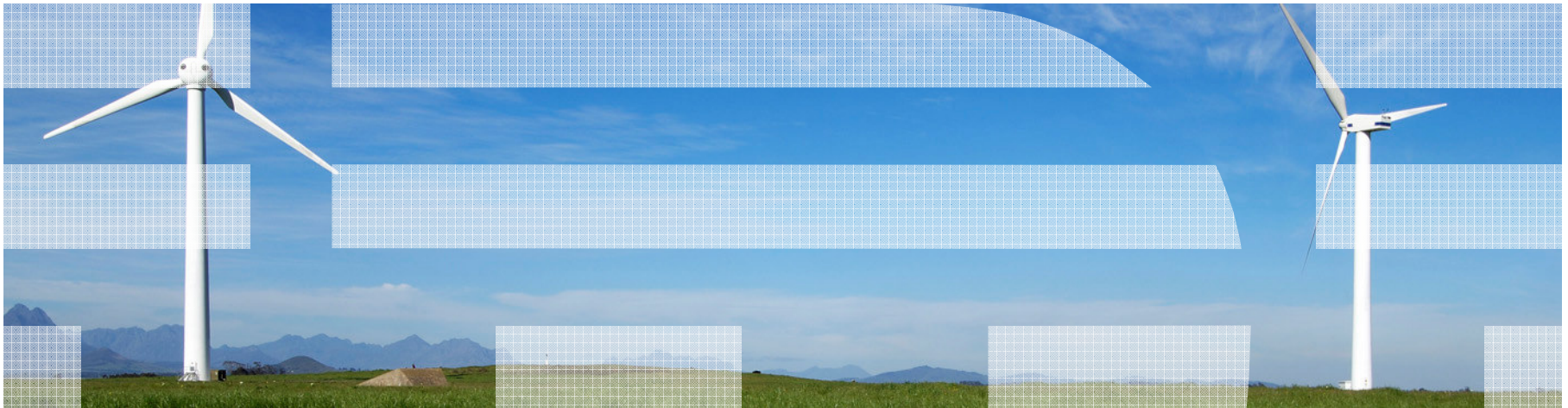
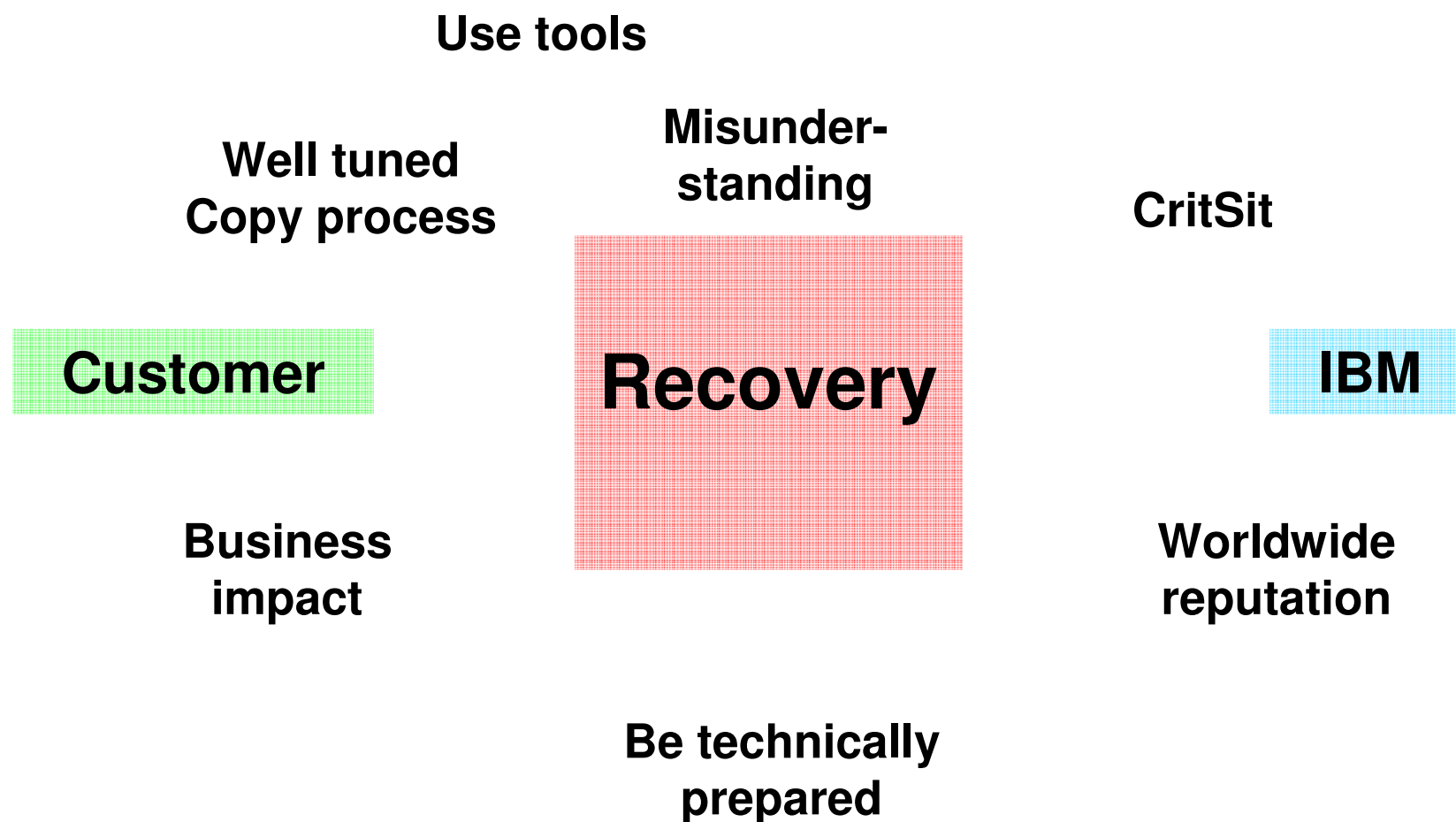


# DB2 for z/OS: Expert on Recovery



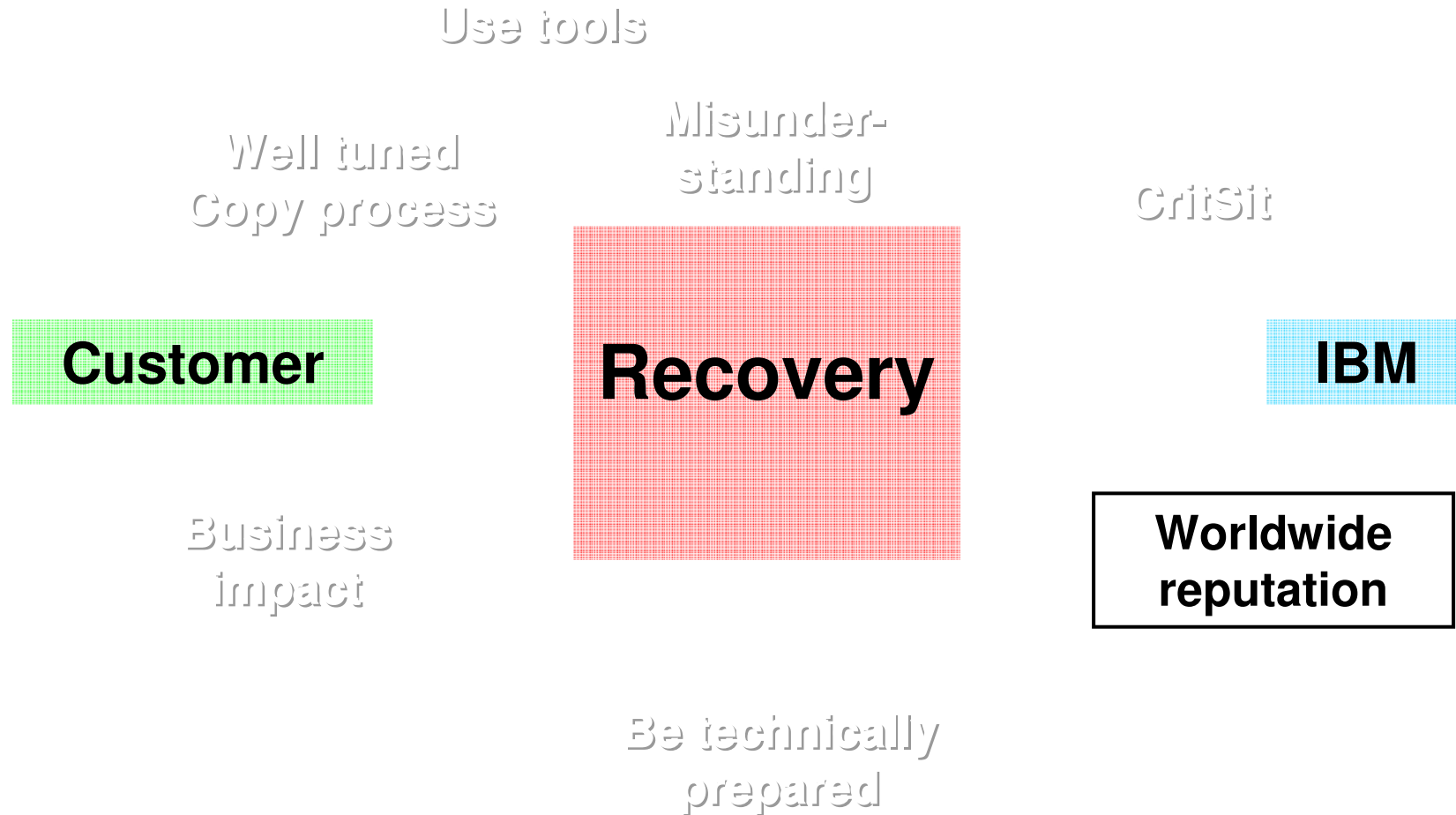
## Why being an Expert on Recovery: Different points of view



## Why being an Expert on Recovery: Different points of view

- Some aspects must be accepted, like
  - Worldwide reputation
  - Business impact
  
- Some aspects could be improved, like
  - Be technically prepared
  - Misunderstanding
    - Copy versus Recovery process

## Why being an Expert on Recovery: Different points of view



## Enterprise Information is on System z

*Information on Demand for System z Delivers Competitive Advantages*

*DB2: 59 out of the top  
59 banks in the world*

*DB2: 9 of the top 10 global  
life/health insurance providers*

*DB2: 23 of the top  
25 US retailers*

***UPS runs DB2 for z/OS to support the world's largest known peak database workload - 1.1 Billion SQL statements per hour!***

*24x7 ATM  
Deposits  
& Withdrawals*

*Reserves  
airline seats*



*Runs the world's  
stock exchanges  
& banking networks*

*Tracks the world's  
packages*

***8 of every 10 of the largest retail banks in Australia, Germany, Japan,  
and the United States use IMS for their core banking***

*\$3 trillion/day transferred  
through IMS by one customer*

*95% of top Fortune  
1000 companies use IMS*

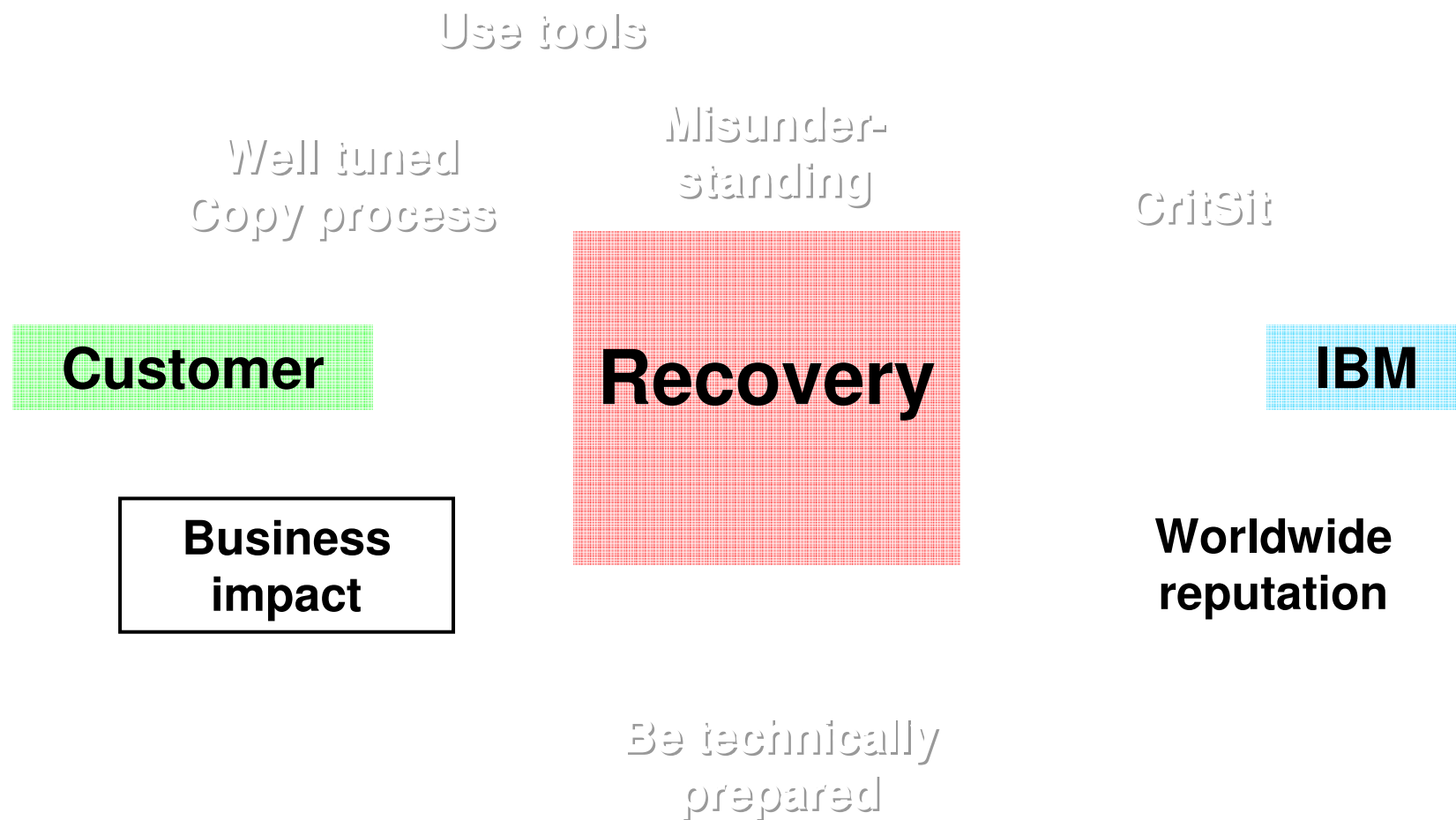
*Over 15 billion GBs of  
production data in IMS...*

## Who has DB2 on z/OS



*... and many more*

## Why being an Expert on Recovery: Different points of view



## Business impact for companies - 1

- IT outages cost billions
  - Not only the outage, but also the recovery
  - <http://www.cio.de/knowledgecenter/pc-support/2261875/>
- Based on studies of CA
  - <http://www.arcserve.com/us/solutions/business-continuity-disaster-recovery.aspx>
  - [http://m.softchoice.com/files/pdf/brands/ca/ACOD\\_REPORT.pdf](http://m.softchoice.com/files/pdf/brands/ca/ACOD_REPORT.pdf)
  - <http://www.arcserve.com/us/lpg/~media/Files/SupportingPieces/ARCserve/avoidable-cost-of-downtime-summary-phase-2.pdf>
- Additional studies show that cost savings which are in the area of recovery:
  - <http://www.networkworld.com/careers/2004/0105man.html>
  - [http://static.usenix.org/event/lisa02/tech/full\\_papers/patterson/patterson.html](http://static.usenix.org/event/lisa02/tech/full_papers/patterson/patterson.html)

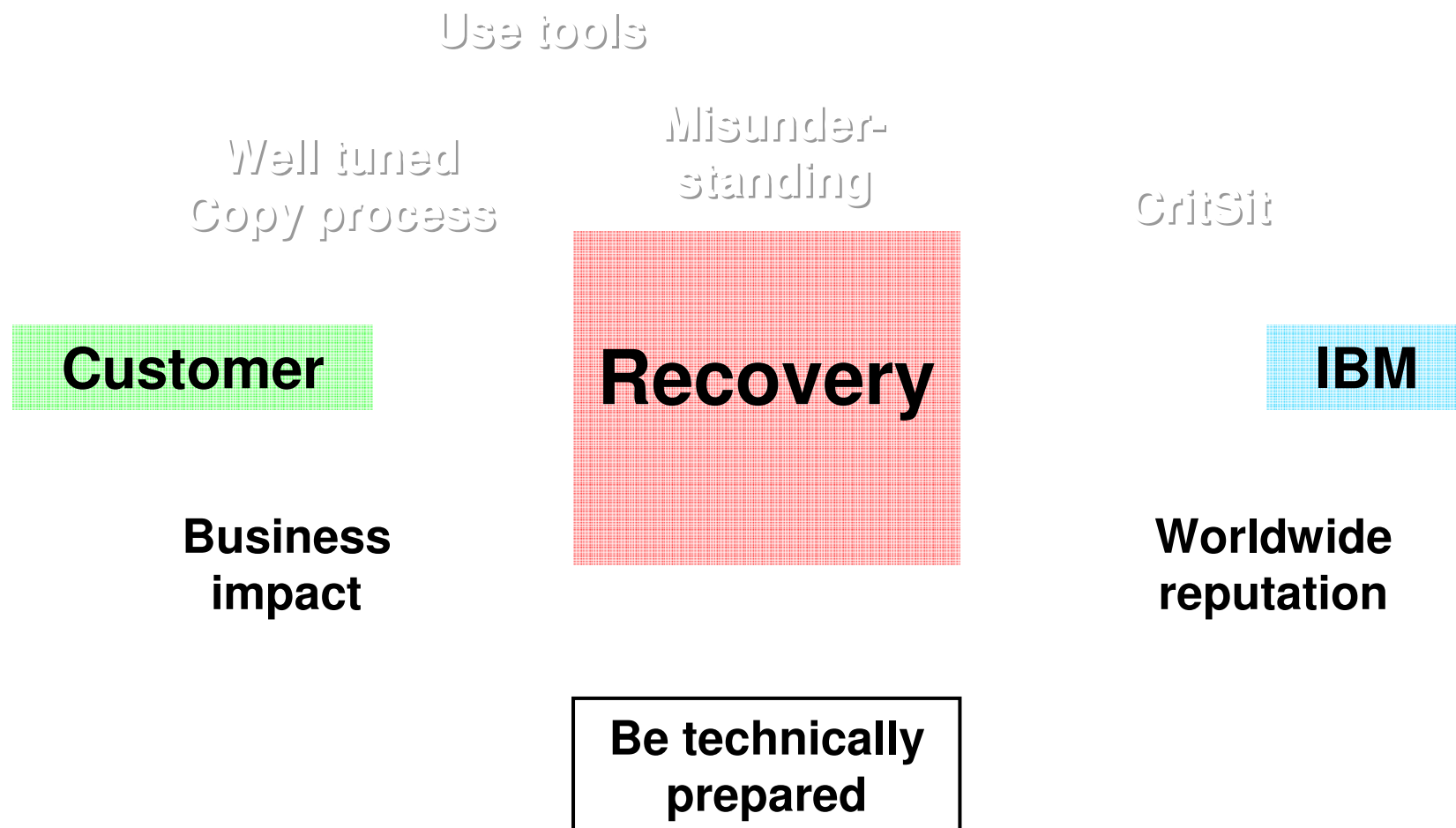


## Business impact for companies - 2

### ■ Costs per hour „downtime“

– Brokerage operations	\$6,450,000
– Credit card authorization	\$2,600,000
– Ebay	\$225,000
– Amazon.com	\$180,000
– Package shipping services	\$150,000
– Home shopping channel	\$113,000
– Catalog sales center	\$90,000
– Airline reservation center	\$89,000
– Cellular service activation	\$41,000
– On-line network fees	\$25,000
– ATM service fees	\$14,000

## Why being an Expert on Recovery: Different points of view



## Be technically prepared

- Preparation has 2 faces
  - Performance
  - Challenging situations
    - Challenge is not: Run RECOVER utility and all is fine
- Challenging situation is a case like:
  - Data inconsistency
  - Data corruption
  - Both terms are used as synonyms
- Test, test, test, ...

## Sample situations

- German customer, September 2010
  - Lock structure rebuild for maintenance purposes
  - A subset of locks were lost
  - Following restart of DB2, various data integrity abends occurred
    - Page regression due to lost locks, lost GBP-dependency
  - Identified suspect pagesets, fixed corruption, managed data loss
- US customer, January 2009
  - DASD cache purged
- British customer, July 2008
  - NVS DASD cache purged
  - 30,000 DB2 pagesets potentially affected



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# Kursbeschreibung: DB2 for z/OS - Advanced Recovery Procedures

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Kursnr.	ZORCD0DE	Kursform	Klassenraum
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Dauer	5.0 Tage	Kurstyp	Öffentlich
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Kurspreis	EUR 2.990,00 exkl. USt. EUR 3.558,10 inkl. USt.
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Dieser Workshop ist fuer alle, die im DB2 z/OS-Umfeld arbeiten und einen tiefen Einblick in das weite Gebiet Recovery im DB2 erhalten wollen.

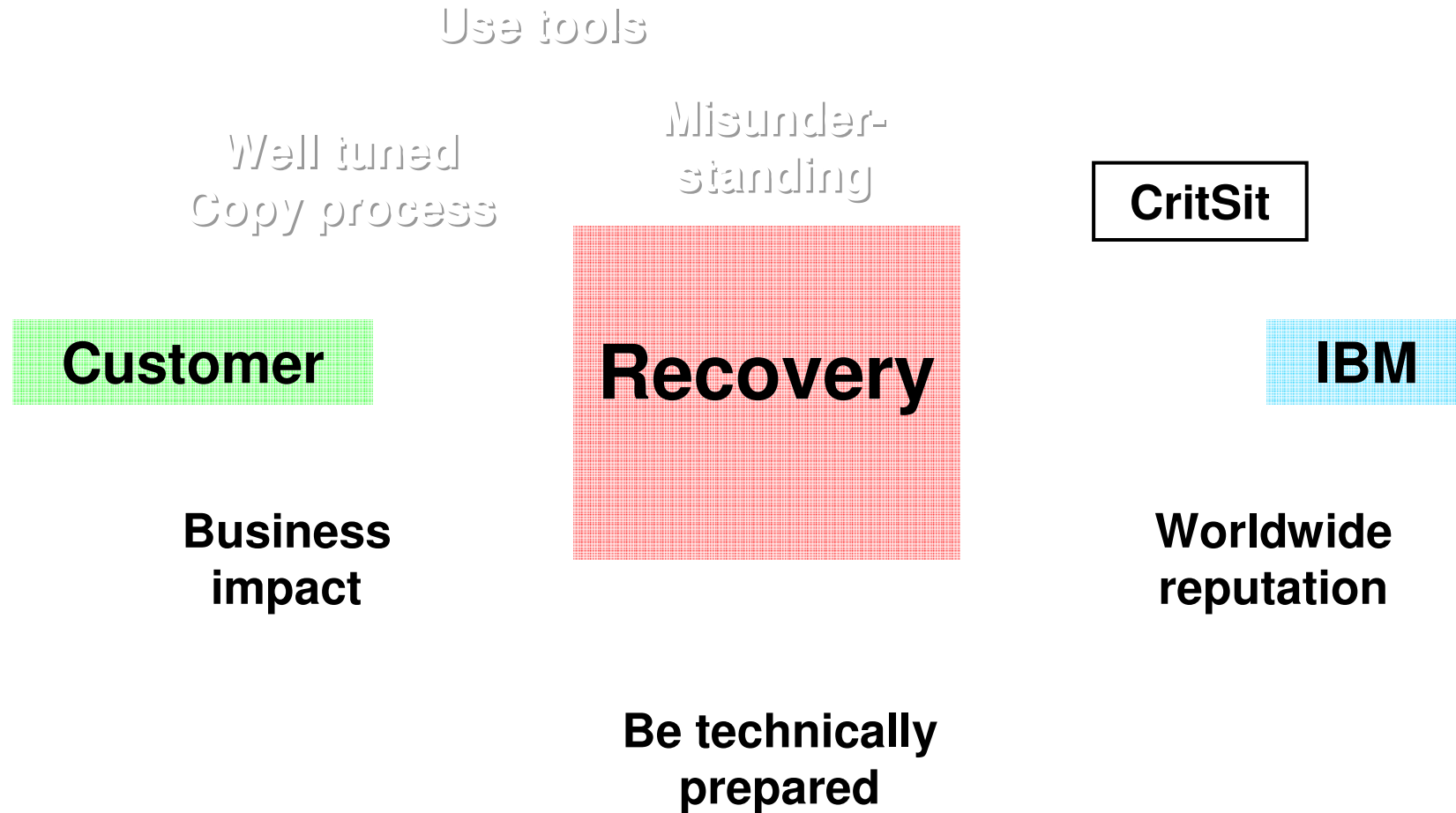
Ausgehend vom Aufbau der DB2 Pagesets (Table Spaces und Index Spaces) werden Internas wie RID (Record ID) und Record Aufbau (BRF, RRF) vorgestellt.

Schrittweise werden existentielle DB2 Data Sets wie BSDS und Logs besprochen und analysiert. Auch wird die Benutzung der entsprechenden Utilities, wie z.B. DSNJU003 und

## Weitere links

- IBM Breakfast Briefings
- IBM eNews
- IBM Software Services
- IBM STG Lab Services

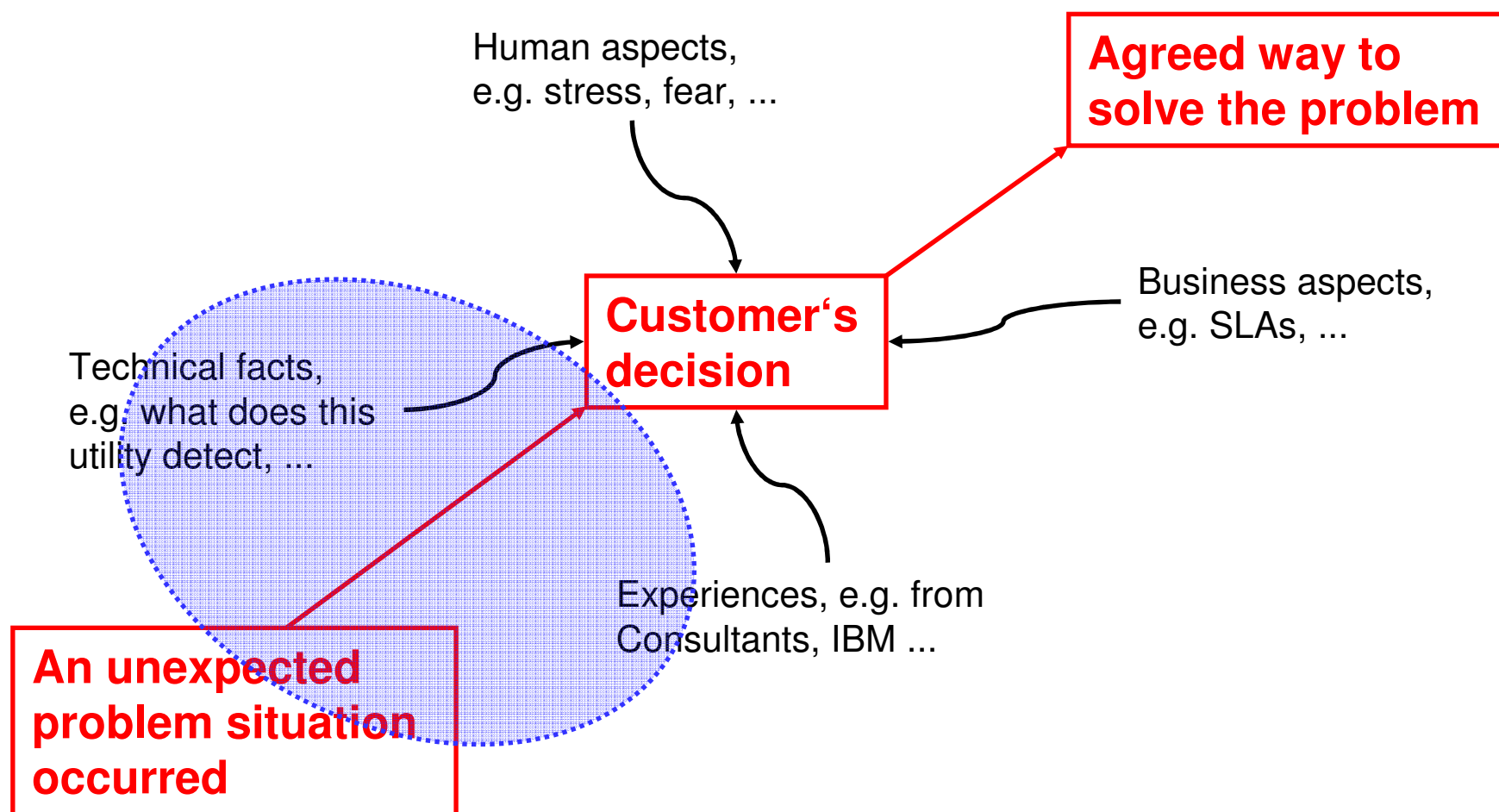
## Why being an Expert on Recovery: Different points of view



## Managing disaster: Critical situations

- In an ideal world it never happens!
- In reality...
  - A number of high profile data corruption and data recovery issues
  - Why ?
    - Hardware problems
    - Software defects
    - User errors
- Where the blame lies is not the issue – these situations require extensive support for DB2 data recovery

## Managing disaster

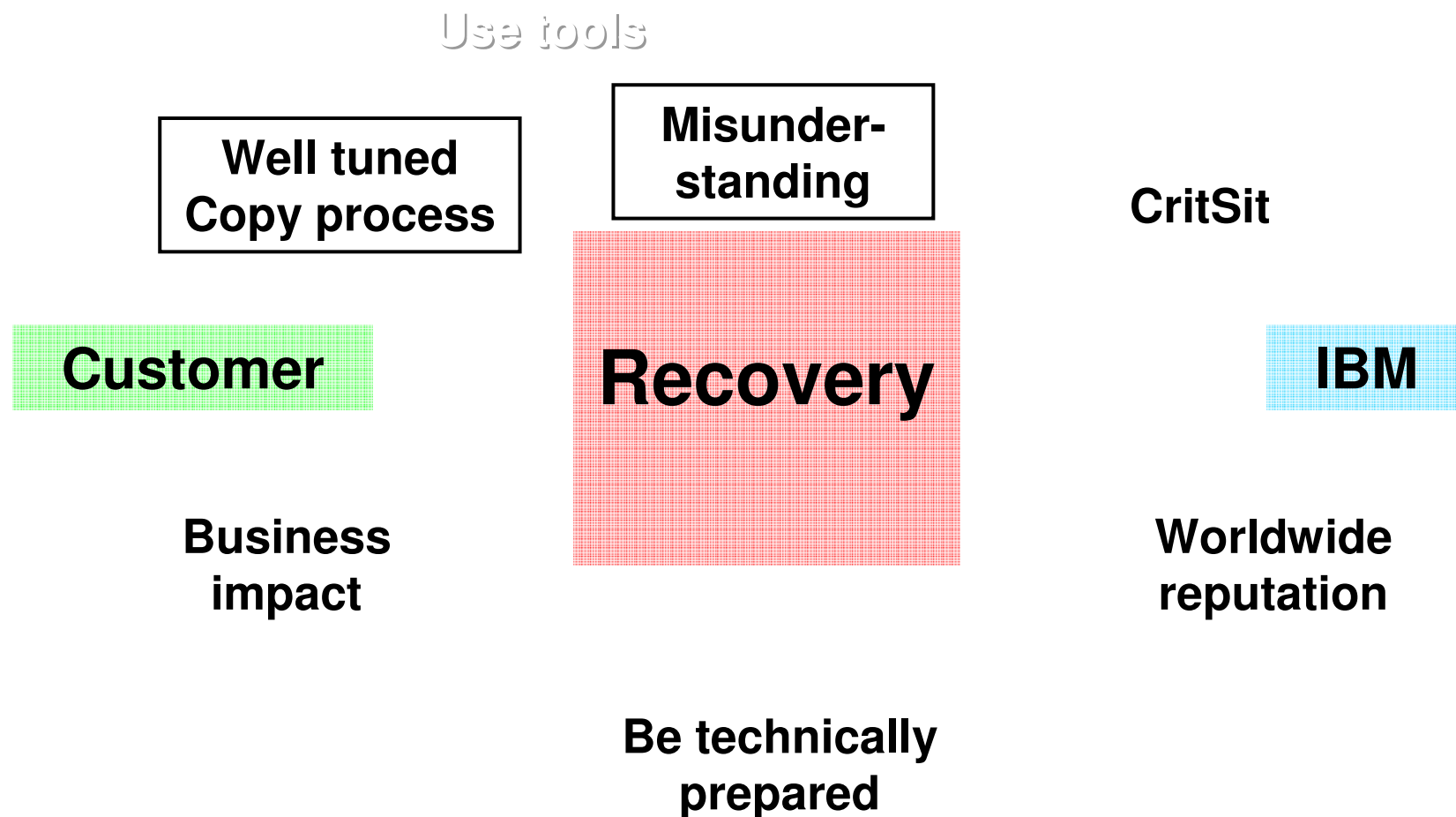




## Essential rules

- 1) Soft skills really matter
  - a) Don't panic!!
  - b) Keep calm
  - c) Gain control of the situation & appear confident
  - d) Maintain credibility
  - e) Get help if necessary
- 2) Get an quick overview of the situation
- 3) Understand the urgency and severity
- 4) Get an understanding of the scope of the problem
- 5) Decision on Recover strategy
- 6) Main priorities
  1. Preventing further damage
  2. Fixing existing damage
  3. Diagnosing root cause

## Why being an Expert on Recovery: Different points of view



## Misunderstanding

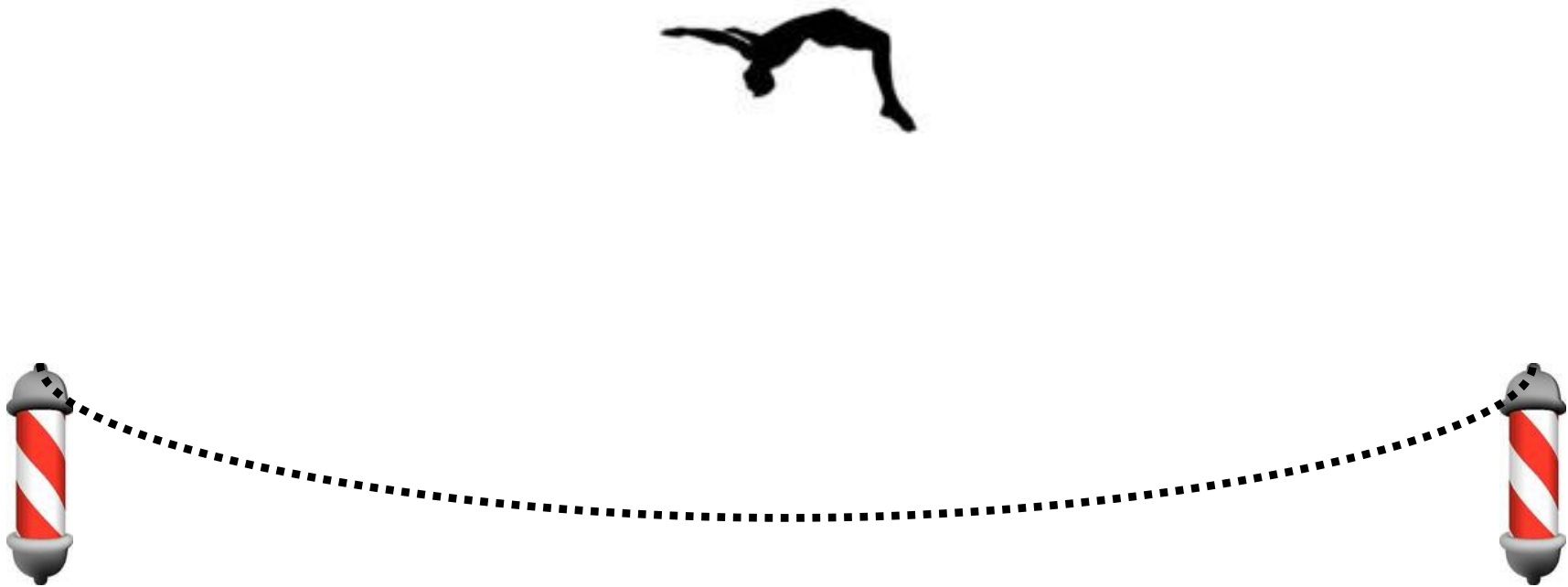
- Underestimating:
  - „Our last recovery was 10 years ago and it worked very well“
- Not prepared:
  - „In case of disaster recovery we assemble the jobs for these 20.000 objects“. „Do you do this by tool?“. „No, tools are too expensive. We do this by hand“
- Misinterpret hardware duplexing with software recovery
  - „We have PPRC and GDPS and have therefore a RTO (Recover Time Objective)=0“
- Misinterpret copy procedure with recovery procedure
  - „We have a high-sophisticated schedule of our copy jobs“

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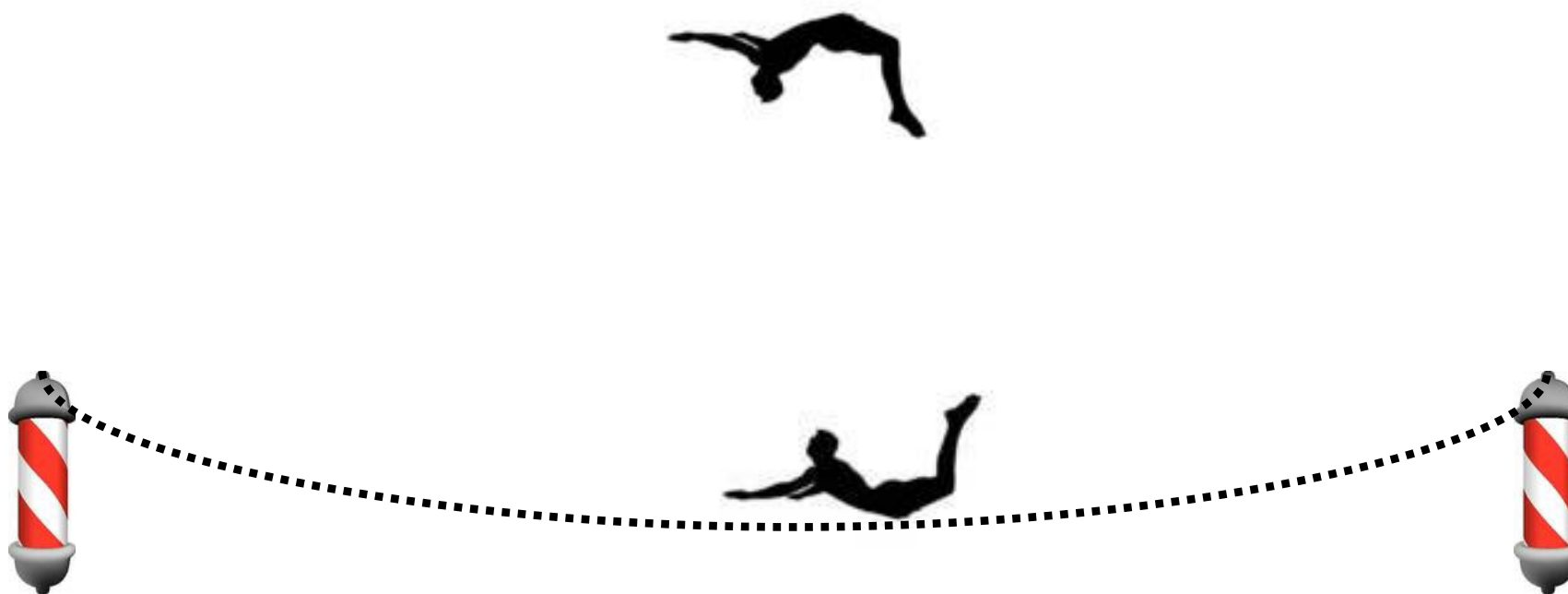
Daily business = High sophisticated things



Copy process = The net is stretched

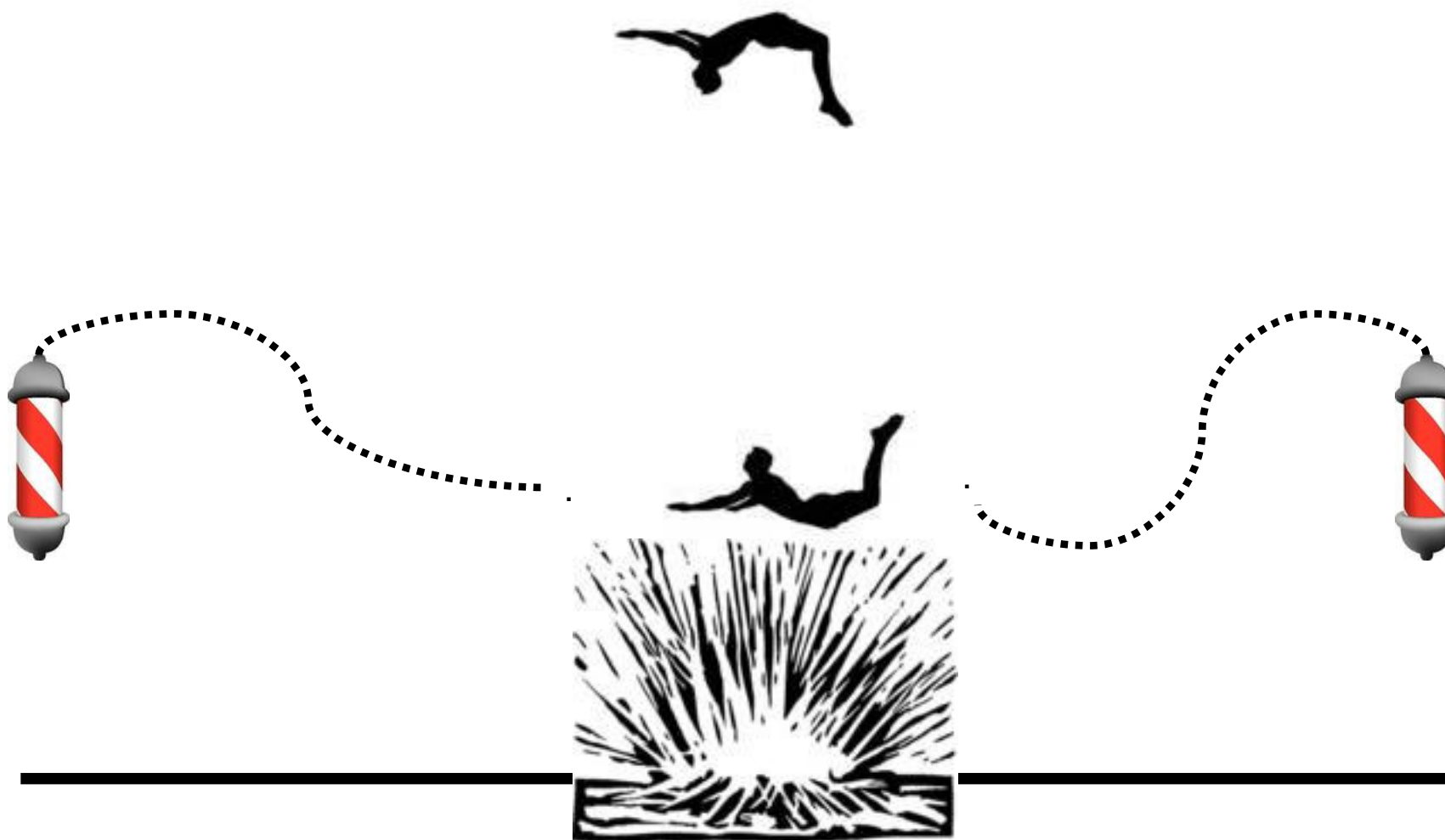


Recovery = Is the net good enough? Yes



Recovery = Is the net good enough? No

= Disaster



## Recovery = Is the net good enough?

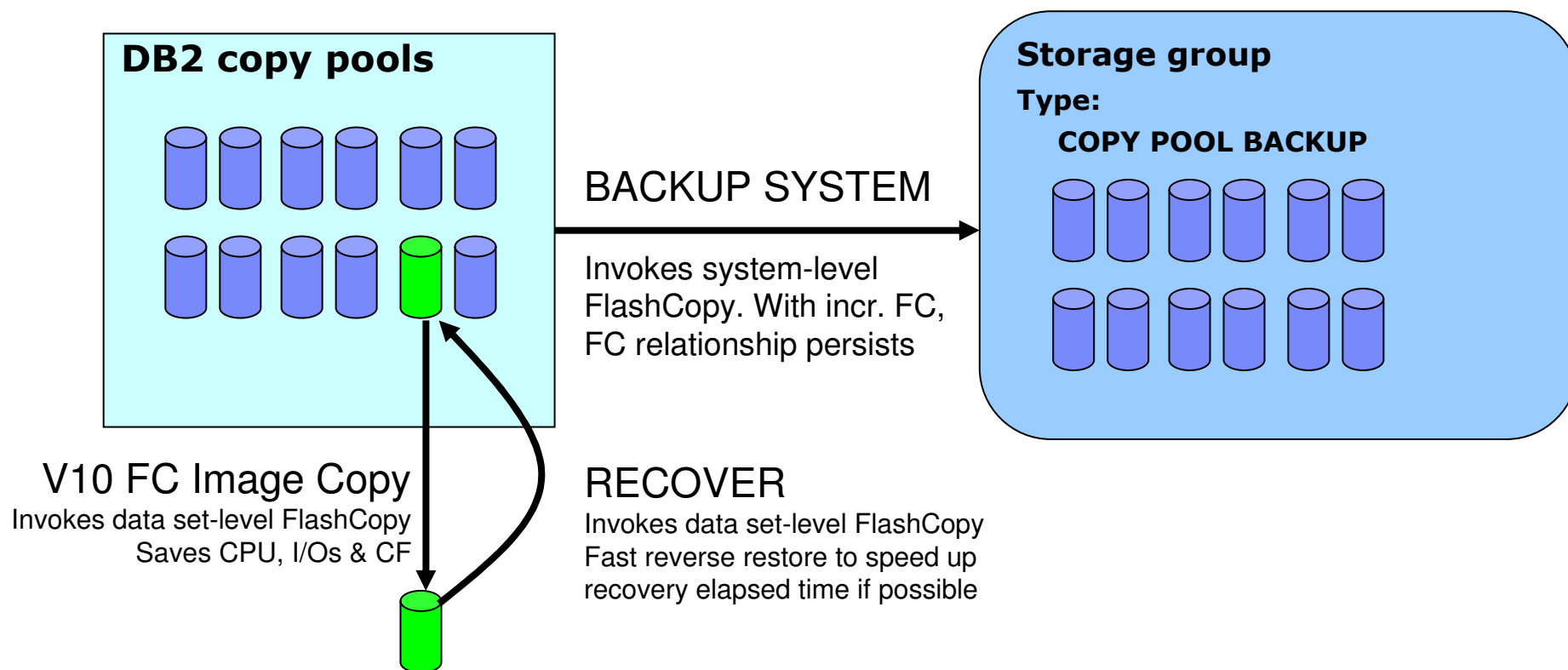
- Service Offering: **Recover Assessment**
  - Estimation how well prepared is the customer
  - Recording of their requirements and SLAs
  - Analysis of their environment
    - System configuration
    - Backup strategy
    - Monitoring (e.g. Messages)
    - DB2 restart
    - Prevention
    - Dependencies (IMS, CICS, ...)
    - Organisation (e.g. tests, procedures, ...)
  - Final report
- But at the end customer must test regularly their recovery procedures to see if they match their SLAs (=Service Level Agreements)
  - How to setup a test, how often, what should be tested, ...
  - If tests are done, IBM tools and other IBM offerings might have a benefit for the customers



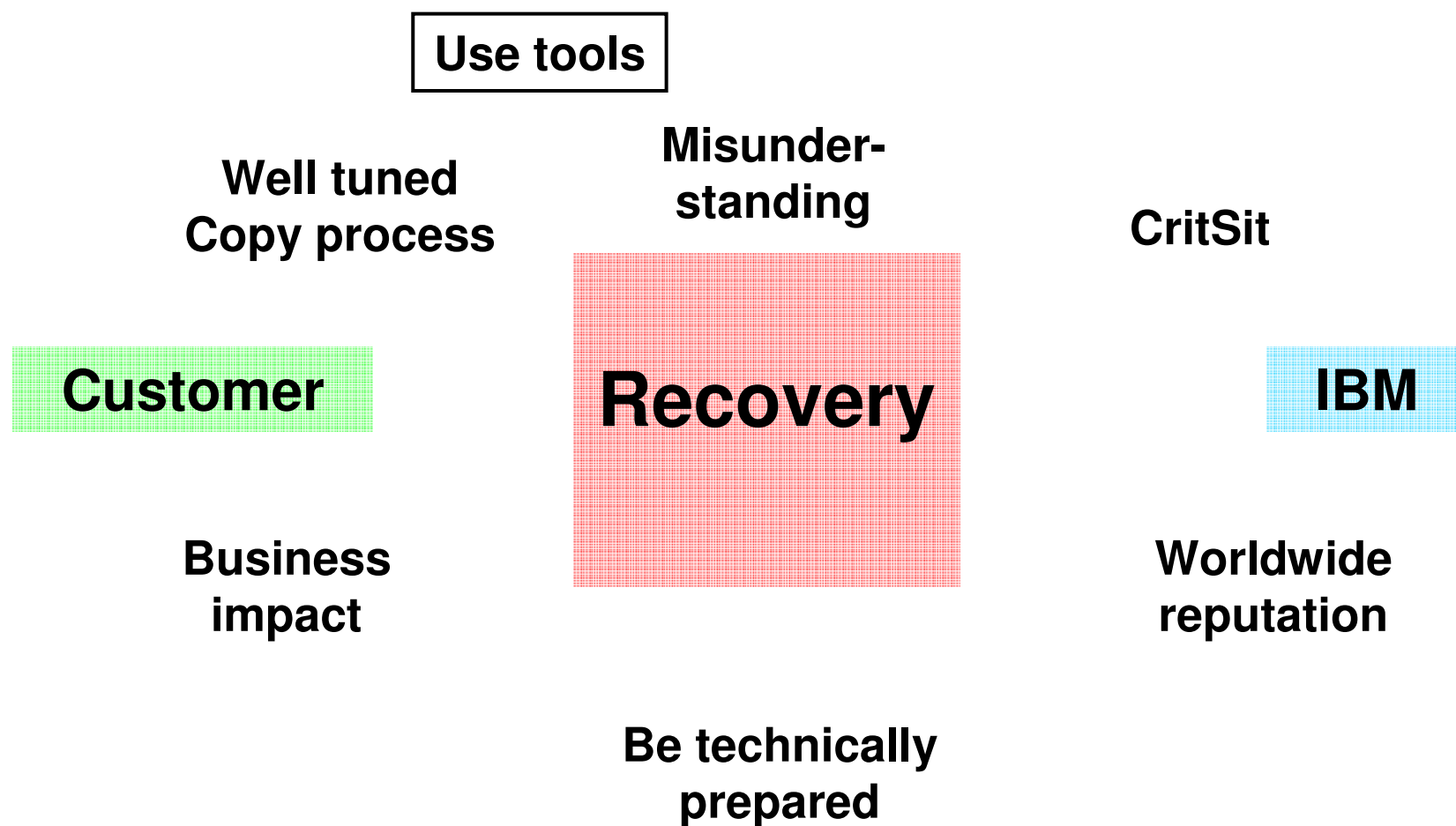
## DB2 COPY & RECOVER Utility Enhancements

- Performance improvements
- Image Copy
  - Dataset-level Flashcopy for consistent online copy
- Recover is key in case of disaster
  - Object-level recovery from volume-based backup
  - Recover to PIT
    - with consistency
    - with BACKOUT and VERIFYSET option
- Backup & Restore System
  - Volume-based backup exploiting Flashcopy
  - Incremental Flashcopy
  - Tape support

## BACKUP SYSTEM and FlashCopy Image Copy



## Why being an Expert on Recovery: Different points of view

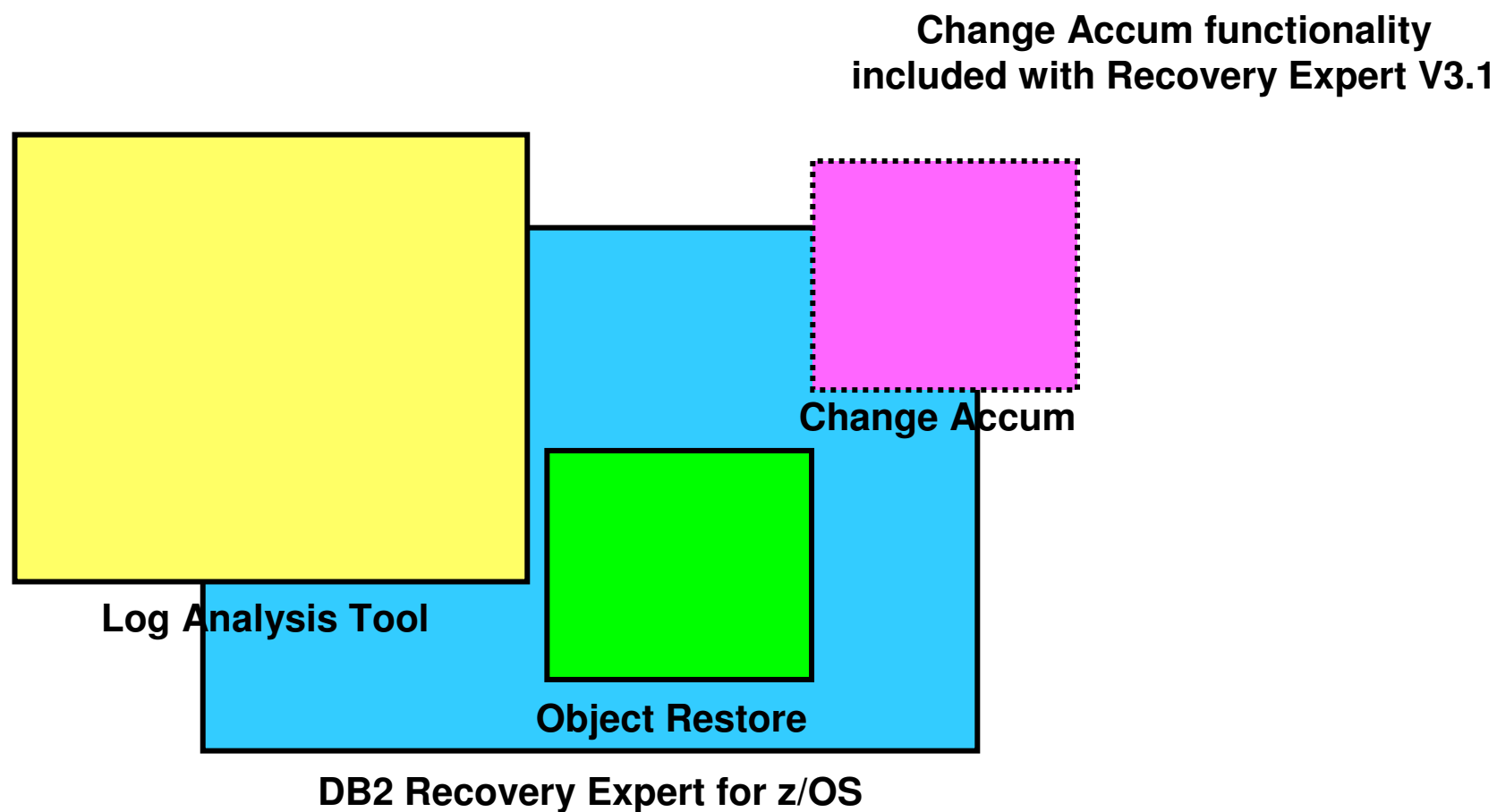


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## Use a Tool

- Buying a tool does not mean: Solving all the problems
- A tool must be regularly used otherwise it is senseless!

## DB2 Recovery Tools!



## DB2 Recovery Expert z/OS at a glance

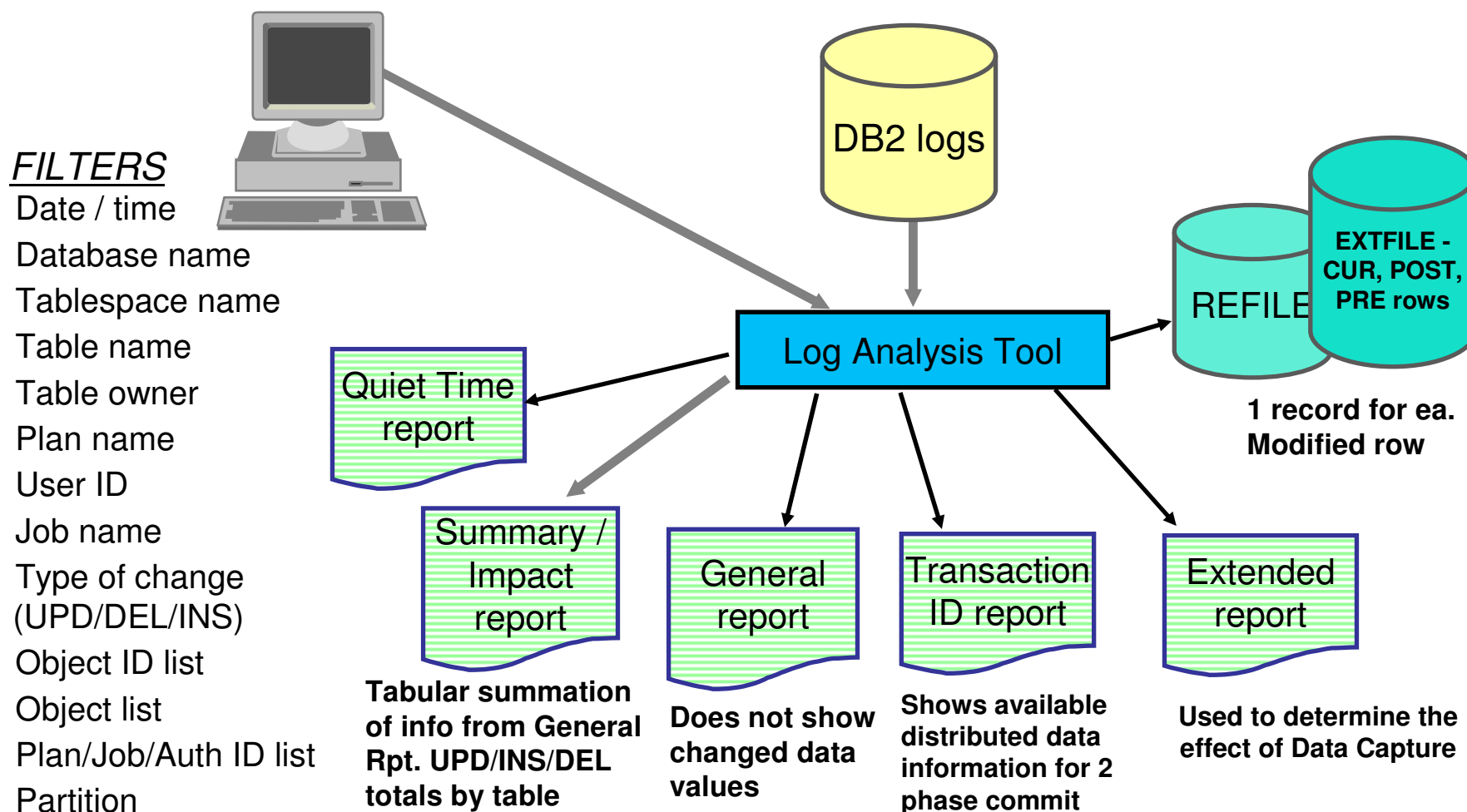
- A backup and recovery solution that helps protect critical data assets
- Reducing the timeline to recovery
  - Determine point of recovery
  - Locate all affected objects
  - Create necessary recovery jobs
- Intelligent Recovery Manager
  - Helps to select the best recovery plan from a list of options
- Application versioning and recovery
  - Tracks object versions and data dependencies
  - Recovers dropped objects and recreates authorizations
- Storage-aware database tools
- Ease of Use

## DB2 Log Analysis Tool z/OS at a glance

- **Functionality:**
  - DB2 Log Analysis Tool analyses DB2 logs
- **Benefit:**
  - Reports can be generated to see who what and when something was changed (INSERT,UPDATE oder DELETE): „Poor man auditing“ → Guardium
  - Before and after images of the data.
  - Could help in case of disaster if log is still ok.
  - Tool generates UNDO SQL and REDO SQL statements.
  - Minimizing recovery situations by identifying data, which was changed.
  - Identifying consistent recovery points.

# DB2 LOG ANALYSIS TOOL

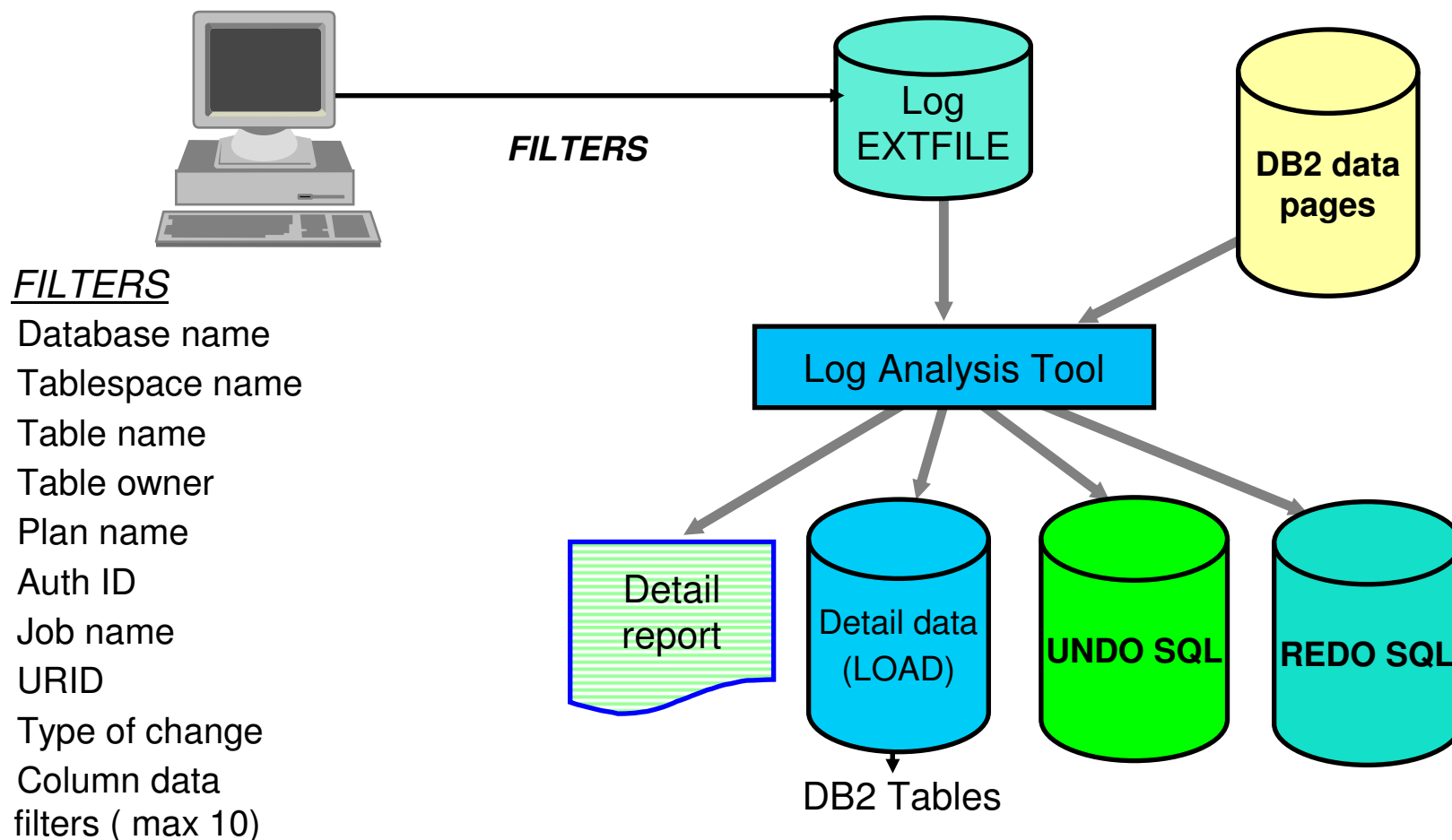
## Product Execution - Phase 1



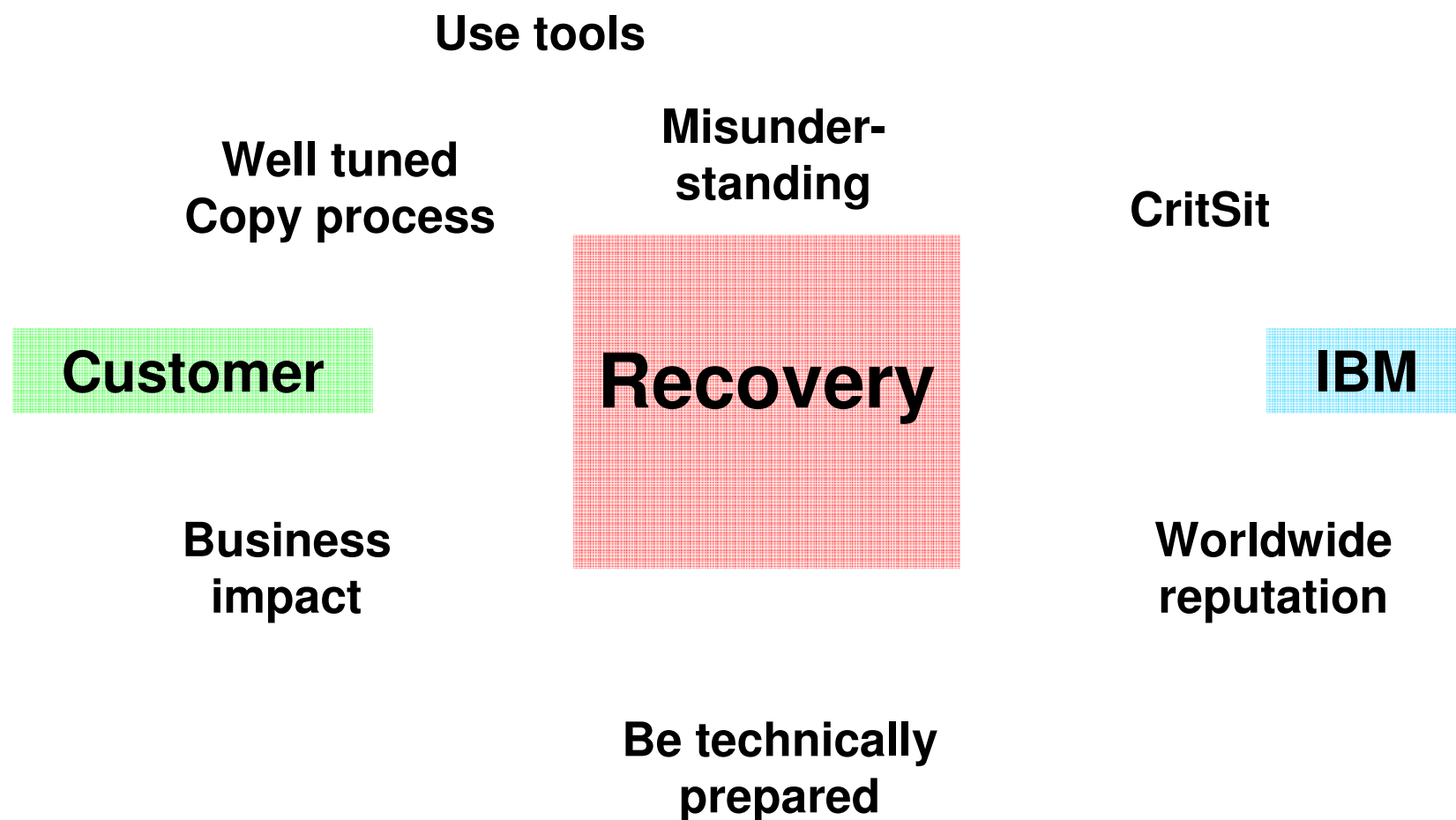


# DB2 LOG ANALYSIS TOOL

## Product Execution - Phase 2



## Why being an Expert on Recovery: To reduce downtime!



## A approach to be prepared and to be a Recovery Expert!

**Education:  
Advanced Recovery  
Procedures**

**Management talk: Are  
you prepared?**

**Tooling:  
e.g. Recovery Expert**

**Recovery assessment:  
Service offering**

**Recovery workshop:  
What are the facts?**

## Primary contact persons – zIM CTPs

- Armin Kompalka
- Hans Jürgen Schmidt
- Heidrun Wietzorek
- Peter Hartmann
- Rüdiger Stumm



## Primary contact persons – zIM Sales

- Fabian Fuelle



- Marcel Dey



- Patrick Hempeler



- Thomas Marufke

