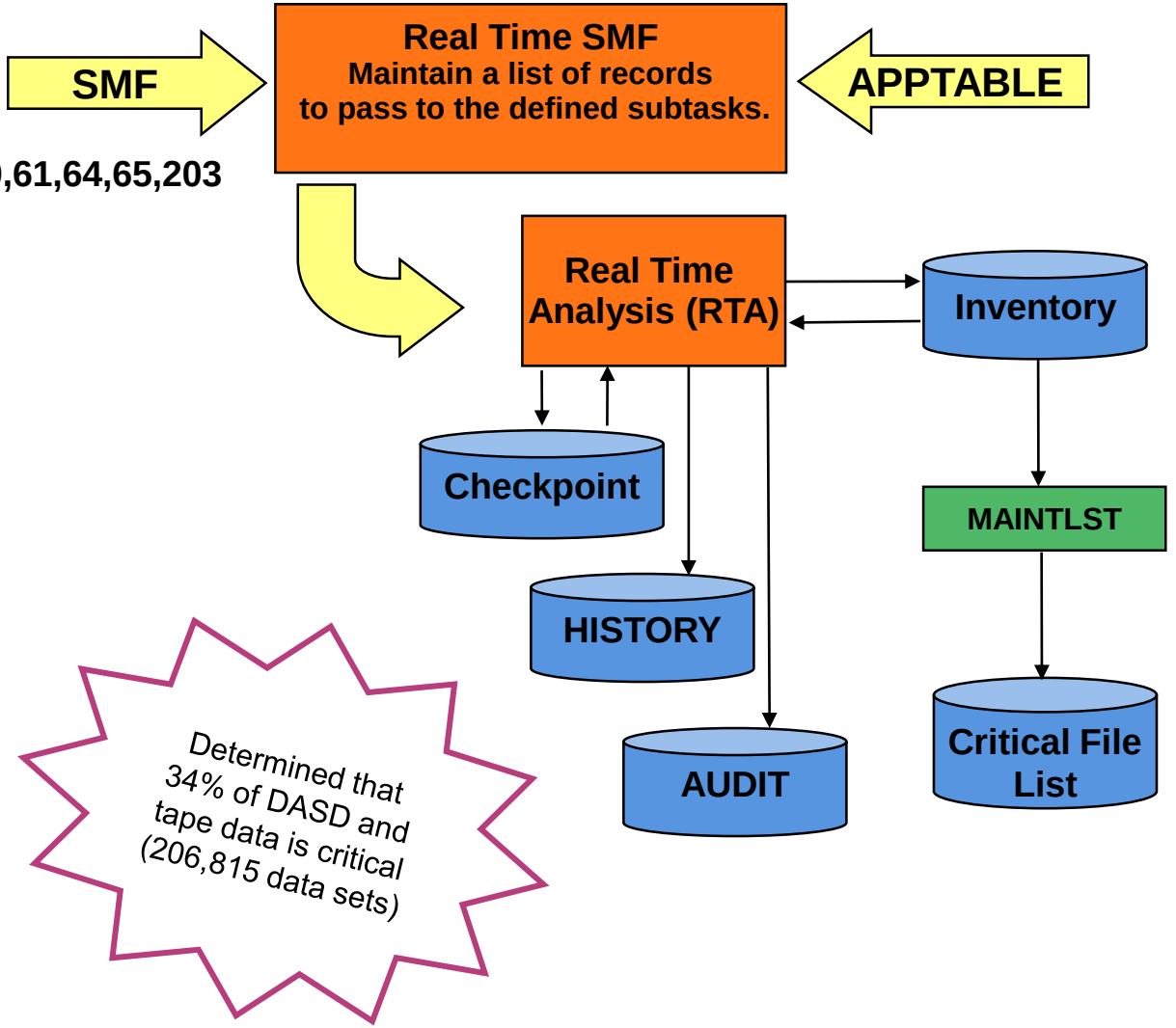
Resiliency for batch that meets business SLAs

RT/SMF provides the foundation for SMF analytics



- Scheduling interfaces to automatically update APPTABLE as new jobs and/or applications are added
- RTSMF gathers SMF data and passes select records to subtasks
- Analysis is performed in real time and Inventory is updated to reflect these evaluations
- History data is produced by IZBR/RTA and is kept for subsequent analytical reporting
- IZBR/RTB updates the changed date for datasets both DASD and tape that are modified in the back up table
- IZBR/RTS works dynamically with the Inventory file for backup scheduling
- IZBR/VRS simulates the recovery as the applications are running in production
- SCANSMF scans legacy backups and updates the backup table
- TimeLiner (patent pending) tracks job and dataset usage while running. This provide point in time accountability of what jobs are running.
- UFI provides refined list of datasets to be updated or modified within the job and/or step

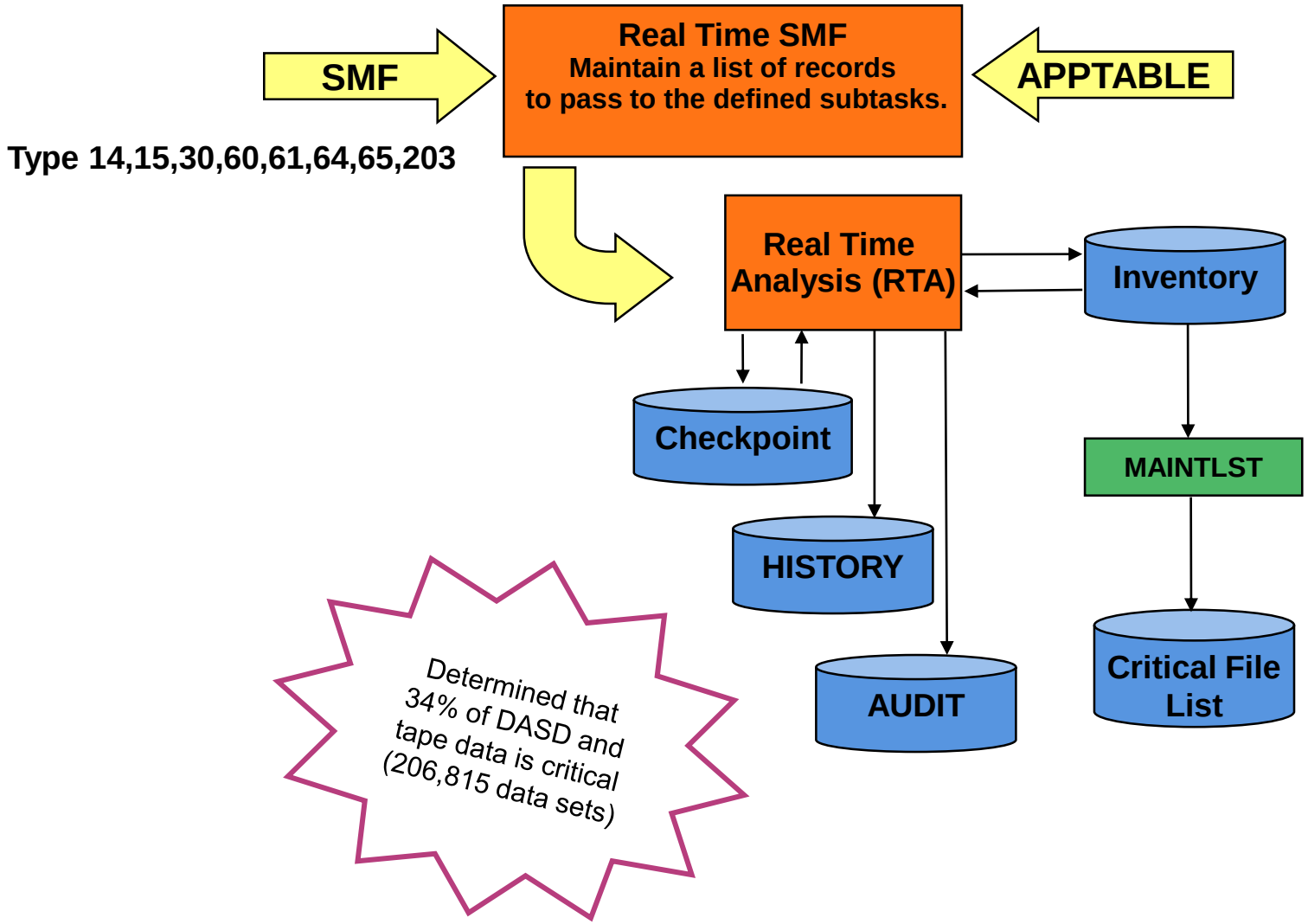
Real Time Analysis (RTA)



- Real time Analysis Checkpoints itself after each Analysis Cycle. This aids in restartability, each application is completed in the event the task is restarted
- The APPTABLE interfaces with the job scheduler and is updated as new jobs and/or applications are added
- RTA writes both HISTORY and AUDIT SMF data for backend utility functions and analysis utilizes un-reformatted SMF data
- Critical File List is a derivative of Inventory and may be demand rebuilt with the MAINTLST utility

Real Time Analysis (RTA)

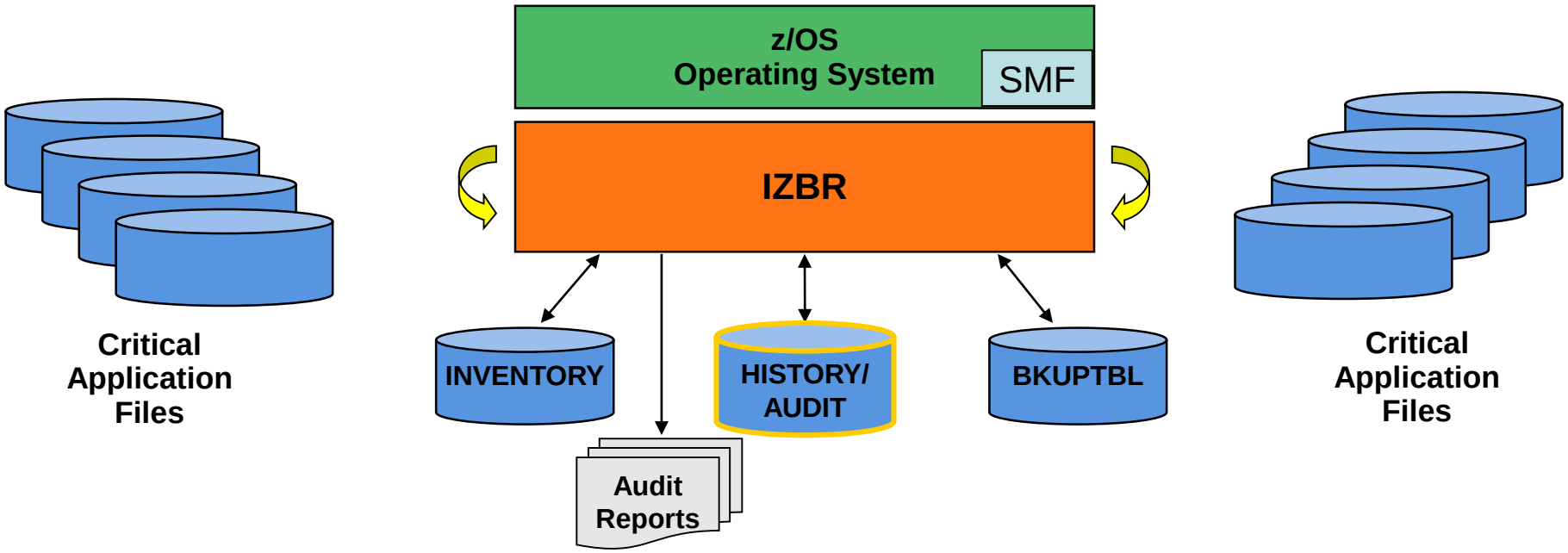
- Key Information Gathered
  - Dataset Dependencies
  - Depth of GDGs
  - Frequency of Use
  - Sizing of datasets
  - File type
  - Access
  - Last reference Date/Time
  - Dataset Disposition
  - And much more



Audit Function

- IZBR constantly looks for *new critical files* and can flag them for backup by default
- IZBR identifies non-production jobs that are updating production files and production jobs using non-production files
- IZBR reports files that have been modified since the time of last backup and provides an inventory report of tapes

Identified 15,120 Critical Datasets being used by non-scheduled jobs



AUDITCHK report

IZBR can identify possible gaps in compliance that can result in PCI non-compliance, audit failures and regulatory breaches.

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                                        IZBR                    14 Jun 2019 13:47:11 PAGE:    1
                          5698-BR1 (C) COPYRIGHT TERACLOUD S.A. 1993,2019 AND IBM CORP. 2019
          AUDITCHK REPORT:LIST OF CRITICAL FILES REFERENCED BY JOBS NOT LISTED IN APPLICATION TABLE

----------------------------DSN : PROD.BATCH.ATM.REPORT-----------------------------------

 DATE    TIME     JOBNAME  DDNAME   ACCESS   VOLUME TYPE VOLUME DATASET DISPOSITION UPDATED?
 _______ _______  _______  _______  _______  ___________ ______ _______ ___________ ________
 12MAY19 17:23:09 ABS05    ISP17049 INPUT    DASD        PSM135 OLD
 13MAY19  7:45:28 SOS05    ISP07315 INPUT    DASD        PSM002 OLD
 24MAY19 21:11:39 WCA140   SYS00001 OUTPUT   DASD        PSM044 NEW                    *

------------------------------DSN : PROD.BATCH.TRANS.REPORT-------------------------------

 DATE    TIME     JOBNAME  DDNAME   ACCESS   VOLUME TYPE VOLUME DATASET DISPOSITION UPDATED?
 _______ _______  _______  _______  _______  ___________ ______ _______ ___________ ________
 24MAY19 19:00:42 77700    SYS00001 OUTPUT   DASD        PSM186 OLD                    *


----------------------------DSN : PROD.BATCH.TRANS.MASTER-------------------------------

 DATE    TIME     JOBNAME  DDNAME   ACCESS   VOLUME TYPE VOLUME DATASET DISPOSITION UPDATED?
 _______ _______  _______  _______  _______  ___________ ______ _______ ___________ ________
 06MAY19 11:46:52 ITC08    SYS00033 INPUT    DASD        PSM078 OLD
 06MAY19 11:49:07 ITC08    SYS00034 INPUT    DASD        PSM078 OLD
 06MAY19 11:52:47 ITC08    SYS00042 INPUT    DASD        PSM078 OLD
```

Critical datasets are read or updated by jobs outside of the scheduler, including possible TSO users or test jobs

CROSSDEP report

IZBR provides reports to understand application data dependencies for resiliency, key rotation and other purposes

```
                                                IZBR                    PAGE:          1
                                          BRN - VERSION 4.7              DATE: 06/19/2019

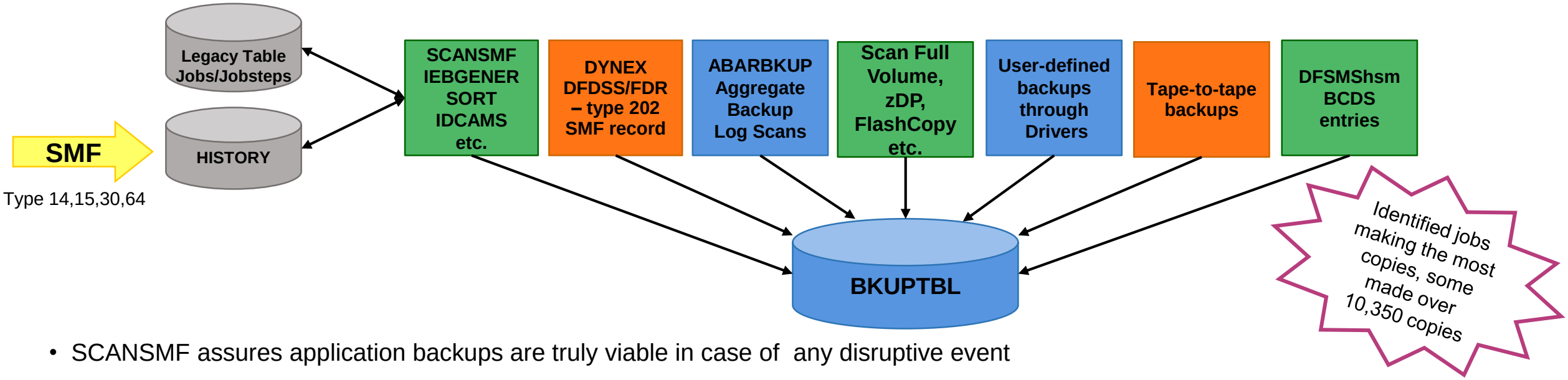
         REPORT NAME: CROSSDEP - LIST OF CRITICAL FILES UPDATED BY MORE THAN ONE APPLICATION
DSN:   PROD.SHARE.XXXABC.TRANS
UPDATED BY:   AFM10P    AFMMRG    18MAY19 20:33:23 REFERENCED BY: AFMSMR    18MAY19 20:32:56
              AFM12P    AFMMRG    18MAY19 20:33:23                 AFMSMR    18MAY19 20:32:56
              AFM4PM    AFMMRG    18MAY19 20:33:23                 AFMSMR    18MAY19 20:32:56
              AFM6AM    AFMMRG    18MAY19 20:33:23                 AFMSMR    18MAY19 20:32:56
              IAT10P    AFMMRG    18MAY19 20:33:23                 AFMMRG    18MAY19 20:33:24
              IAT12P    AFMMRG    18MAY19 20:33:23                 AFMMRG    18MAY19 20:33:24

DSN:   PROD.BATCH.ATM.MASTER
UPDATED BY:   GENDLY                               REFERENCED BY: ACRACH6   18MAY19 15:29:52
              JVS                                                 ACRJVS16  18MAY19 20:33:29
              ACHPCST                                             ACRACH5   18MAY19 20:55:37
              OTS                                                 ACROTS1   18MAY19 21:46:48
              ATM                                                 ACRATM9   18MAY19 22:40:36
              OPT                                                 ACRATM15  18MAY19 23:27:17

DSN:   PROD.SHARE.BATCH.MASTER
UPDATED BY:   ETS       ATMEXT    18MAY19 20:36:42 REFERENCED BY: ETSCTR    19MAY19 23:32:15
              CCS       ATMEXT    18MAY19 20:36:42                 CCSFDR    18MAY19 21:13:03
              GEN       ATMEXT    18MAY19 20:36:42                 GENMET    18MAY19 21:13:21
              AUD       ATMEXT    18MAY19 20:36:42                 AUDATM    18MAY19 21:13:26
              OTS       ATMEXT    18MAY19 20:36:42                 OTSCSH    18MAY19 21:13:27
              SAM       ATMEXT    18MAY19 20:36:42                 SAMATM    18MAY19 21:13:27
```

Critical datasets are read or updated by multiple applications

Application Backup Verification – Backup Scanning



- SCANSMF assures application backups are truly viable in case of any disruptive event
- SCANSMF tracks current operational backups & adds these backups to the BKUPTBL to be used to recover critical datasets
- Real time BKUPTBL evaluates entries that IZBR maintains for backup
    - Tape and non-VSAM data are tracked through SMF type 15 records
    - VSAM datasets are evaluated through the catalog search interface
- IZBR tracks full volume backups at both the volume and dataset level including mirrored DASD and SNAP/FlashCopy allowing for restore of data at the dataset, application or volume level
- When files are modified, change fields for these datasets are updated & file is shown as “changing since its last backup” and a backup can be automatically scheduled

IZBR Reporting – Provides Immediate Value

GUIDE SHARE EUROPE UK REGION

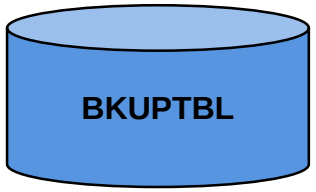
Identified 75,376 critical data sets without backup

What do you want to know?	***There's an IZBR report for that…***
Which of my critical data sets aren't being backed up?	BACKWO shows changed, critical data sets that haven't been backed up
What are my application data dependencies?	CROSSDEP shows data sets being updated by multiple applications
Which production and non-production jobs are sharing data?	AUDITCHK shows production data accessed/ updated by non-production jobs; non-production data accessed by production jobs
What new production applications and datasets have been added?	MAINTLST identifies new critical data sets that have been added
Why are there so many backups of my data sets? Who's creating them?	LEGACY shows data set backups, methodology (including non-standard) and number of versions

IZBR Driver Templates Provide Flexibility

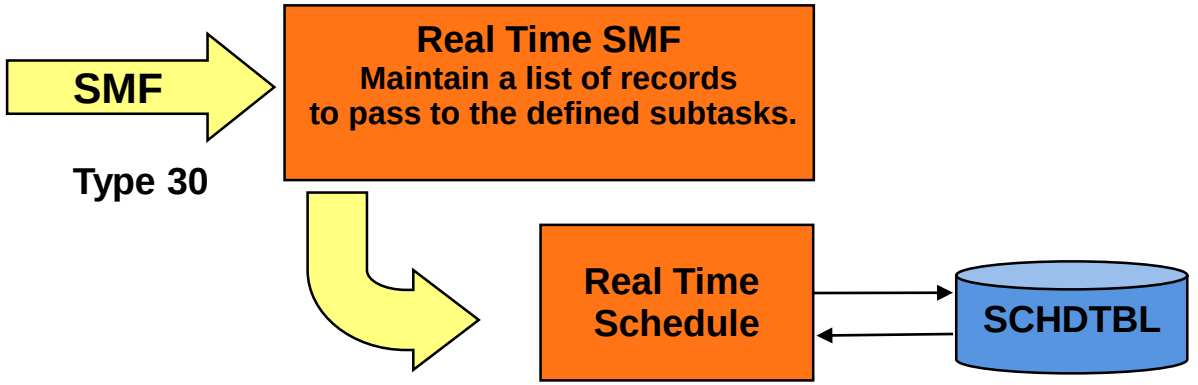
```
#JOB
//%JOBAPP% JOB (),CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID
/*JOBPARM SYSAFF=*
//VFILIB JCLLIB ORDER=EXPL.VFI.X000.CNTL
#JCL
//*-------------------------------------------------------------
//* APPLID = %APPLID%
//*-------------------------------------------------------------
//JS%JS%   EXEC XDSSBKUP,
//         APPLID=%APPLID%,
//         BDSN='%BKUP_HLQ%.%APPLID%.JS%JS%.D%DATE%.T%TIME%',
//         RET=%RETSAV%
//PS10.VFIFILT DD *
#JCLEND
#HEAD
#SELECT
:F  INCLUDE(%DSNAME%  -
:O           %DSNAME%  -
:L           %DSNAME%  )
:S  INCLUDE(%DSNAME%)
#ENDJCL
/*
```

The BKUPTBL contains a comprehensive inventory of all backups used to drive templates



- Automated creation of JCL for backups at dataset or volume level
- Automated creation of JCL for restores at dataset or volume level
- Can include any pre or post-processing needed, i.e. freeze and thaw of database volumes for advanced full-volume backups

Real Time Schedule (RTS)



Real Time Schedule evaluates scheduling events and criteria to determine a file's eligibility for being backed up.

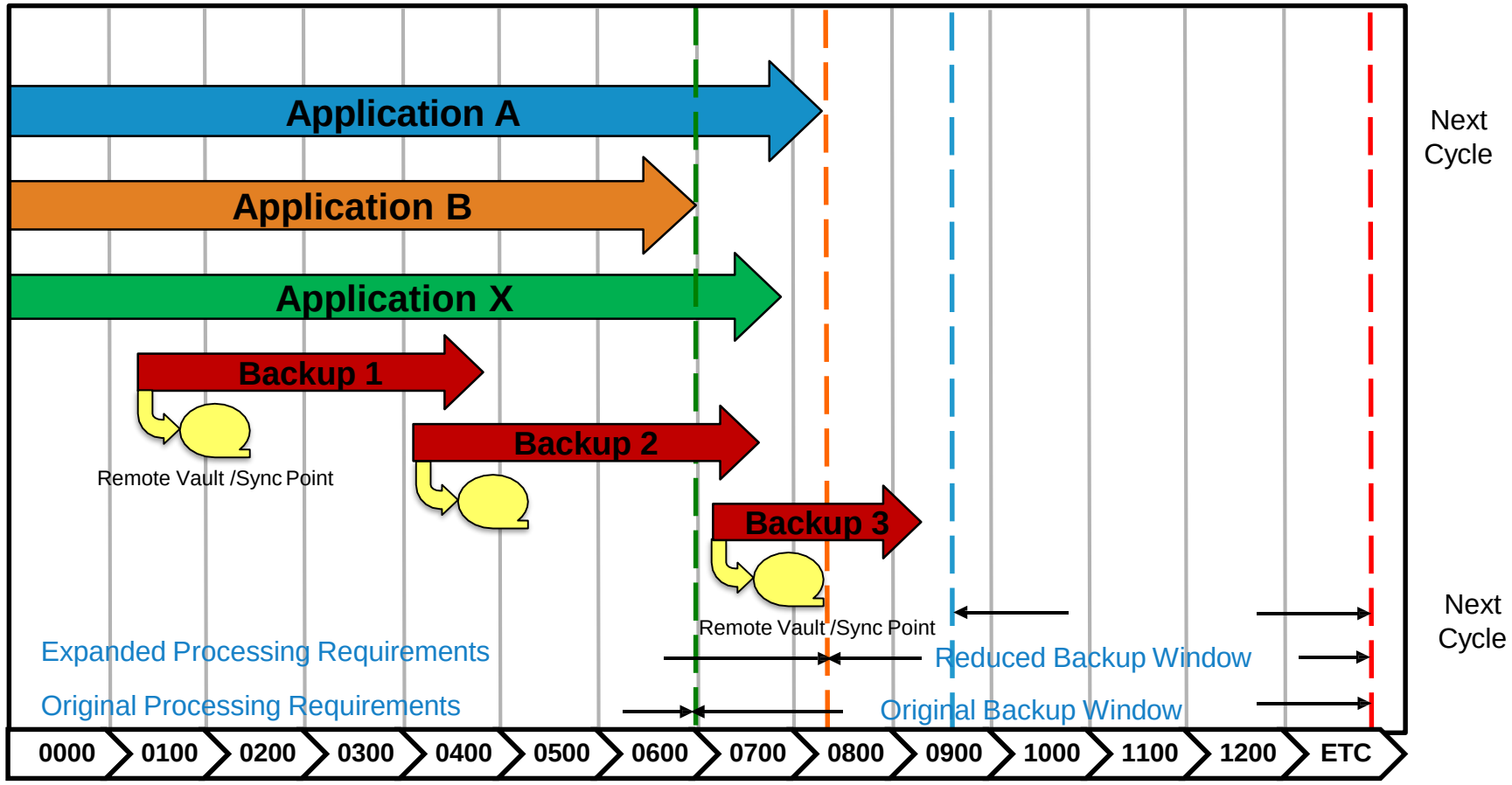
A parameter within the BKUPJCL program generates backups for eligible files and tracks the submission of their backup jobs.

Through real time availability of SMF data, the task of tracking backups through completion becomes simple and efficient.

Identified a backup scheme to accommodate 36-hour batch cycle – saving processing time and backups

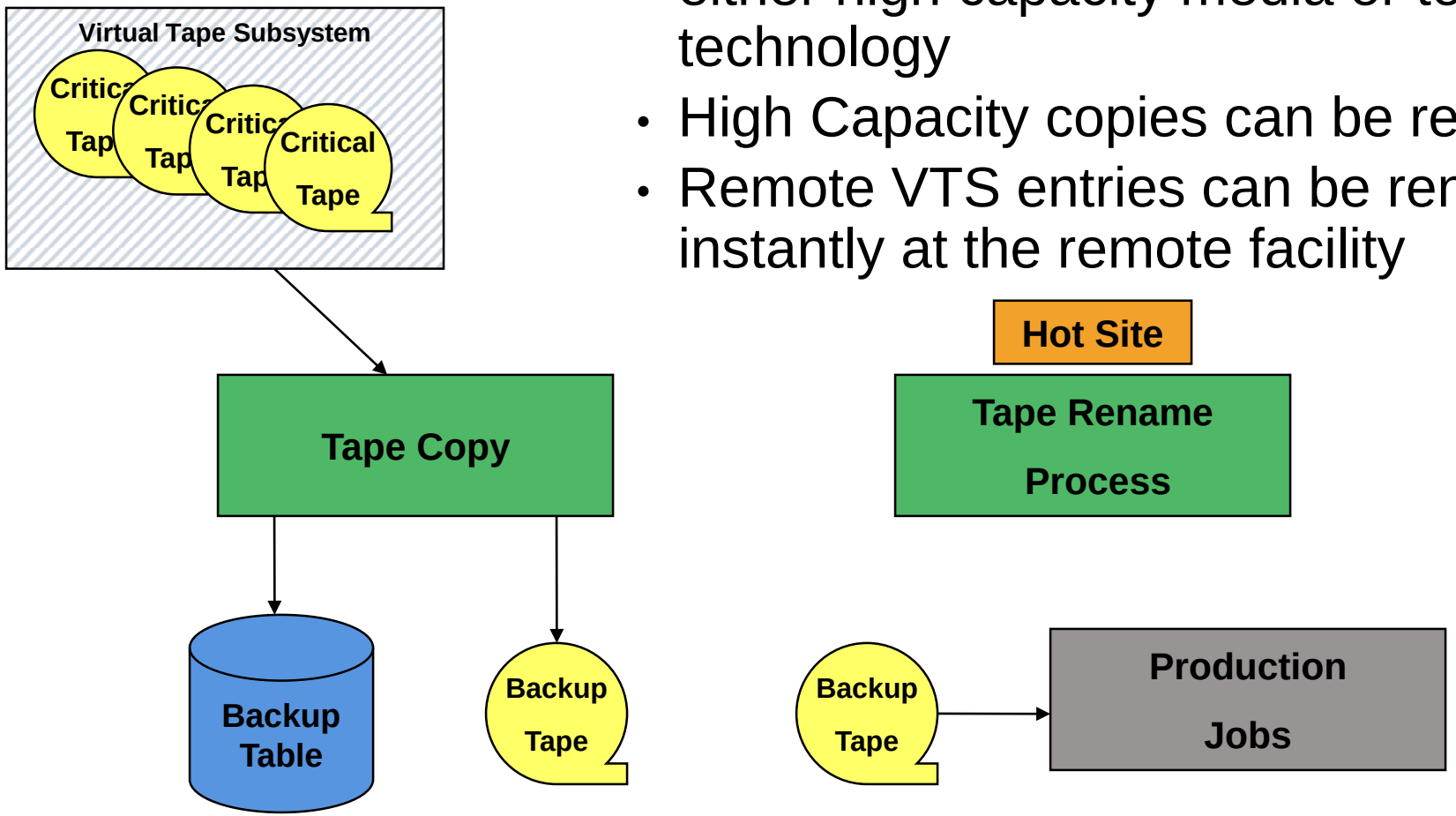
Dynamic Scheduling

- Enables backup creation and application processing to run concurrently
- Reduces the amount of data submitted for backup and assures data is backed up only once at the appropriate time, without contention with batch jobs, relative to dependencies and other factors.
- Allows for sync points among multiple applications, including databases.
- Augments data that may be missing in existing application backups.

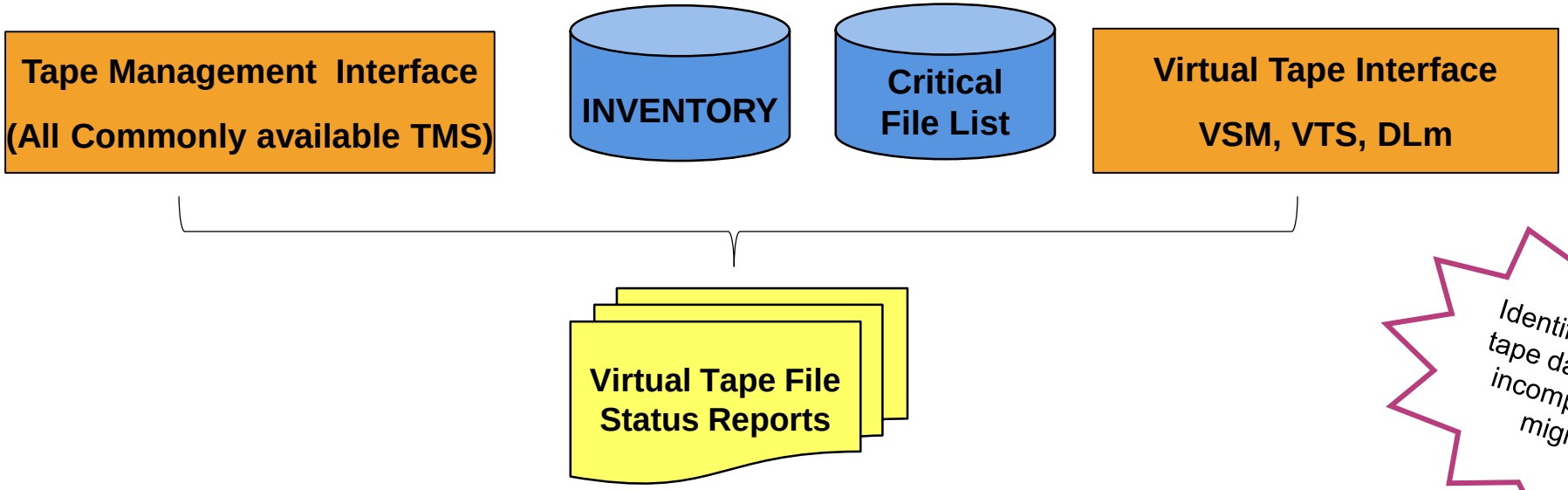


Virtual Tape Support

- IZBR can be used to create backup copies of critical tape datasets - backups can be directed to either high capacity media or to remote VTS technology
- High Capacity copies can be restored into the VTS
- Remote VTS entries can be renamed and used instantly at the remote facility



Replicated/HA Virtual Tape Support



- Uses Real Time components of IZBR and associated information from the Tape Management and Virtual Tape systems
- IZBR reports actual status of your tape data sets at the time of disruption
- Allows quick decision making for the point and time to recover

Reducing Impact of HSM Migrate/Recall overhead

This feature provides the ability to pre-stage datasets for recall by HSM, preventing delays and missed SLAs in batch processing due to recall waits.

Benefit:

- Using traditional 4HRA software pricing models
  - IZBR prestaging recalls allows you to move the overhead of recalls to a non-peak window, potentially reducing peak usage

- Using the new Tailored Fit pricing model
  - IZBR knows data usage patterns and can provide information to adjust data set migration criteria to reduce migrate/recall activity, lowering overall HSM usage

Identified 3,632 critical datasets were in migrate status

Critical Datasets Not on Replicated Volumes

Are you replicating all of your DASD volumes? If not, are you sure all the data sets that you need at a remote site are on volumes being replicated?

- IZBR MOVEJCL identifies critical data sets that need to be available for recovery that aren't on replicated volumes.
- IZBR automatically builds JCL to relocate the data sets to replicated volumes.

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REPORT DATE: 24 MAY 2019                              IZBR
REPORT TIME: 14:07:48                    5698-BR1 (C) Copyright Teracloud S.A. 1993,2019 and IBM Corp.
2019

===> BRNVMVJC REPORT:  LIST OF DATASETS NOT ON DESIRED VOLUMES
APPLID    --------------- DATASET NAME --------------- CURVOL TYPE SRC JCL METH ----------------------
STATUS --

SYSTEMS  BRN.S480.LIBRARY                               SW0005 DASD CFL NO  N/A  Move to: U(01A0-0AFF)
SYSTEMS  BRN.S480.LISTLKED                              SW0004 DASD CFL NO  N/A  Move to: U(01A0-0AFF)
SYSTEMS  BRN.S480.PGMLIB                                SW0005 DASD CFL NO  N/A  Move to: U(01A0-0AFF)
SYSTEMS  BRN.S480.PSOURCE                               SW0006 DASD CFL NO  N/A  Move to: U(01A0-0AFF)
SYSTEMS  BRN.S480.TEST.DIST.LIBRARY                     SW0006 DASD CFL NO  N/A  Move to: U(01A0-0AFF)
SYSTEMS  BRN.S480.TEST.USERMAC                          SW0006 DASD CFL NO  N/A  Move to: U(01A0-0AFF)
SYSTEMS  BRN.S480.TLN.LKEDSPLT                          SW0005 DASD CFL NO  N/A  Move to: U(01A0-0AFF)
```
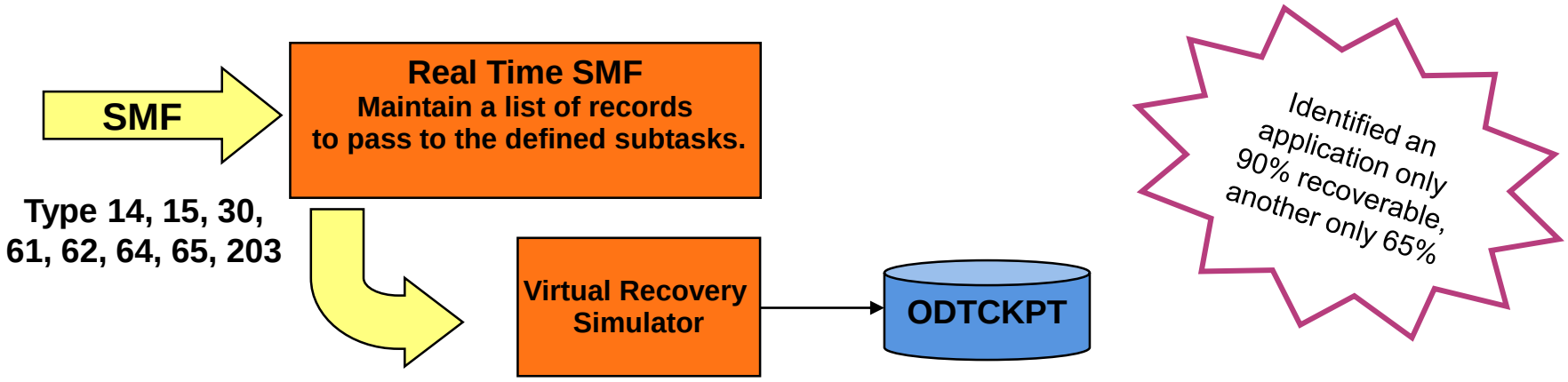

Real Time Virtual Recovery Simulator (VRS)

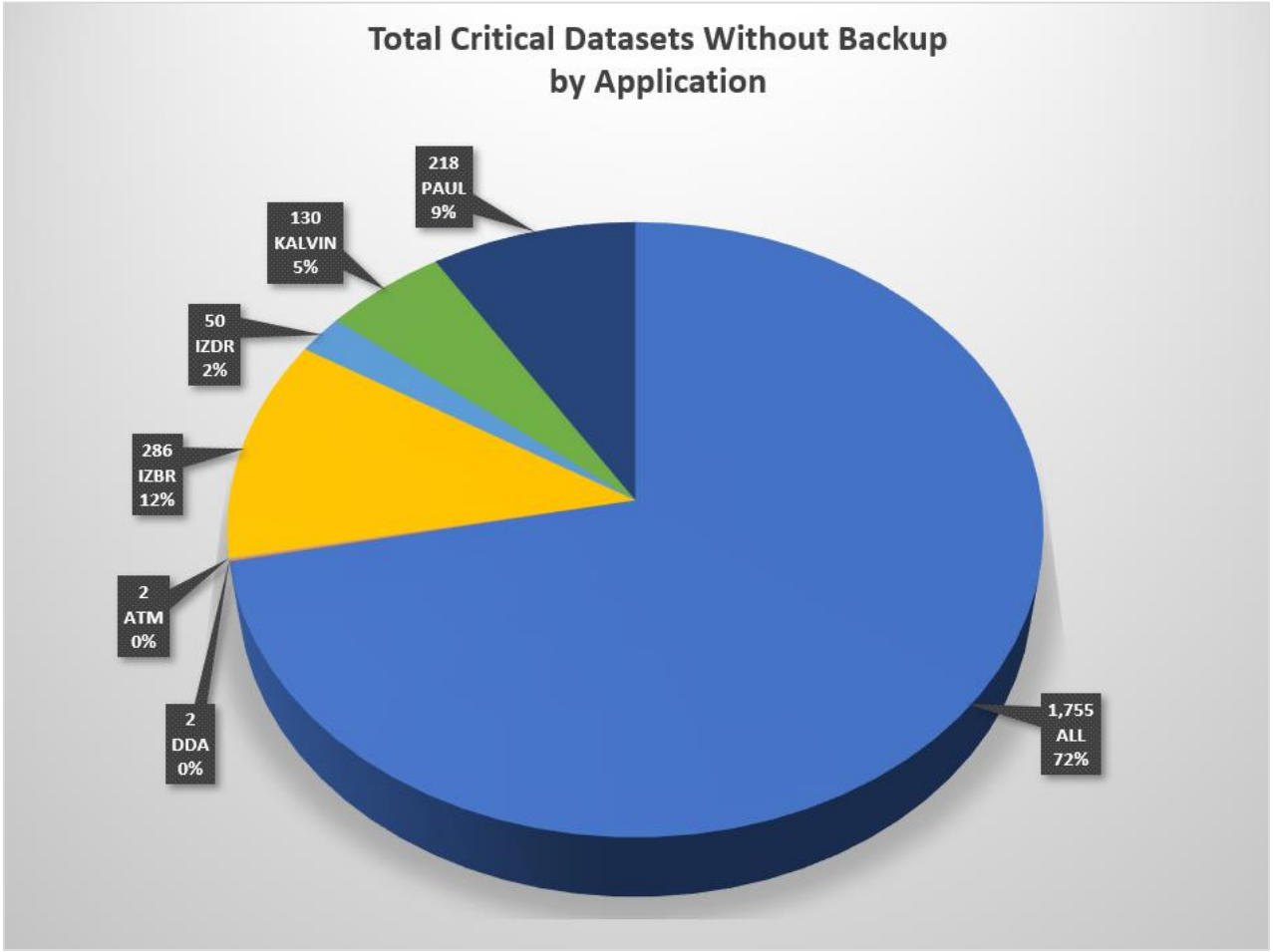


- Real Time Virtual Recovery Simulator simulates a recovery exercise at any time to identify exposures in the recovery of an application(s) or of entire environment
- Innovative “virtual testing” allows you the capability of testing scenarios that today would not be tested due to cost, time or unavailability of technology or human resources
- The ability to run “what if” scenarios at any time are critical in a world of SLAs that must be met

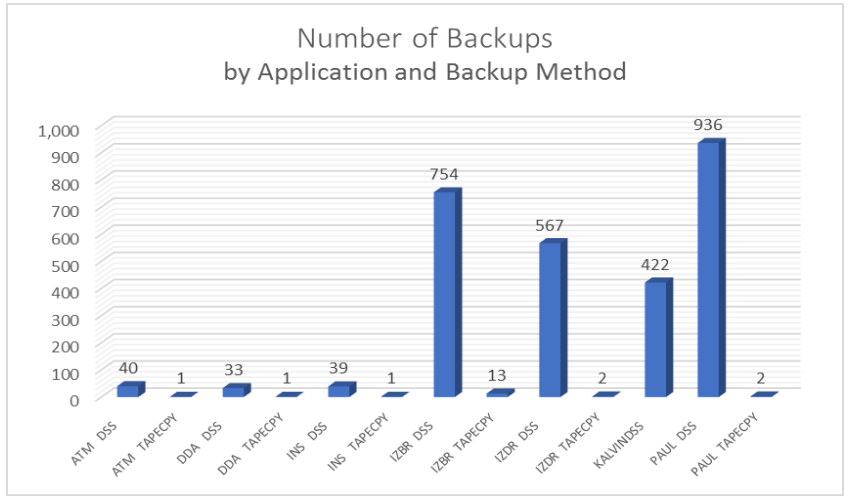
Insight into Business Risk

Which of the applications might not be recoverable in an event?

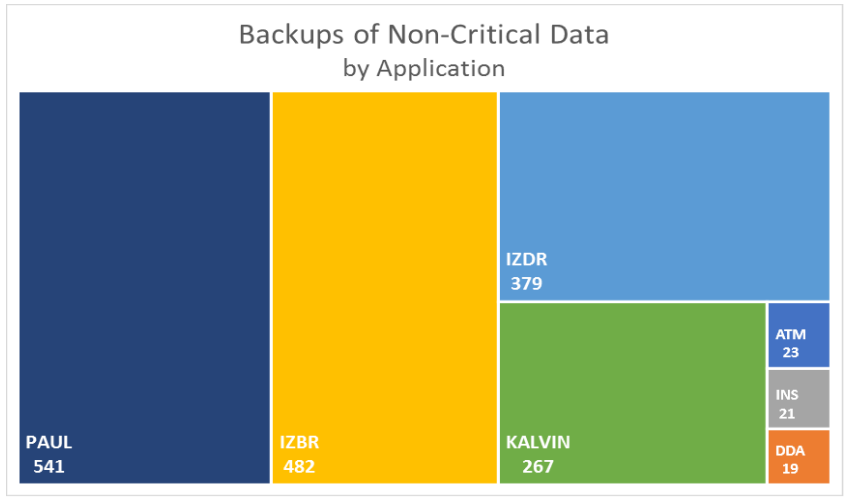
Where do you need to take steps to close the resiliency gaps?



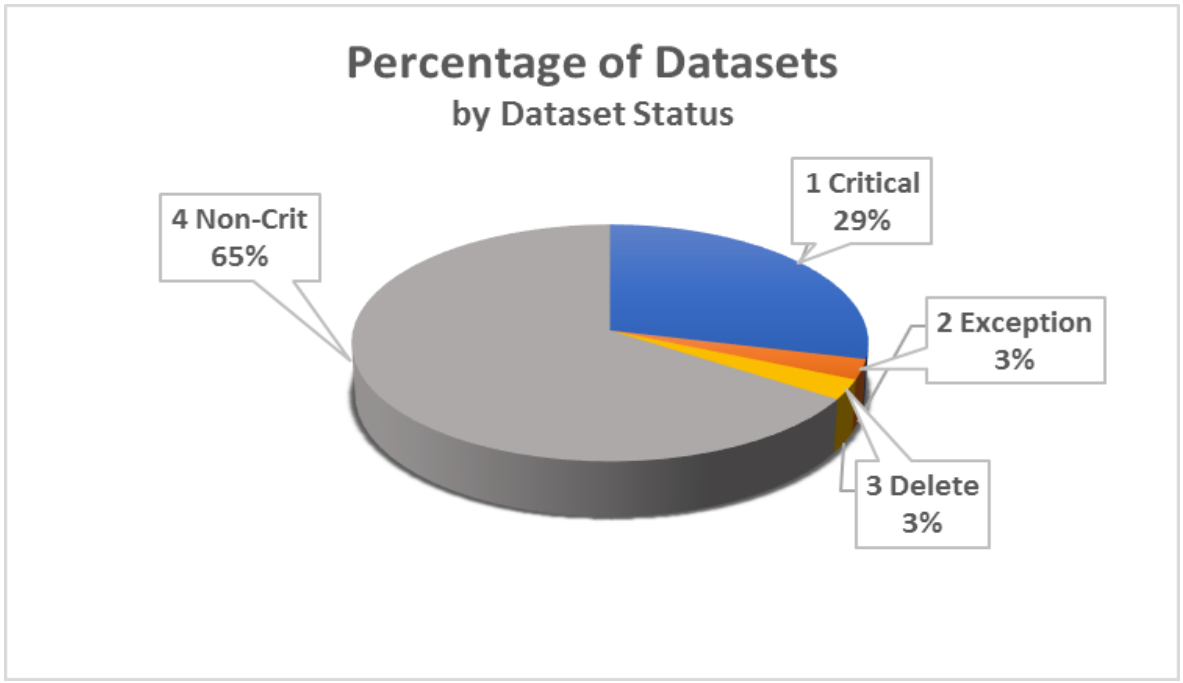
INVENTRY Data Insights



How is the data backed up? And by who?
How many methods do you need to manage?

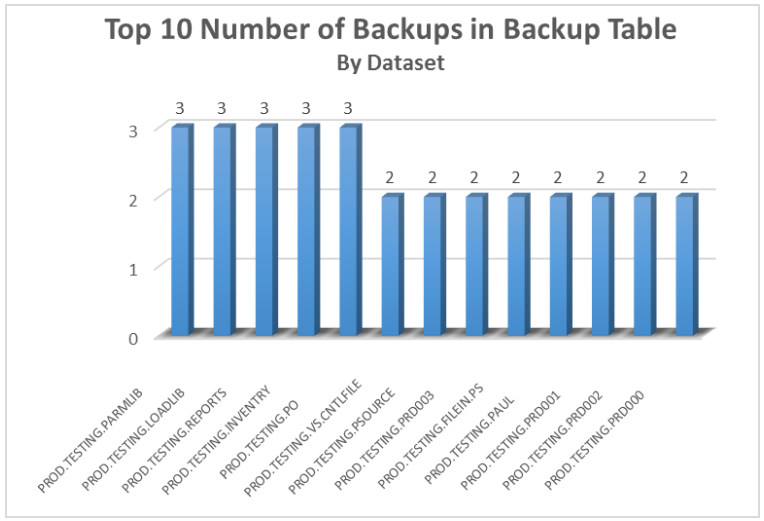


Who's taking non-critical backups?
Can you reduce wasted resources?

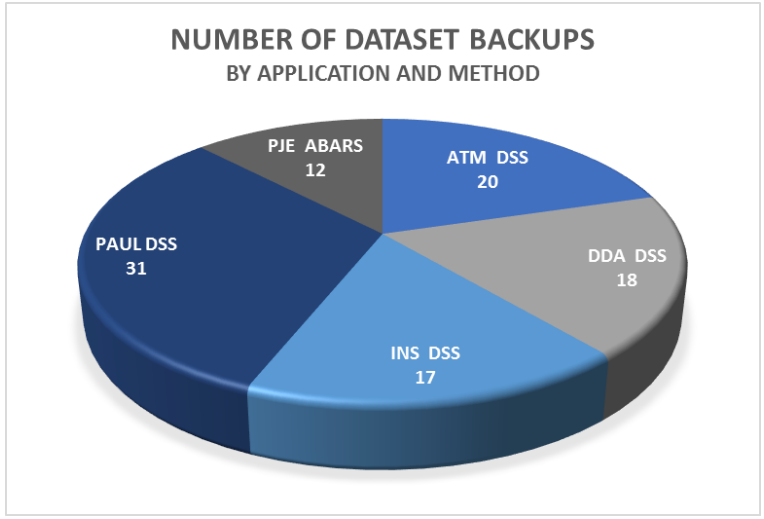


How much of your data is critical?
What must you be able to recover?

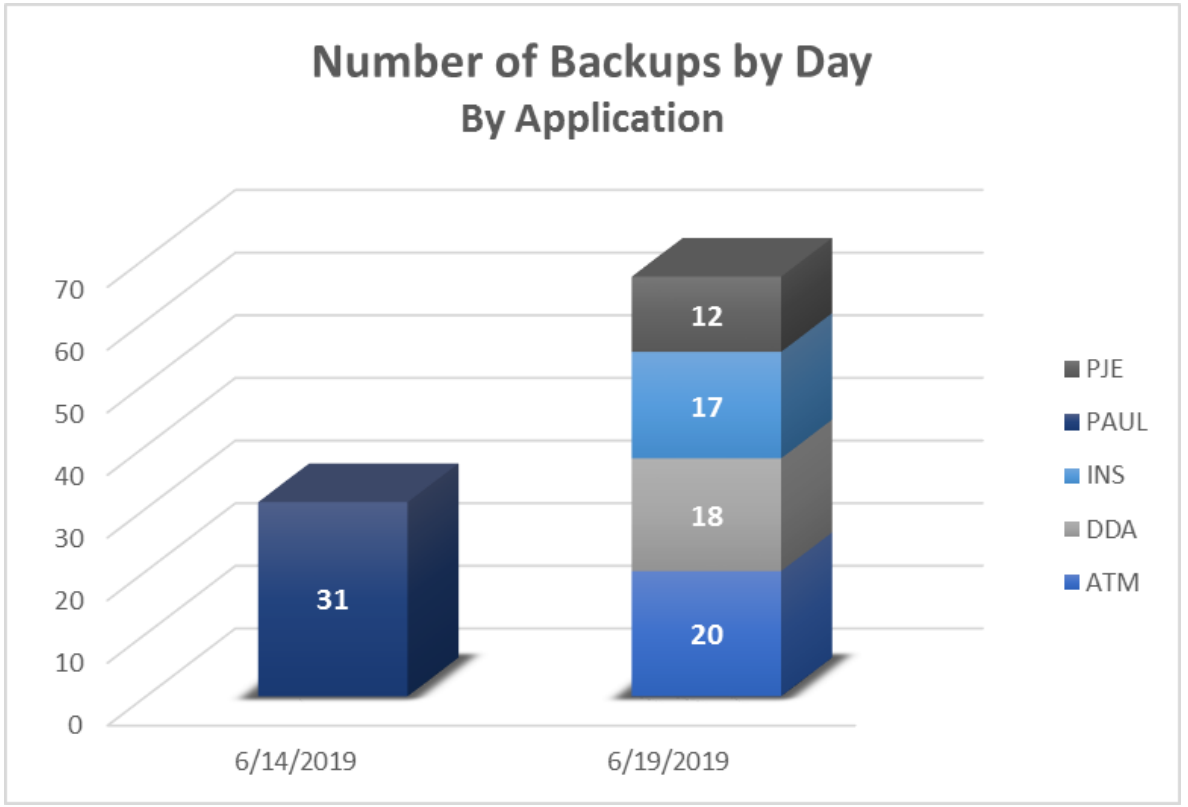
BKUPTBL Data Insights



How many redundant backups do you have of the same dataset?

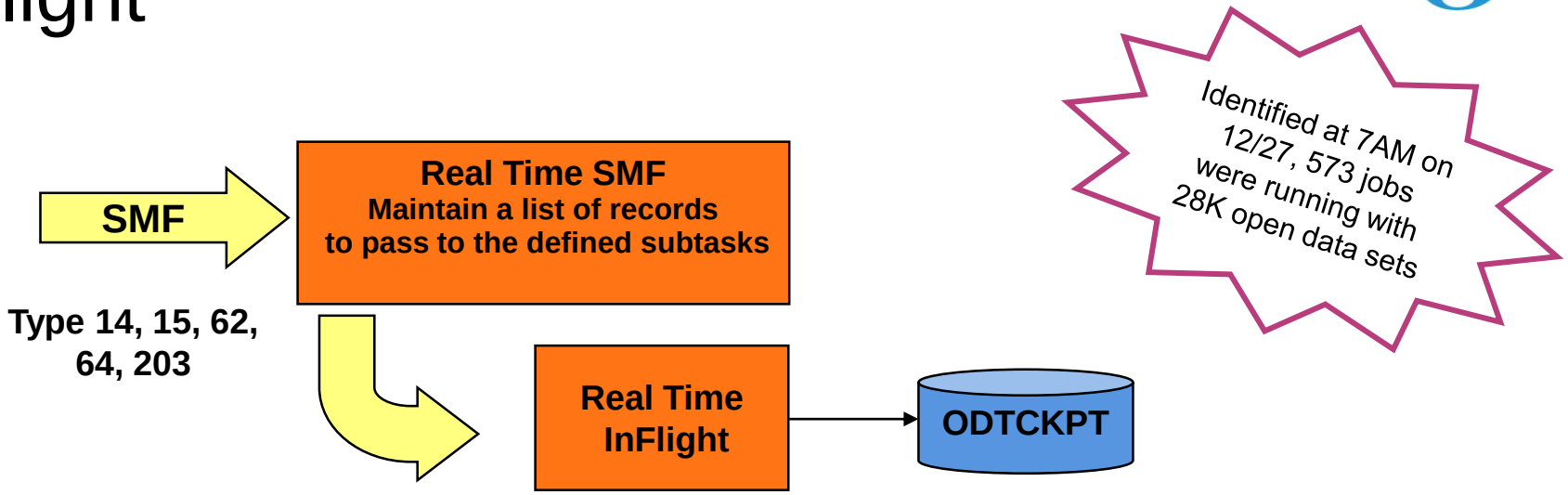


Which applications are using which methods?
Who's using non-standard methods?



How many backups are being taken per day?
How many resources do I need to plan for to support it?

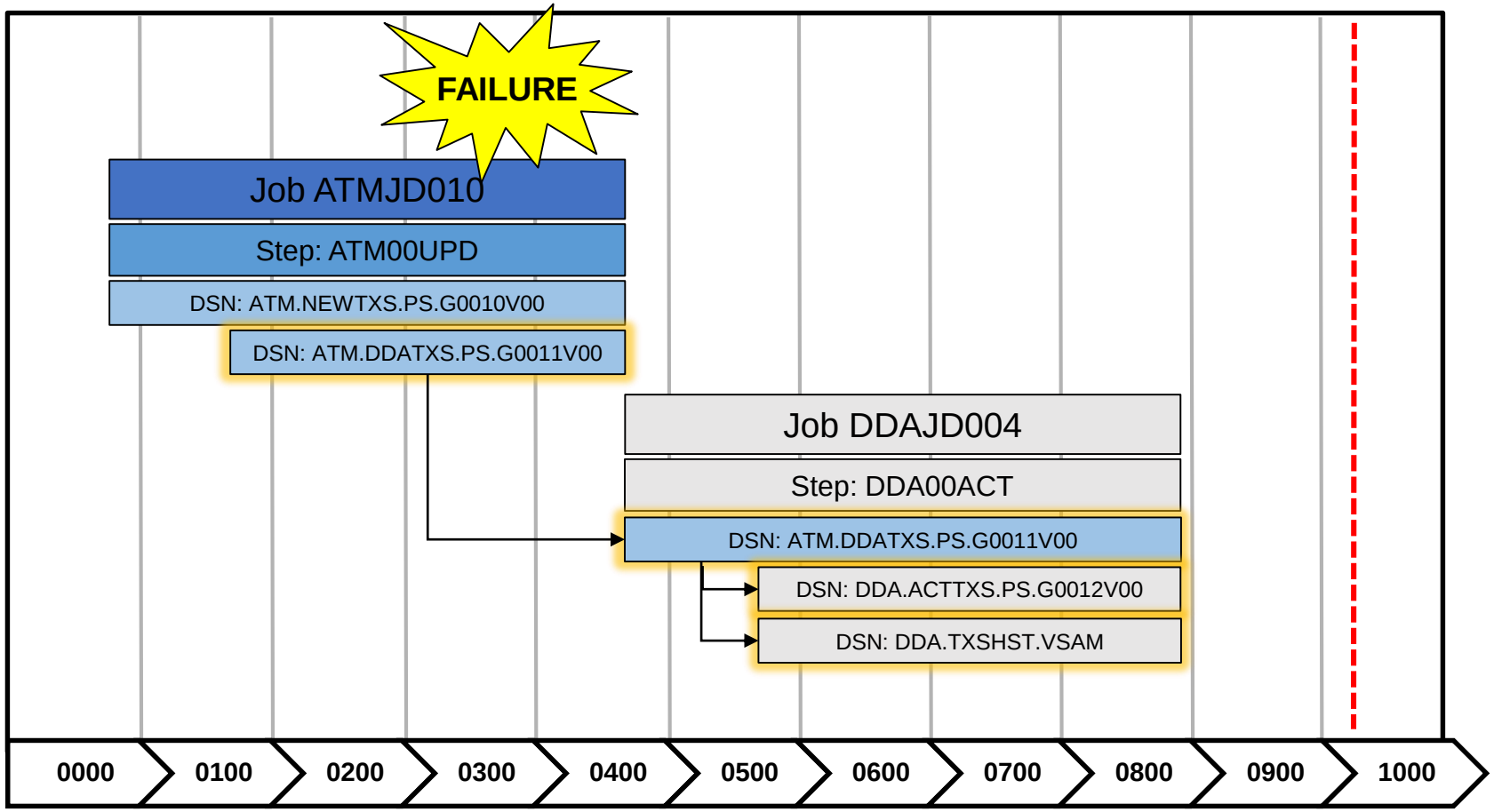
Real Time InFlight



- Real Time InFlight information captured in tandem with applications executing to maintain an up-to-the-minute viewpoint of what jobs are running as well as which files are currently open within these jobs
- The proprietary system tracks and checkpoints the information, providing operational and recovery personnel with valuable information to easily identify potential data that may be compromised
- Innovative dataset open tracking enables the capability of determining which sequential data may be compromised by creating SMF records at open time. This in conjunction with the standard type 14/15 records give more complete picture in reference to dataset integrity

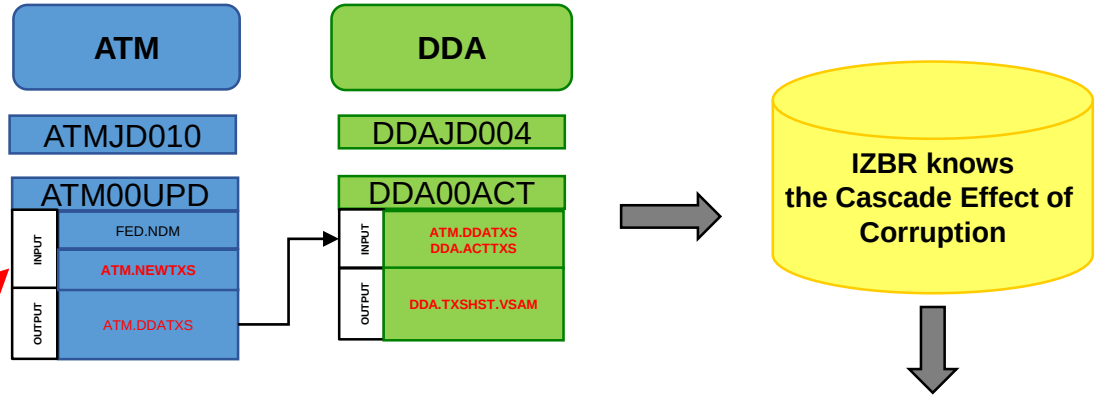
TimeLiner

- If a failure occurs at 3AM, how do you know what sequential files might be open in batch?
- Through knowledge of data set opens and closes, TimeLiner provides the downstream dependencies of jobs, jobsteps and data sets so you can recover with confidence.



Cascade Reporting – Point-in-Time

IZBR TimeLiner panels show the ‘cascade effect’ of datasets and jobs that are downstream of the corrupted dataset

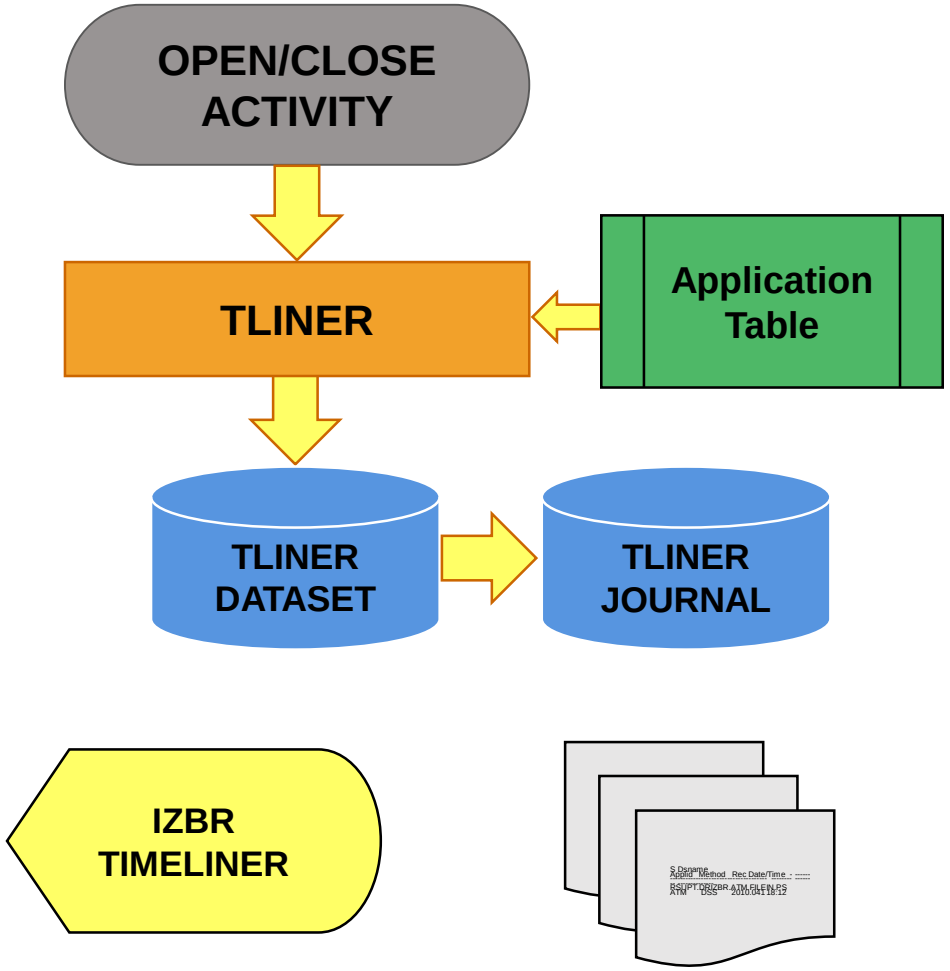


IBM Z is part of a bigger ecosystem - consider corruption from external sources

IZBR keeps track of the downstream dependency relationships

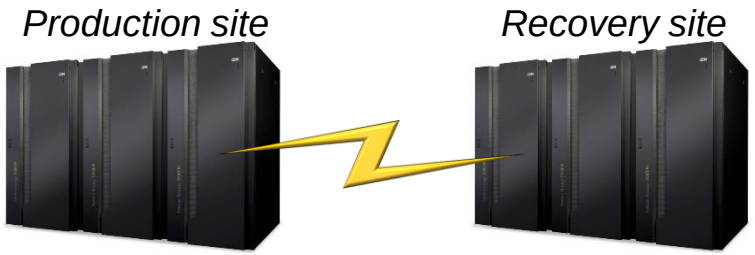
```
Cascade Impact Report for STEP

Job name  : ATMJD010
Job id    : JOB11235
Step name : ATM00UPD
Step start: 2018/09/25 02:58:25.36
Step end  : 2018/09/25 03:08:26.52

---------------------------------------- ------------------------------ -------- --------
Dataset name                             Affected D/T                   Jobname  Jobid    Stepname
---------------------------------------- ------------------------------ -------- --------
ATM.NEWTXS.PS.G0010V00                   2018/09/25 02:58:28.46 ATMJD010 JOB11235 ATMJD010
ATM.DDATXS.PS.G0011V00                   2018/09/25 02:58:28.46 ATMJD010 JOB11235 ATMJD010
ATM.DDATXS.PS.G0011V00                   2018/09/25 03:22:26.38 DDAJD004 JOB11259 DDA00ACT
DDA.ACTTXS.PS.G0012V00                   2018/09/25 03:22:26.38 DDAJD004 JOB11259 DDA00ACT
DDA.TXSHST.VSAM                          2018/09/25 03:22:26.38 DDAJD004 JOB11259 DDA00ACT
================================================================================================

TOTAL DATA SETS IMPACTED: 4
================================================================================================
```

IZBR TimeLiner

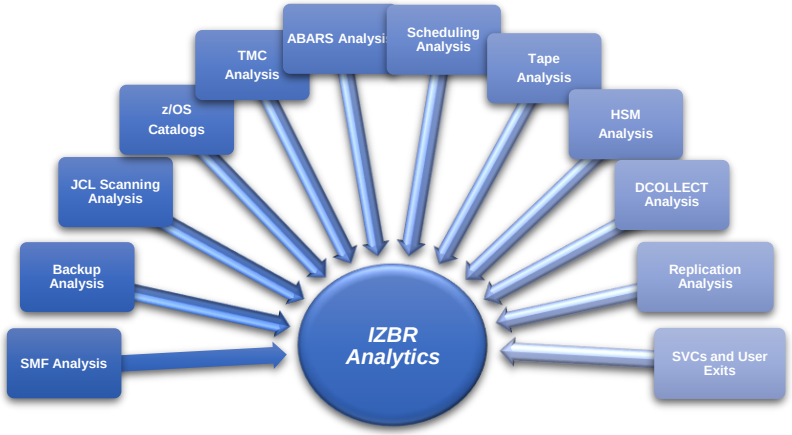


- Provides an up-to-the-minute window of jobs running as well as which files are currently open within these jobs
- Customizable to present a timeline depiction of system activity aligned to consistency points
- Proprietary system tracks and checkpoints information, providing operational and recovery personnel with valuable information to easily identify potential compromised data
- Innovative dataset open tracking
  - Enables capability of determining which sequential data may be compromised by tracking open activity of non-VSAM data

GDPS and IBM Z Batch Resiliency – Recovery Beyond the Infrastructure



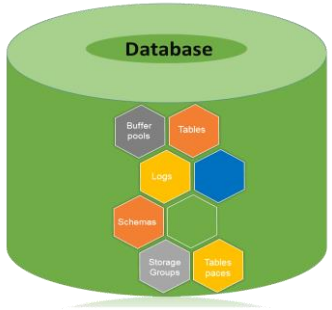
GDPS brings you to a state of data consistency at the Recovery site



Leverage the power of the Z environment for up-to-date information surrounding the current state and all for critical decision-making, automation, root cause analysis depending on product or client need

Database management software restores transactional integrity on restart

Recovery site



Database management subsystem restart takes care of backing out in-flight transactions ready to commence OLTP workloads

IZBR: IBM Program number 5698-BR1 & http://ibm.biz/IZBR_Announcement

IZBR provides an **Auditable**, **Actionable**, **Repeatable** recovery process that can prove your compliance because IZBR provides a three-pronged data management approach to know:

- How it's used
- Who's using it
- Where the data is located

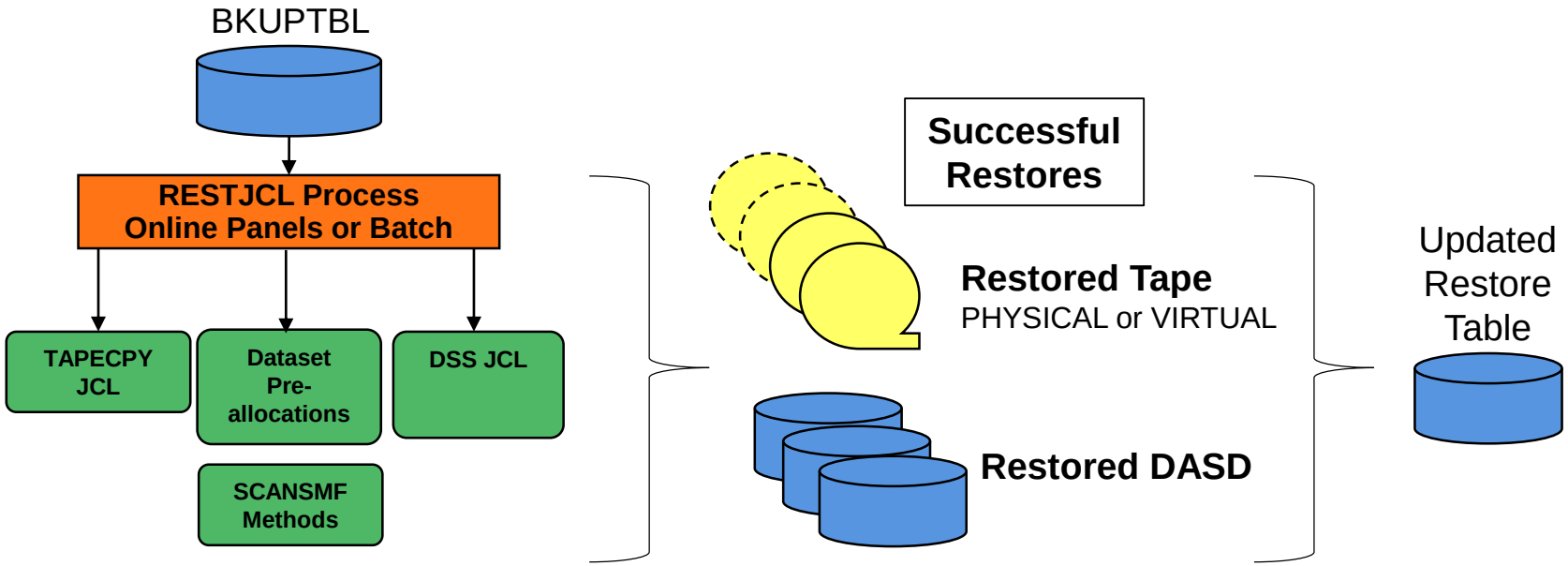
But who restores transactional integrity for batch? There are no logs, journals or DBMS tools for batch…until IZBR

Recovery site

```
Cascade Impact Report for STEP

Job name  : ATMJD010
Job id    : JOB11235
Step name : ATM00UPD
Step start: 2018/09/25 02:58:25.36
Step end  : 2018/09/25 03:08:26.52

Dataset name                          Affected D/T          Jobname  Jobid    Stepname
ATM.NEWTXS.PS.G0010V00                2018/09/25 02:58:28.46 ATMJD010 JOB11235 ATMJD010
ATM.DDATXS.PS.G0011V00                2018/09/25 02:58:28.46 ATMJD010 JOB11235 ATMJD010
ATM.DDATXS.PS.G0011V00                2018/09/25 03:22:26.38 DDAJD004 JOB11259 DDA00ACT
DDA.ACTTXS.PS.G0012V00                2018/09/25 03:22:26.38 DDAJD004 JOB11259 DDA00ACT
DDA.TXSHST.VSAM                       2018/09/25 03:22:26.38 DDAJD004 JOB11259 DDA00ACT

TOTAL DATA SETS IMPACTED: 4
```

IZBR knows the downstream affects of 'in-doubt' data

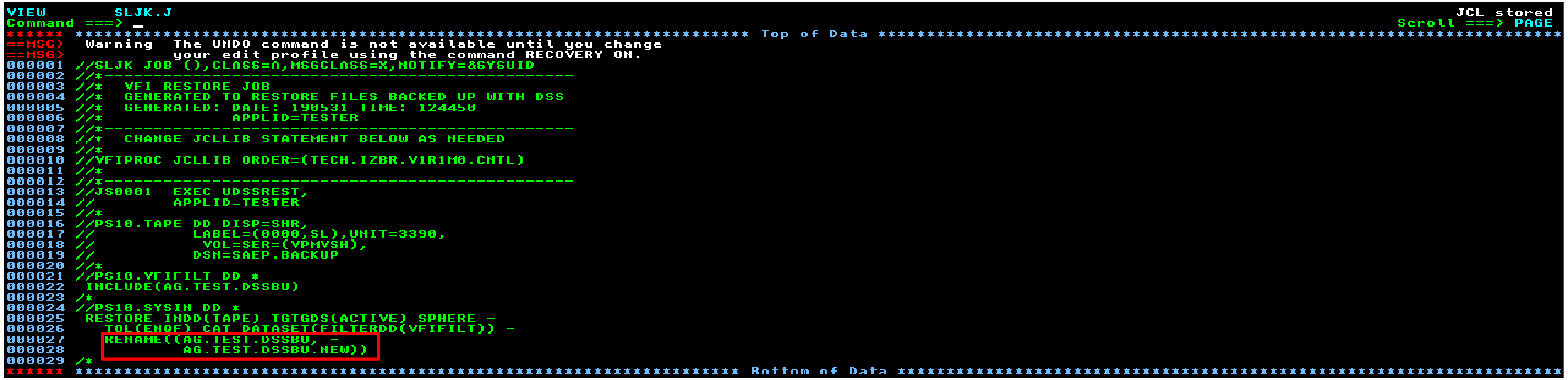
Restore based on backup methodology



- IZBR works with standard data movers to create JCL / Control Cards
- IZBR automates the generation of JCL to restore critical datasets and verifies completeness of the restore process
- Restore JCL can be created for:
  - The entire environment
  - Individual applications
  - Individual datasets
- Restores can be made from the online panels or through IZBR-generated batch jobs
- Tape restores (virtual or physical) can be done via z/OS catalog and TMC manipulation without copying the backup tape

What IZBR ultimately does is make recovery easier!

IZBR delivers even deeper insight and more granular recovery options making truly innovative application recovery possible



```
VIEW       SLJK.J                                                    JCL stored
Command ===> _                                                   Scroll ===> PAGE
****** ***************************** Top of Data ******************************
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
//SLJK JOB (),CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID
//*-----------------------------------------------
//*   VFI RESTORE JOB
//*   GENERATED TO RESTORE FILES BACKED UP WITH DSS
//*   GENERATED: DATE: 190531 TIME: 124450
//*              APPLID=TESTER
//*-----------------------------------------------
//*   CHANGE JCLLIB STATEMENT BELOW AS NEEDED
//*
//VFIPROC JCLLIB ORDER=(TECH.IZBR.V1R1M0.CNTL)
//*
//*-----------------------------------------------
//JS0001   EXEC UDSSREST,
//         APPLID=TESTER
//*
//PS10.TAPE DD DISP=SHR,
//           LABEL=(0000,SL),UNIT=3390,
//            VOL=SER=(VPMVSH),
//           DSN=SAEP.BACKUP
//*
//PS10.VFIFILT DD *
 INCLUDE(AG.TEST.DSSBU)
/*
//PS10.SYSIN DD *
 RESTORE INDD(TAPE) TGTGDS(ACTIVE) SPHERE -
   TOL(ENQF) CAT DATASET(FILTERDD(VFIFILT)) -
   RENAME((AG.TEST.DSSBU, -
           AG.TEST.DSSBU.NEW))
/*
****** **************************** Bottom of Data ****************************
```

Restore of a dataset, application or job is done with a simple ‘R’ from IZBR ISPF panels.

Customer Use Cases

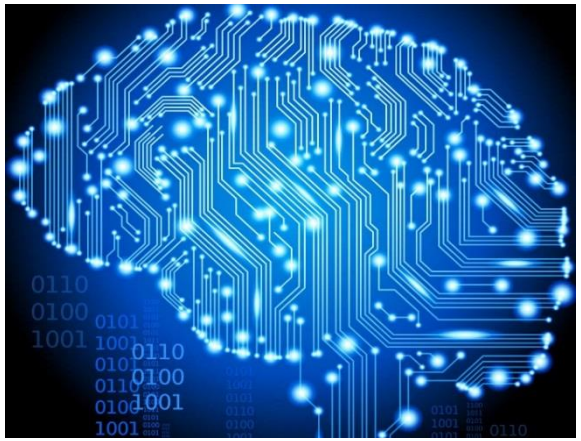
Realizing value with IZBR

Ways that IZBR provides ROI

Using IZBR to replace multiple tools	Using IZBR backup scanning to identify missing backups and duplication of backups	Using IZBR to manage backup resource consumption	Using IZBR TimeLiner feature to recover from Advanced Recovery Technology environment	Using IZBR backup reports to audit backups and identify data dependencies	Using IZBR Analysis feature to migrate and test applications on another complex	Using IZBR reports to identify data on incorrect volumes
• **End-to-end tool** to standardize resiliency management • **Replace multiple tools** reducing cost, upkeep and expertise requirements	• Processing analysis and backup inventory **identifies critical data sets missing backups** • Identifies data sets being **backed up repeatedly, consuming CPU and storage resources**	• IZBR provides a process to **identify the appropriate retention criteria** for incoming transmission data sets • Datasets are **backed up once** • **Excess backups and overhead are reduced**	• Maintains an **inventory of the data sets** available on the volume snaps done to the isolated recovery site • **Automatically builds restore JCL** to recover data sets, using replication utilities, from the isolated site back to the primary site • Provides **improved resiliency, a more complete recovery solution, and increases value of the investment made in the technology**	• Information about **critical data sets that require backup**, and the backups done for those data sets • TimeLiner feature tracks batch jobs and **downstream data dependencies in real-time - quickly and accurately recover data sets** with knowledge of data dependencies and affected applications	• **Maintains a list of the data sets** used by applications within the INVENTRY via the Real Time Analysis feature • Creates the jobs to **selectively copy either critical or all** data sets for these applications • Reports on whether these data sets are **used by these applications alone or have cross-application dependencies** • Provides **a quick and accurate method to migrate and test applications on another complex**	• Customers with partial replication are often **missing data at the remote site** due to incorrect data set placement at the source site • IZBR provides reports and JCL to **relocate data sets to the proper volume** for replication • MOVEJCL also **ensures segregation of production and non-production data sets** on volumes

Using IZBR backup reports to audit backups and identify data dependencies - ACTIONABLE/REPEATABLE

Regional US utility company and large US credit union



Issue:

- **Shrinking mainframe skill** set - **losing valuable application expertise** as staff retires
- Require an **automated, timely solution** that **doesn't rely on mainframe and application expertise**
- Need for data dependency knowledge to **extract data for certain application workloads** to move them to other LPARs or data center locations
- **No easy way to identify all of the data used** by an application

IZBR Resolution:

- **Information about critical datasets that require backup, and the backups done for those datasets**
- TimeLiner feature tracks batch jobs and **downstream data dependencies in real-time - quickly and accurately recover** datasets with **knowledge of data dependencies and affected applications**
- **Identifies the required application data, and any application dependencies** to ensure a smooth relocation

Using IZBR Analysis feature to migrate and test applications on another complex - ACTIONABLE

Large US Prescription Benefits and Large US Insurance Companies

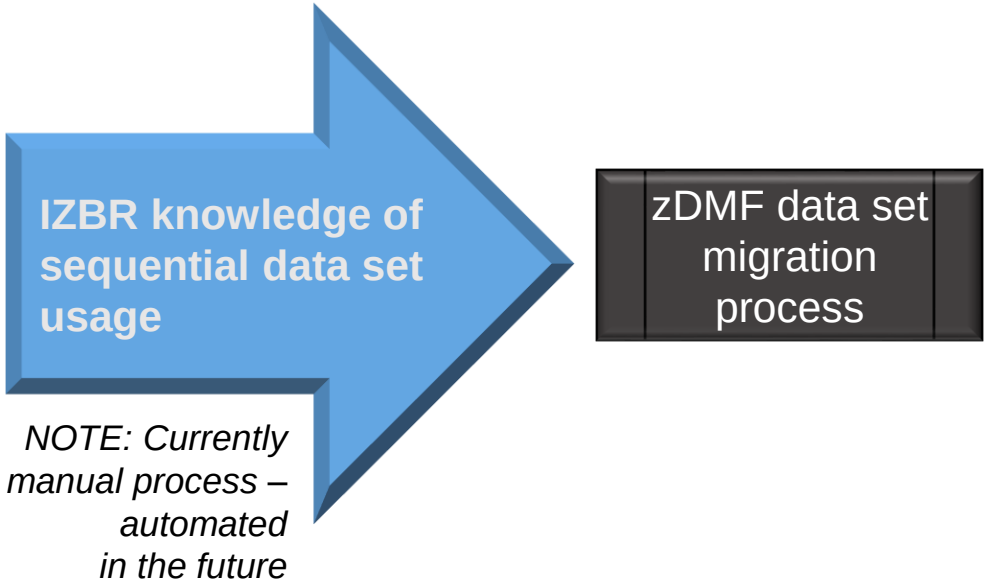
Issue:

- **Business growth drives the need to migrate** select applications to another complex
- **Sale of a segment of the business** requires identification of associated datasets
- **Data dependencies across applications is not known**
- Customer is **unsure what datasets to select** and what **impact there may be** on other applications

IZBR Resolution:

- **Maintains a list of the datasets** used by applications within the INVENTRY via the Real Time Analysis feature
- Creates the jobs to **selectively copy either critical or all** datasets for these applications
- Reports on whether these datasets are **used by these applications alone or have cross-application dependencies**
- Provides **a quick and accurate method to migrate and test applications on another complex**

Using IZBR Analysis to provide input for zDMF data set migration processing - ACTIONABLE



Issue:

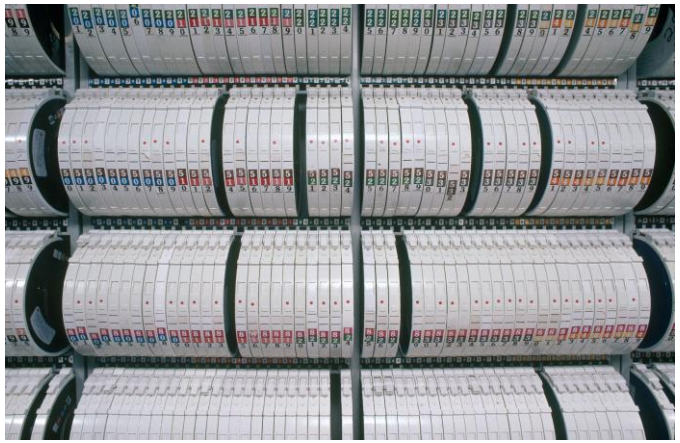
- Businesses **can't afford outages or risk** related to breaches or compliance issues
- **Lack of visibility** into sequential data set usage patterns
- **Data dependencies across applications is not known**
- Customer is **unsure what data sets to group for migration** and what **impact there may be** on other applications

IZBR Resolution:

- **Maintains a list of the datasets** used by applications within the INVENTRY via the Real Time Analysis feature
- Reports on whether these datasets are **used by these applications alone or have cross-application dependencies**
- Provides **a quick and accurate method to select data set migration groupings**
- Leverages new technologies to **improve compliance**

Using IZBR backup scanning to identify missing backups and duplication of backups – AUDITABLE/ACTIONABLE

Major US credit card processor



Issue:

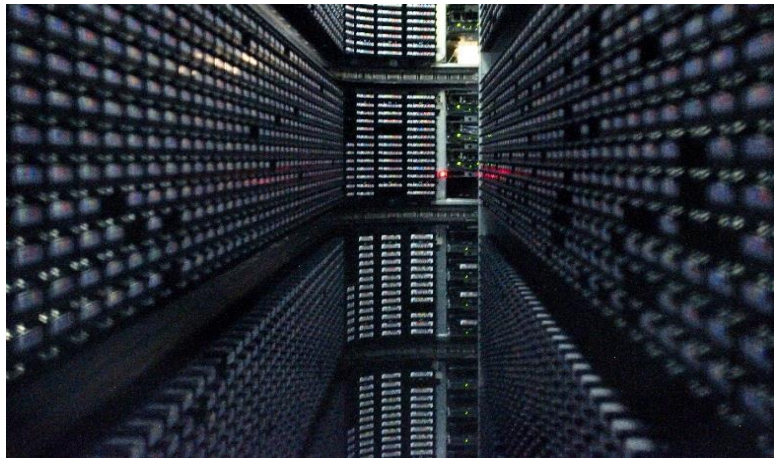
- Replication failover doesn't provide a complete application recovery solution, some customers are adopting a **hybrid approach**
- **Failed disaster recovery tests** occur due to missing backups of critical data, and **ongoing resource constraints** for backup resources

IZBR Resolution:

- Processing analysis and backup inventory **identifies critical datasets missing backups**, which cause disaster recovery test issues
- **Identifies datasets being backed up repeatedly**, compounding the resource constraints

Using IZBR to manage backup resource consumption –ACTIONABLE

Large French IT service provider



Issue:

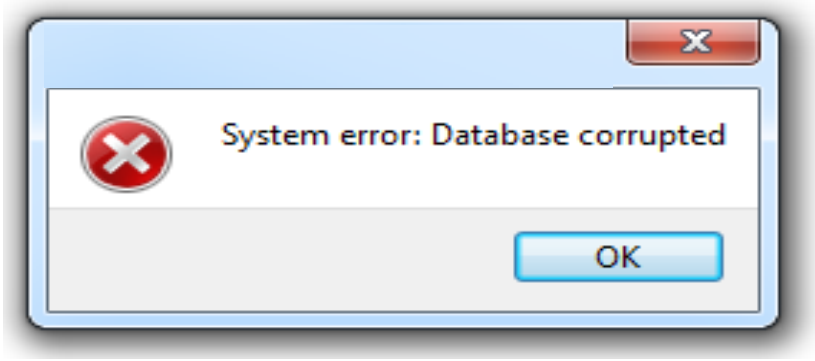
- **Inability to easily manage backup resource consumption** and their retentions for incoming transmission datasets
- Datasets being **backed up repeatedly**
- Large amount of **CPU and storage resources** being consumed unnecessarily

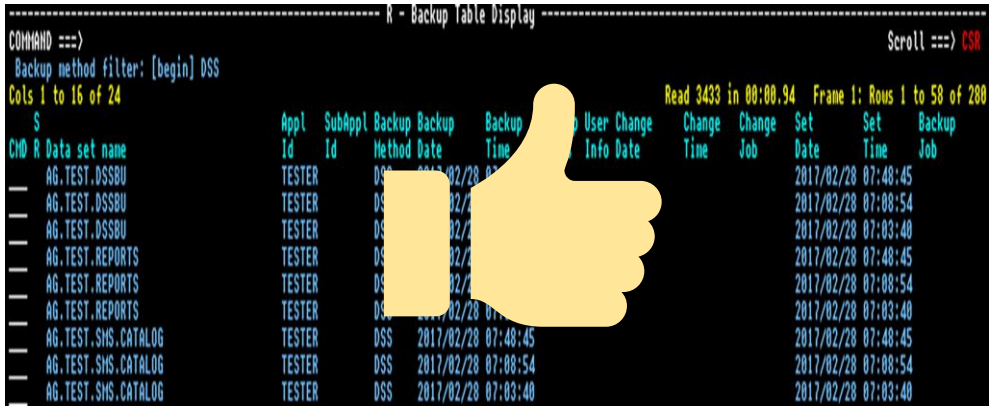
IZBR Resolution:

- IZBR provides a process to **identify the appropriate retention criteria** for the incoming transmission datasets
- Datasets are **backed up once**
- **Excess backups and overhead are reduced**

Using IZBR Backup inventory to recover from Data Corruption or Deletion – ACTIONABLE

Regional US health care insurance





Issue:

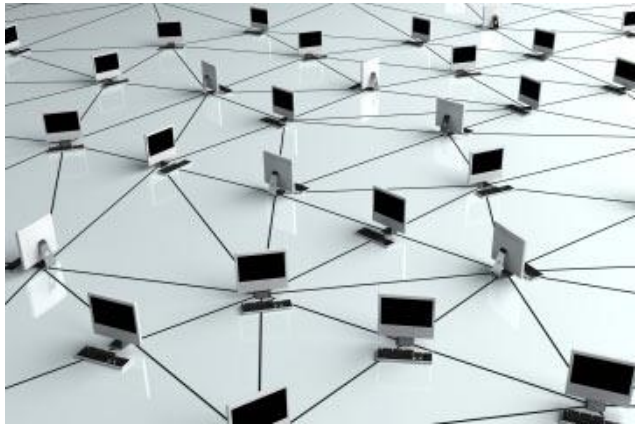
- A scheduled upgrade is performed on Db2 databases. The database admins discover two days later that the **database was corrupted** during the process and they don't have a way to recover.
- Or, an application outage occurs as a result of a user **accidentally deleting critical application datasets**.

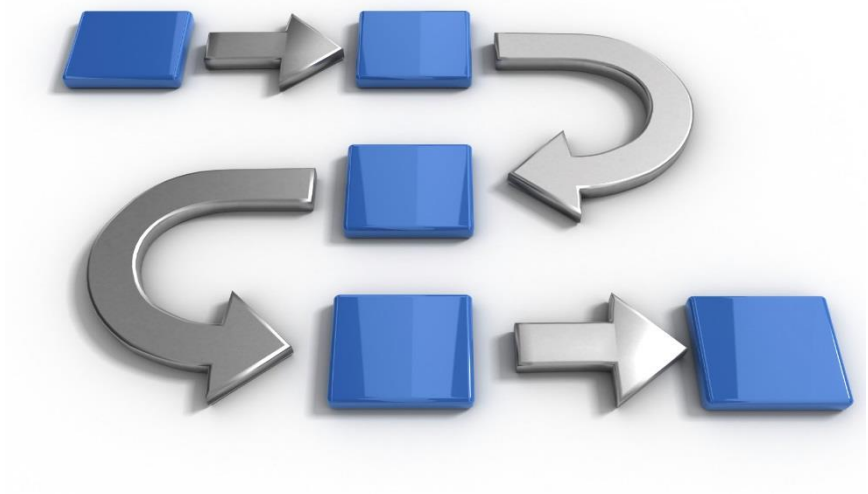
IZBR Resolution:

- Inventory database contains a **consolidated view of all the backups, date/timestamps and methodologies**.
- Allows users to **select the appropriate backups for the recovery**, and **automatically generate the JCL using driver templates to restore** the datasets with a new name.
- **Application availability is resumed quickly, avoiding a significant outage.**

Using IZBR Real Time Analysis to automate and standardize backup and recovery - REPEATABLE

Major US IT service provider





Issue:

- IT service providers need to **manage multiple, unique customer environments** with **limited staff** resources.
- **Tools aren't integrated**
- **Manual and homegrown processes increase risk and cost**

IZBR Resolution:

- Provides a **standardized way to collect and correlate information** for each unique environment.
- **Standardized methodology** enables **automation of the backup and recovery processes**.
- Automation and intuitive ISPF panel-driven inquiry of backups enable staff to **quickly recover data sets, without requiring application expertise**.

Which one are you most concerned about?
IZBR covers them all in one end-to-end Batch Resiliency tool

Key Takeaways

IBM and 21st Century Software are committed to driving continuous product improvement, focusing on customer requirements

Digital Transformation is impacting Operations' ability to support business goals

- IT Operations is tasked with keeping the business running however they are increasingly strained by management of unpredictable workloads together with loss of skills or domain knowledge
- Ability to react to problems to ensure continued resiliency and availability of critical business application (especially batch) is critical

IBM Z Batch Resiliency (IZBR) is a brand-new offering to aid risk management for sequential batch data & applications

- A single end-to-end tool that leverages analytics and automation to lower the time to recover from problems, while reducing dependency on domain expertise and complex, manual or outdated processes
- Quickly and efficiently pinpoint all data affected within a batch cycle to automate recovery using the appropriate backup within minutes of the event, not hours

Your call to action

- Evaluate your current process for managing batch workloads and recovering from data corruptions
- Speak to us about how we can simplify you batch resiliency strategy and arrange a demonstration session

Learn More

- **IBM Marketplace**
- The latest updates and information about these offerings
- **Ibm.biz/IZBRInfo**
- **ibm.biz/IZOIInfo**

- **IBM Z Batch Resiliency Overview**
- Learn more about how IBM Z Batch Resiliency is able to transform batch management by leveraging analytics with automation to reduce operational risk through this article and webinar
- **ibm.biz/WhatIsIZBR**
- **Ibm.biz/IZBRWebinar**

- **Tailored Fit Pricing: How to manage workload in a world without capping**
- Learn how IBM Z Operations Insight Suite can help manage, forecast and optimize your MSU consumption
- **ibm.biz/IZDSCPandTFP**

- **IBM Z Software Newsletter: Operations & Management Edition**
- Subscribe to the quarterly newsletter for operation, systems programmers and administrator to get the latest news, tips, blogs and trials in one place
- **ibm.biz/ZOperations**

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- This session is NK