WebSphere Process Server – Service Component Architecture Common Problems and Solutions

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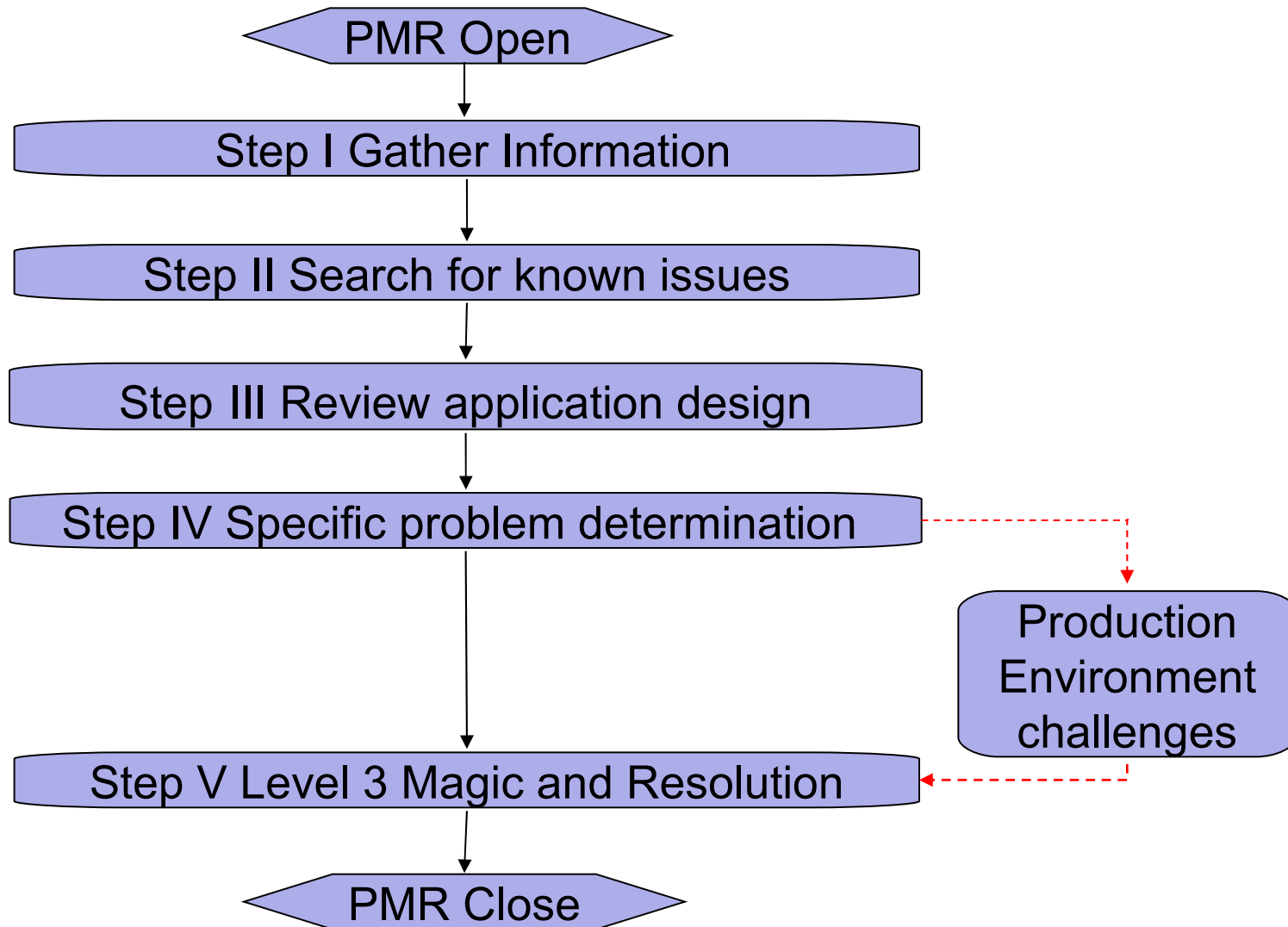Software Engineer, WebSphere Process Server L2 Support
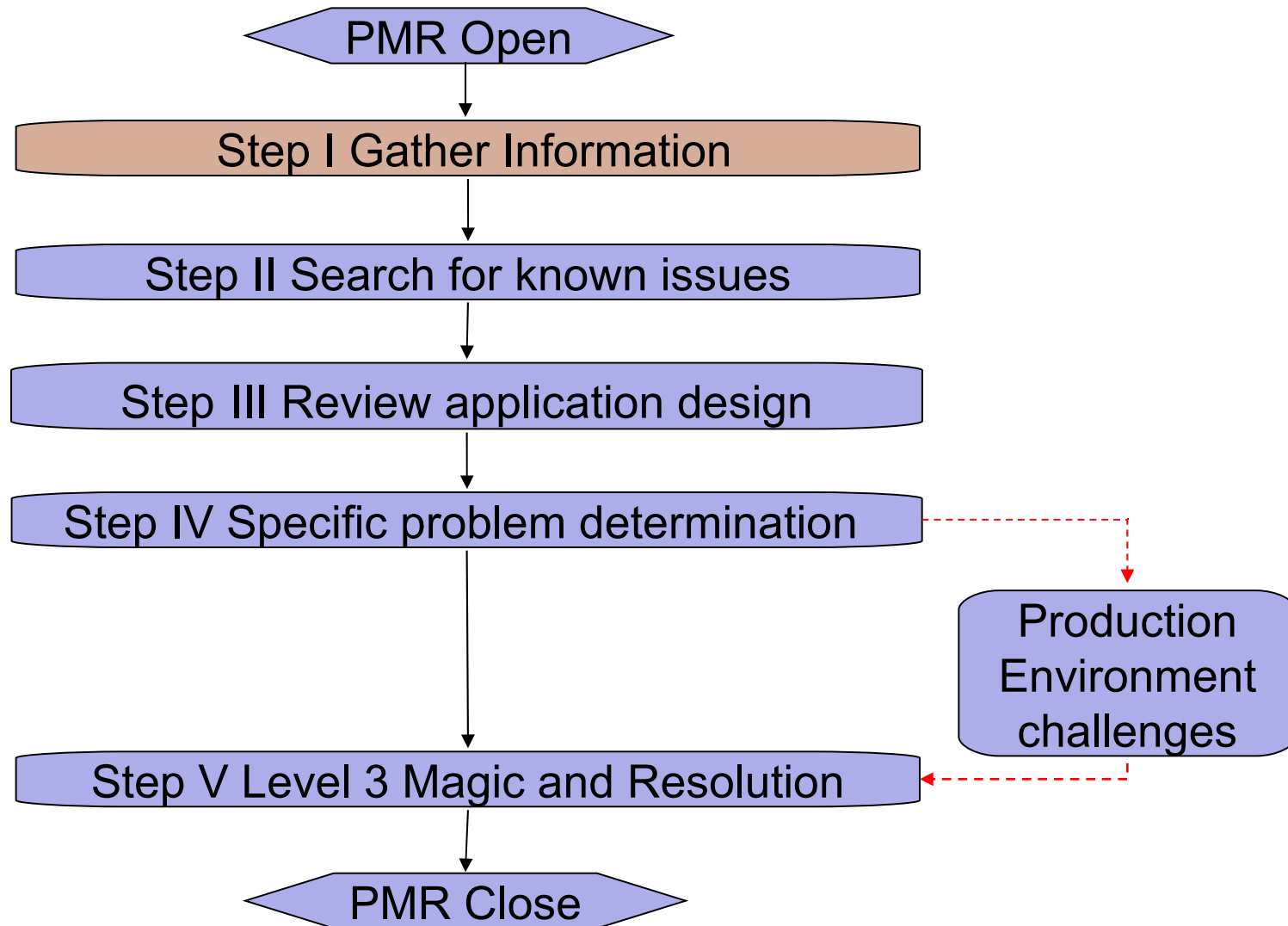1 December 2010

WebSphere® Support Technical Exchange

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Agenda

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Step I Gather Information

Step II Search for known issues

Step III Review application design

Step IV Specific problem determination

Production Environment challenges

Step V Level 3 Magic and Resolution

PMR Close

Agenda

- Service Component Architecture (SCA) problems

  - ▶ Duplicate messages

  - ▶ Timeout

  - ▶ Failed event creation

  - ▶ Stuck messages

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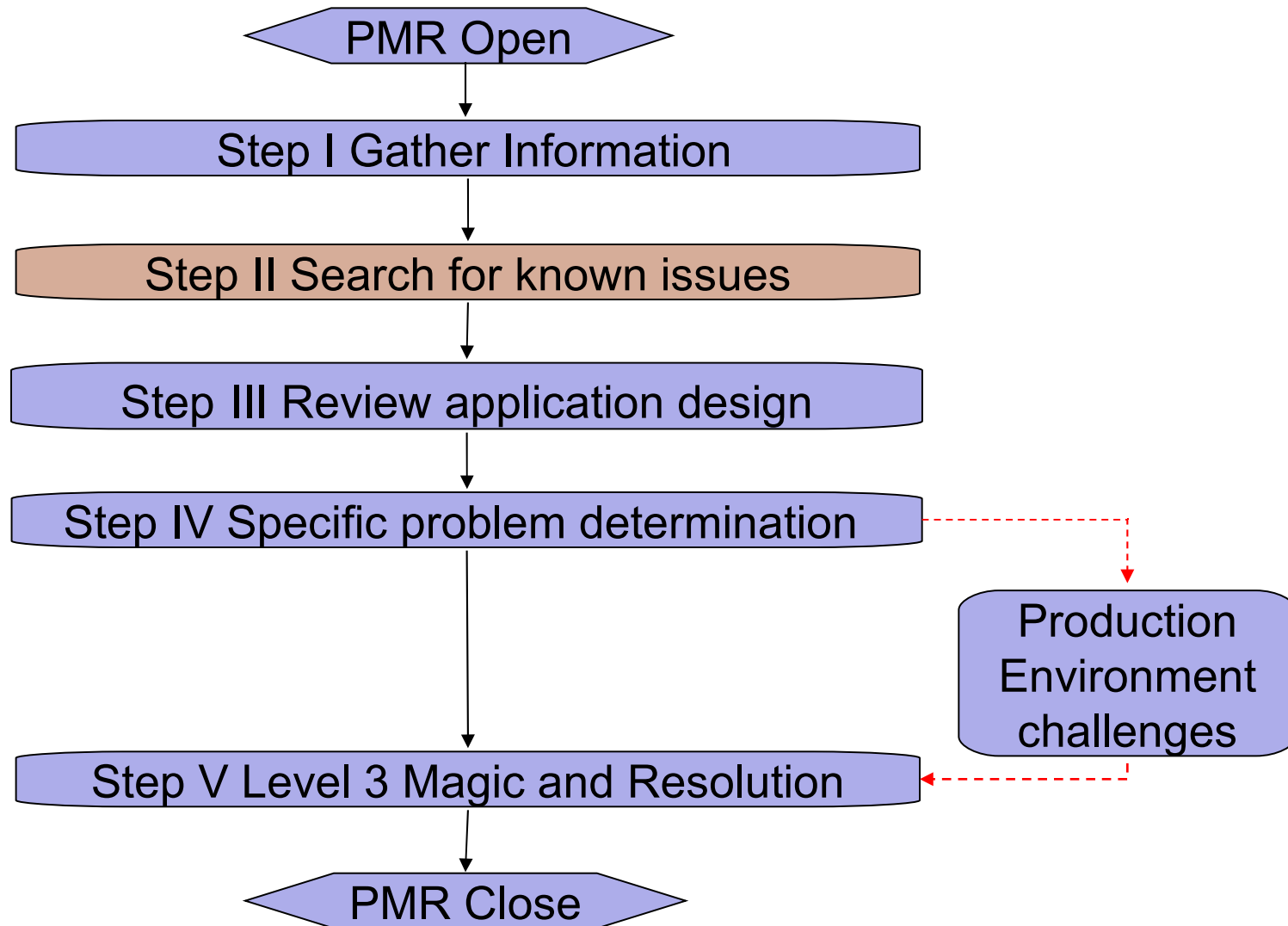
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The what and when

- What:

  - ▶ Clear problem description

  - ▶ Modules and components involved

  - ▶ Error message or exception stack (caused by)

  - ▶ If no error messages, what are other symptoms, example:

    - Duplicate messages
    - Slow processing

- When:

  - ▶ Timestamp of error message

Traces/Logs

- Trace settings Runtime/Configuration tab[1]
- Number and size of historical files[1]
- Verify trace has not rolled over
- Don't forget FFDC
- Send relevant timestamp

    ▸ When was test started and ended
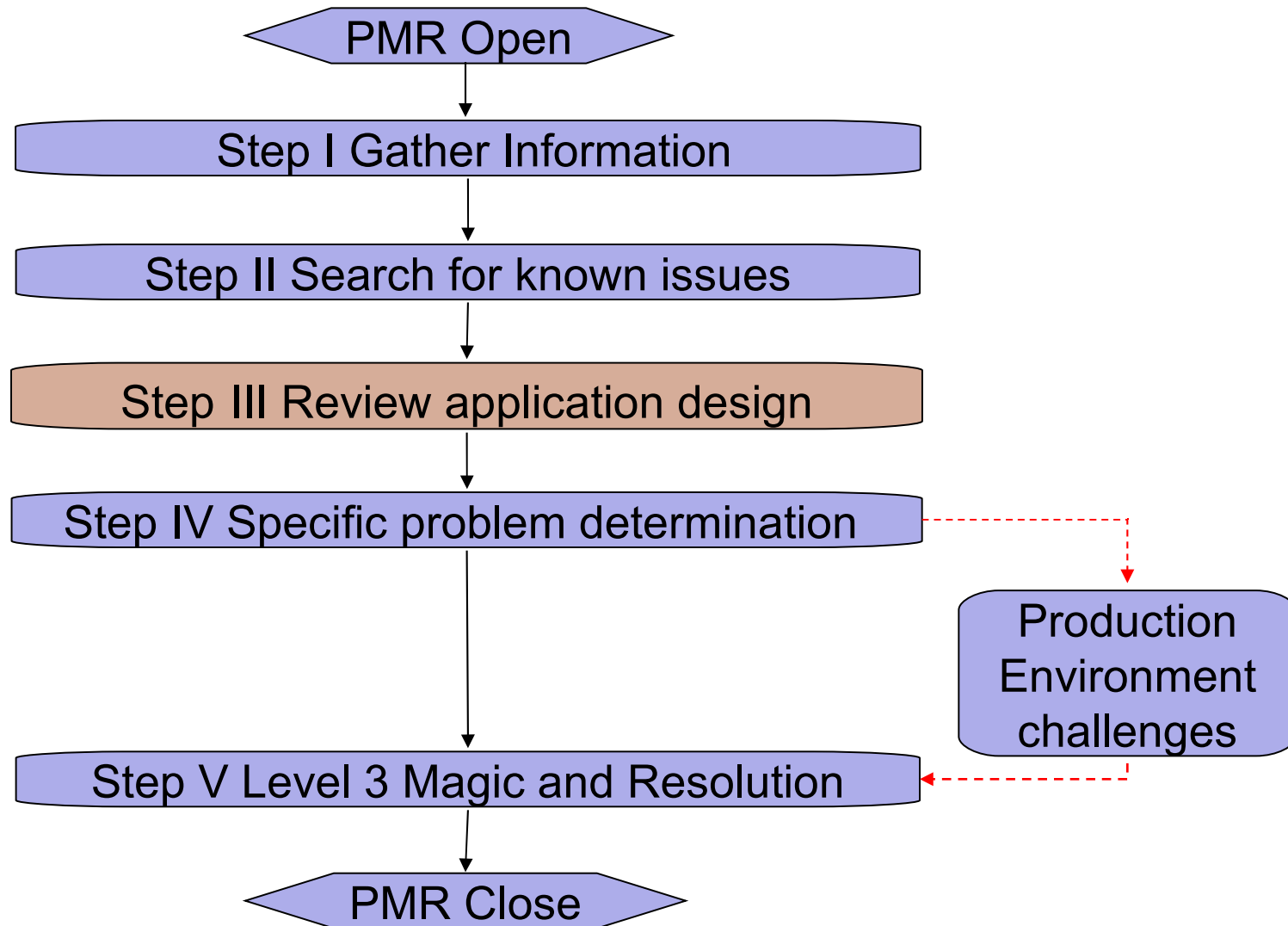
    ▸ Other relevant timestamps

Other relevant information

- Environment information
  - ▶ Version information
  - ▶ Topology description
- Frequency of the problem
- Mustgather[1]

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Search: Where and What

- **Where:**
  - ▶ Support portal[2], Google ➕ Show more results from ibm.com
  - ▶ Add WebSphere Application Server to list of products
- **What: Choosing the right keyword**
  - ▶ Error code
  - ▶ FFDC exception stack
  - ▶ Exception stack

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Application design review

- Invocation style
- Asynchronous implementation?
- sync-over-async switch
- Asynchronous invocation qualifier
- Request/response expiration
- Transactionality
- Asynchronous deferred response

Definition

- ■ What is invocation style

  - ▸ Synchronous

  - ▸ Asynchronous one way

  - ▸ Asynchronous with deferred response

  - ▸ Asynchronous with callback

Synchronous vs Asynchronous invocation

Synchronous
- Same thread
- Caller is blocked
- Ex Phone conversation

Asynchronous
- Different thread
- Caller is not blocked
- Ex Snail mail
- Messaging queues

Asynchronous Deferred Response

- Analogy: When placing an order in Fast food restaurants you are given a token number and you can use that to retrieve your order at a later time.
- When component A invokes component B asynchronously, a ticket is returned to component A
- This ticket can be used later to get the response (InvokeResponse(ticket))

Asynchronous with callback

- Analogy: Restaurant pager/buzzer
- Component A invokes component B
- A method (onInvokeResponse) on Component A gets invoked when response is ready

How to find invocation style?

- developerWorks article on WebSphere Process Server Invocation Styles[3]
- Blog[4]
- Transactions in WebSphere Process Server[5]

Why?

	Synchronous	Asynchronous
Transaction propagation	Possible	Not possible
Business Exception	Back to Caller	Back to Caller
Service Exception	Back to Caller	Failed Events*

*These are are exceptions

Design Time Tip

- Choosing between synchronous vs asynchronous invocation

  ▸ Time required to process request and send response

  ▸ Service Provider Responsiveness/Availability

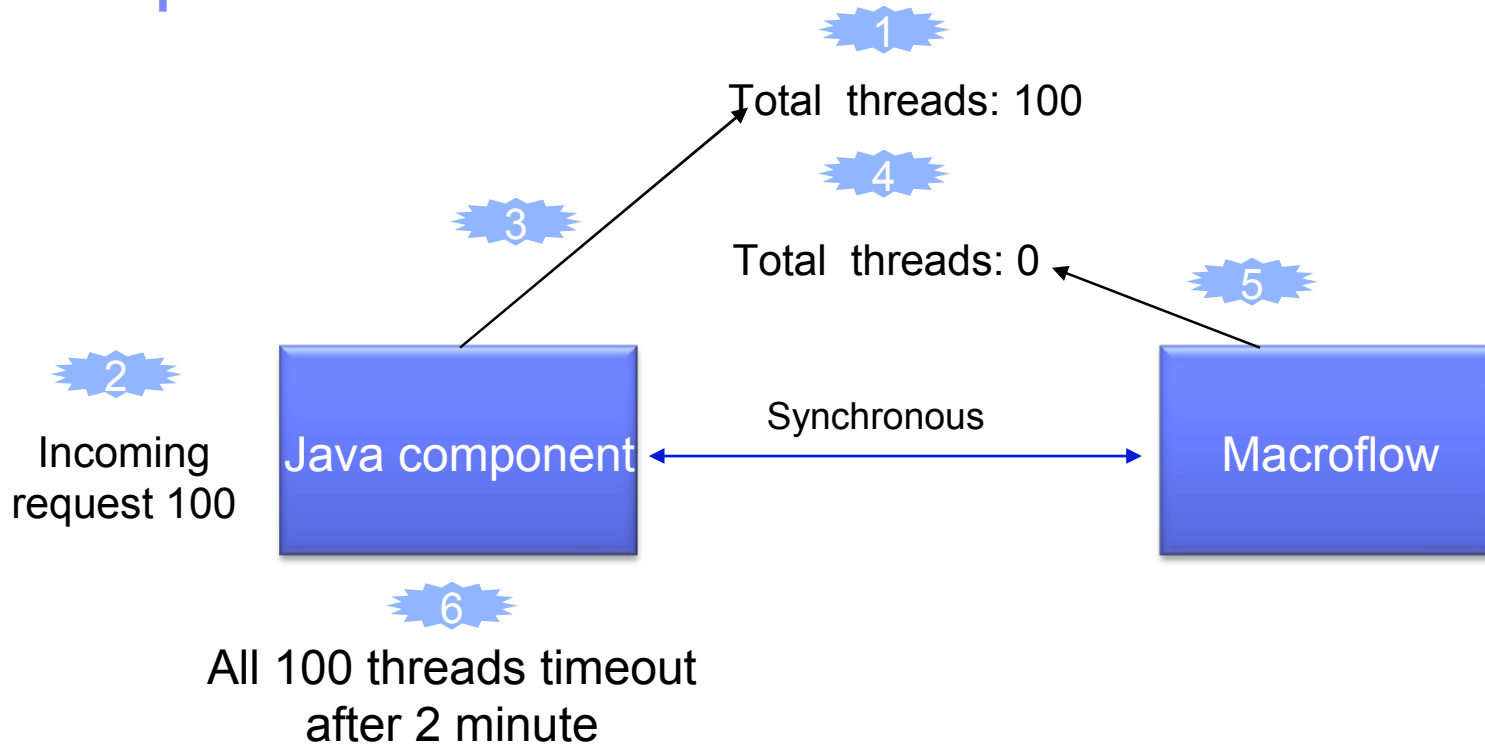 ▸ Transaction propagation

  ▸ Performance

Asynchronous implementations

- Java™ Component (POJO) that implements the ServiceAsyncImpl interface
- Long running business process
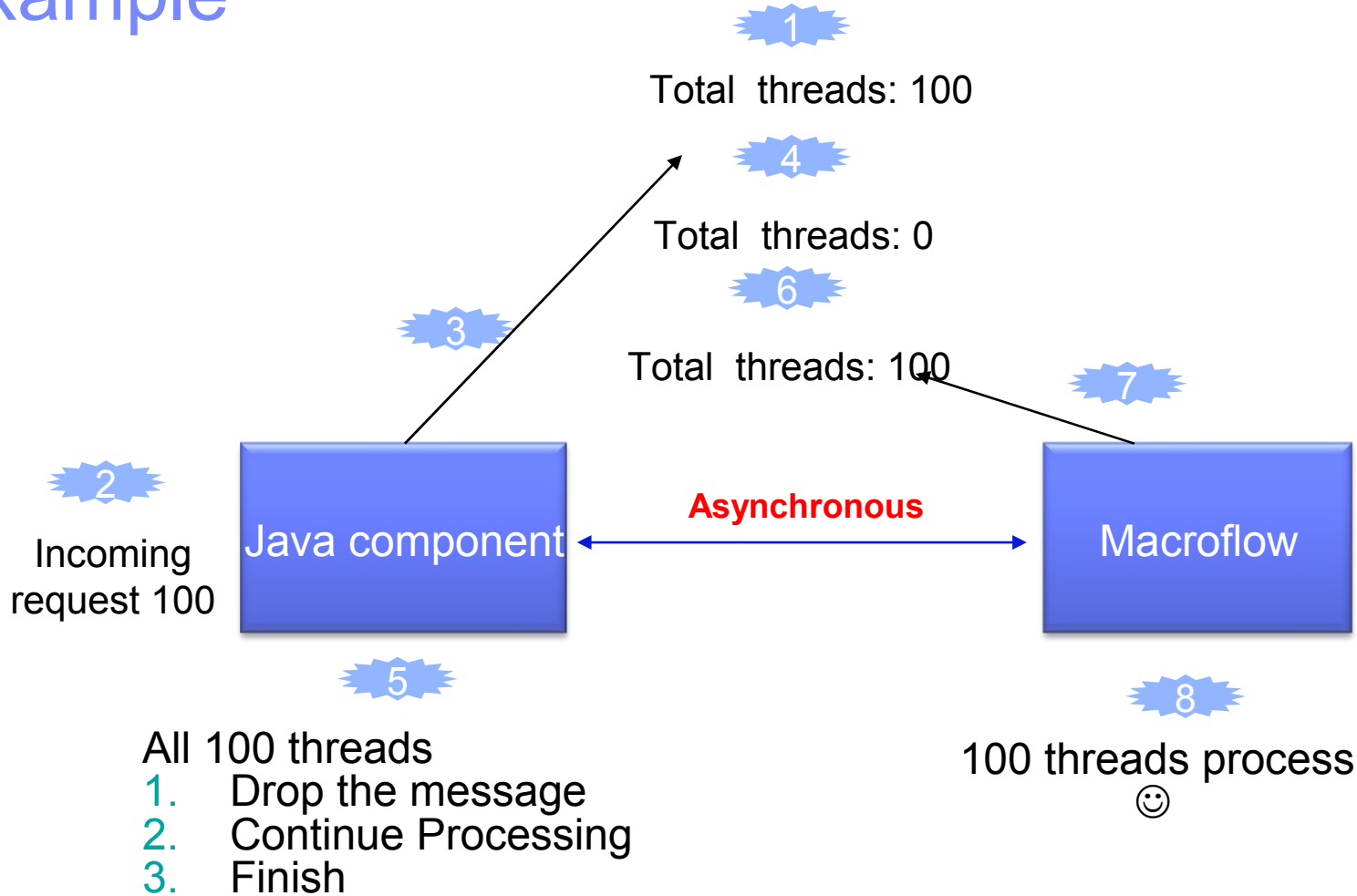- Human tasks
- JMS import
- MQ import

Sync-over-Async switch

- When an asynchronous service is invoked synchronously
- Why should you avoid using this pattern:
  - ▸ A new transaction boundary is introduced
  - ▸ Message expiration is introduced
  - ▸ Asynchronous Invocation=call- Can lead to duplicate messages
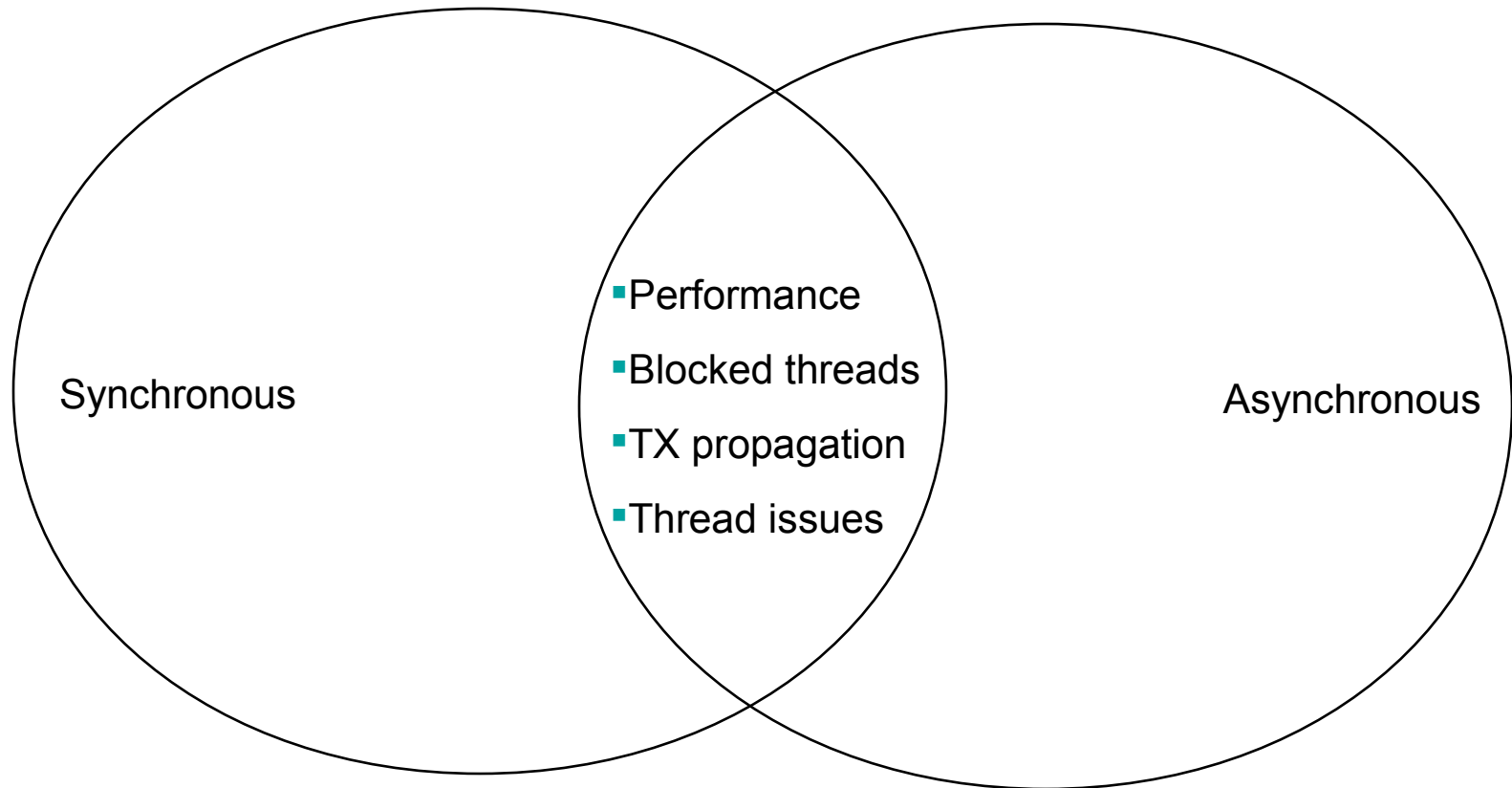 - ▸ Thread pool depletion

Example

Total threads: 100

Total threads: 0

Incoming
request 100

Java component

Synchronous

Macroflow

All 100 threads timeout
after 2 minute

Example

1

Total threads: 100

4

Total threads: 0

6

Total threads: 100

3

2

Asynchronous

Incoming
request 100

Java component

Macroflow

7

5

8

All 100 threads
1.   Drop the message
2.   Continue Processing
3.   Finish

100 threads process
☺

Worst of both the worlds

Synchronous

- Performance
- Blocked threads
- TX propagation
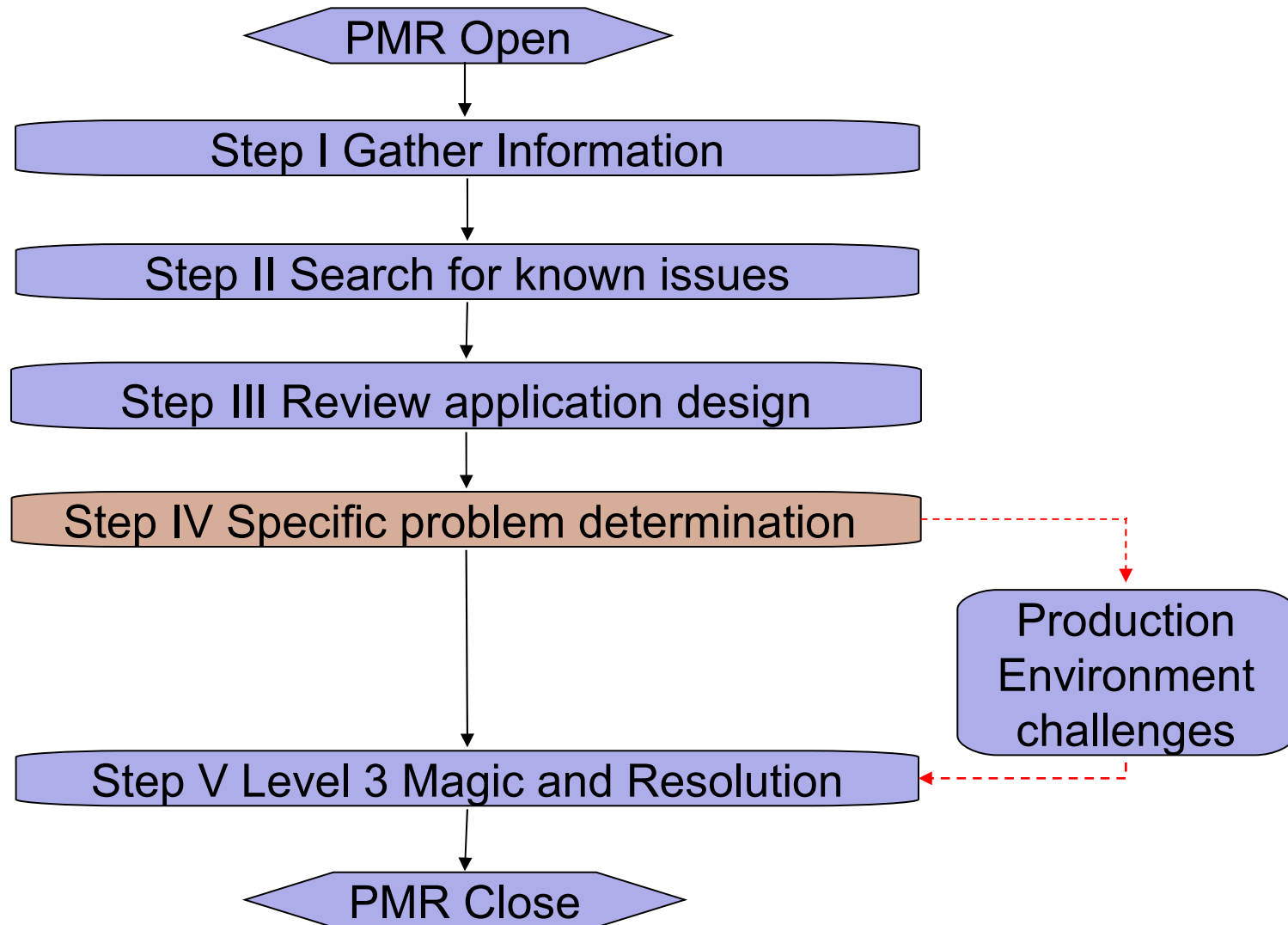- Thread issues

Asynchronous

Asynchronous Invocation (Commit|Call)

- Recommended value commit (TX1=TX2=TX)
- A value of call can cause duplicate messages (TX1!=TX2)
- Value of commit + deferred asynchronous = Possible deadlock[6]

TX 1

Component A

TX 2
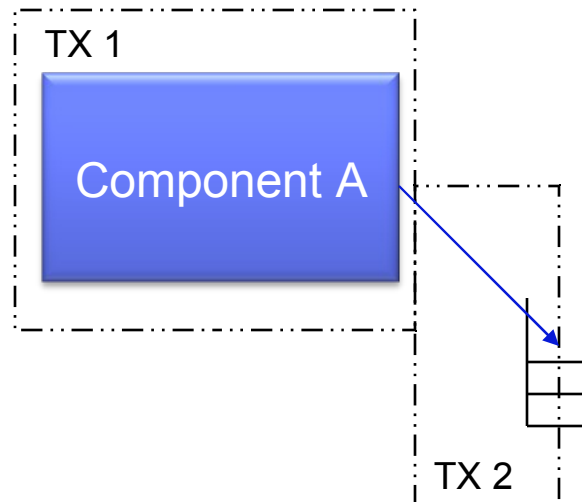
Application design review (cont'd)

- Request/response expiration
- Transactionality[5]
- Asynchronous deferred response

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Duplicate messages

- Verify there are duplicate messages:
  - ▶ Retries due to rollback
    - com.ibm.websphere.csi.CSITransactionRolledbackE-xception: Transaction marked rollbackonly
  - ▶ Non-transactional work like SystemOut.log print statements
  - ▶ Transaction work like DB insert/updates or MQ put/get
- Asynchronous Invocation Qualifier = Commit
- Sync-over-asynch switch

Timeouts

- SCA timeout, transaction timeout etc.
- Timeout in the mediation component[7]
- IBM® Guided Activity Assistant[8]
- Causes:

  ▶ Application design

  ▶ Infrastructure problems (networks,database,MQ)
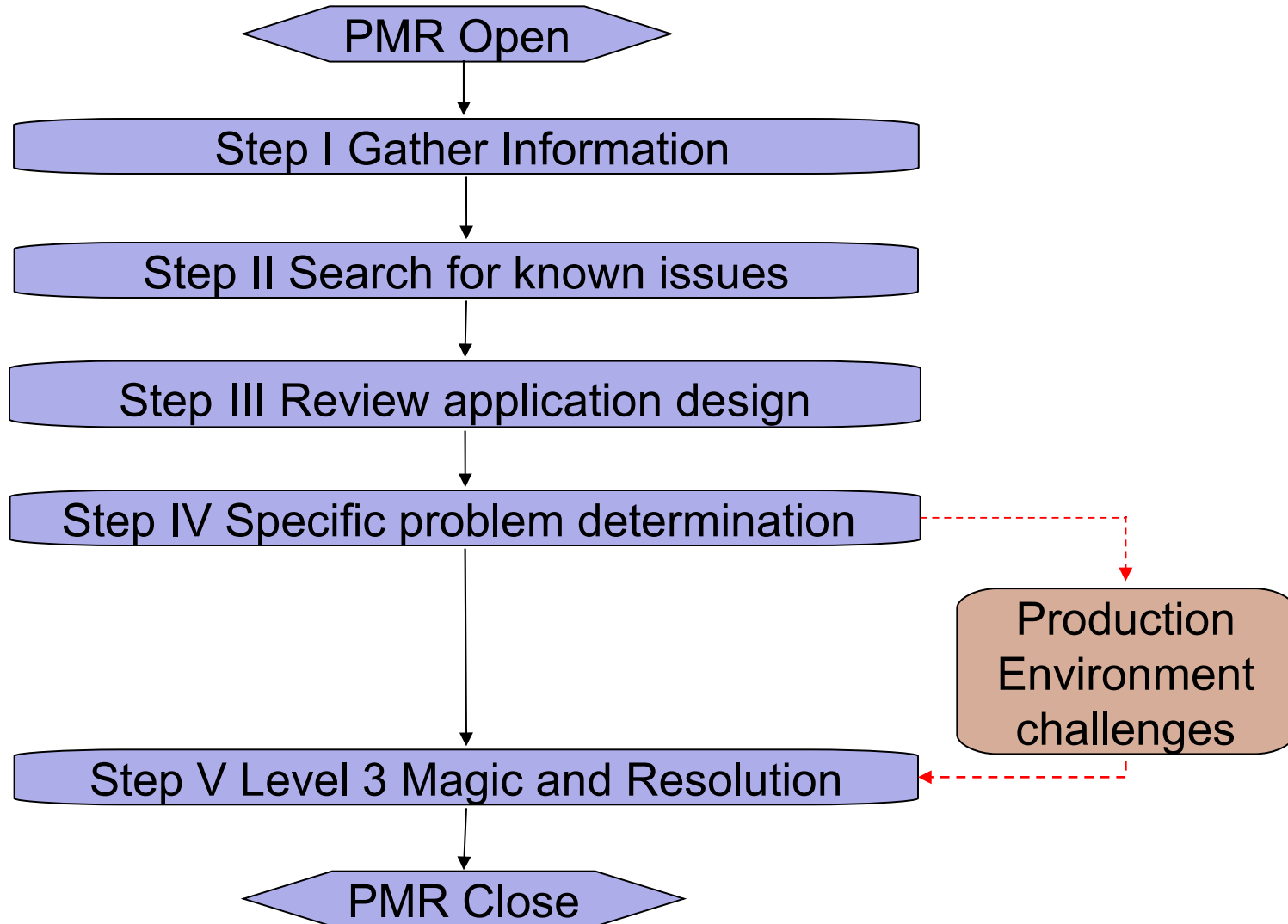
  ▶ Performance tuning

Failed event generation

- Verify the invocation style and type of exception
- Check Page 18 in IBM WebSphere Process Server Best Practices in Error Prevention Strategies and Solution Recovery Red paper[9]
- Asynchronous hop
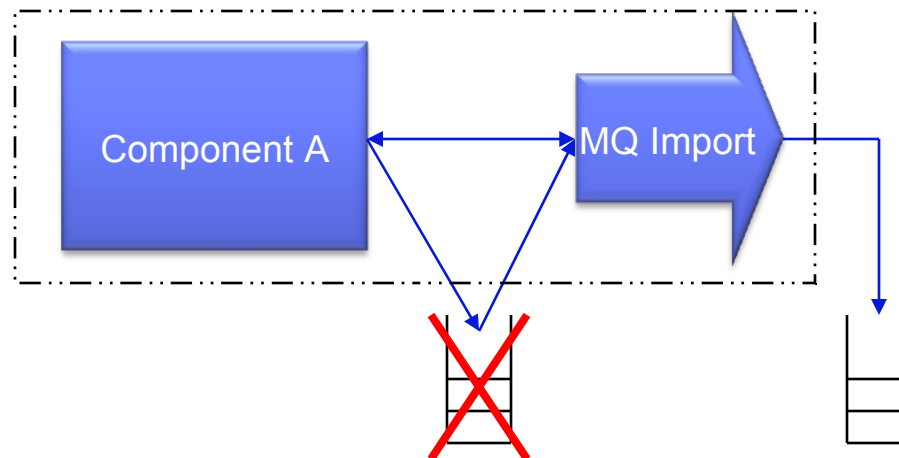
Messages Stuck

- ▪ Must Know tools
  - ▶ SIB Explorer[10]
  - ▶ SIB Destination Handler[11]
- ▪ Message dumps using SIB Destination Handler
- ▪ Possible causes:
  - ▶ Routing path[12]
  - ▶ Unconsumed messages
    - • Asynchronous deferred response
    - • SIB correlation messages
  - ▶ Exception messages
  - ▶ Stored messages[13]
- ▪ Tip: Use request/response expiration when appropriate

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Production environment challenges

Time

Volume

Data

Don'ts in production environment

- Don't delete the tranlogs
- Don't delete the messages from the queues
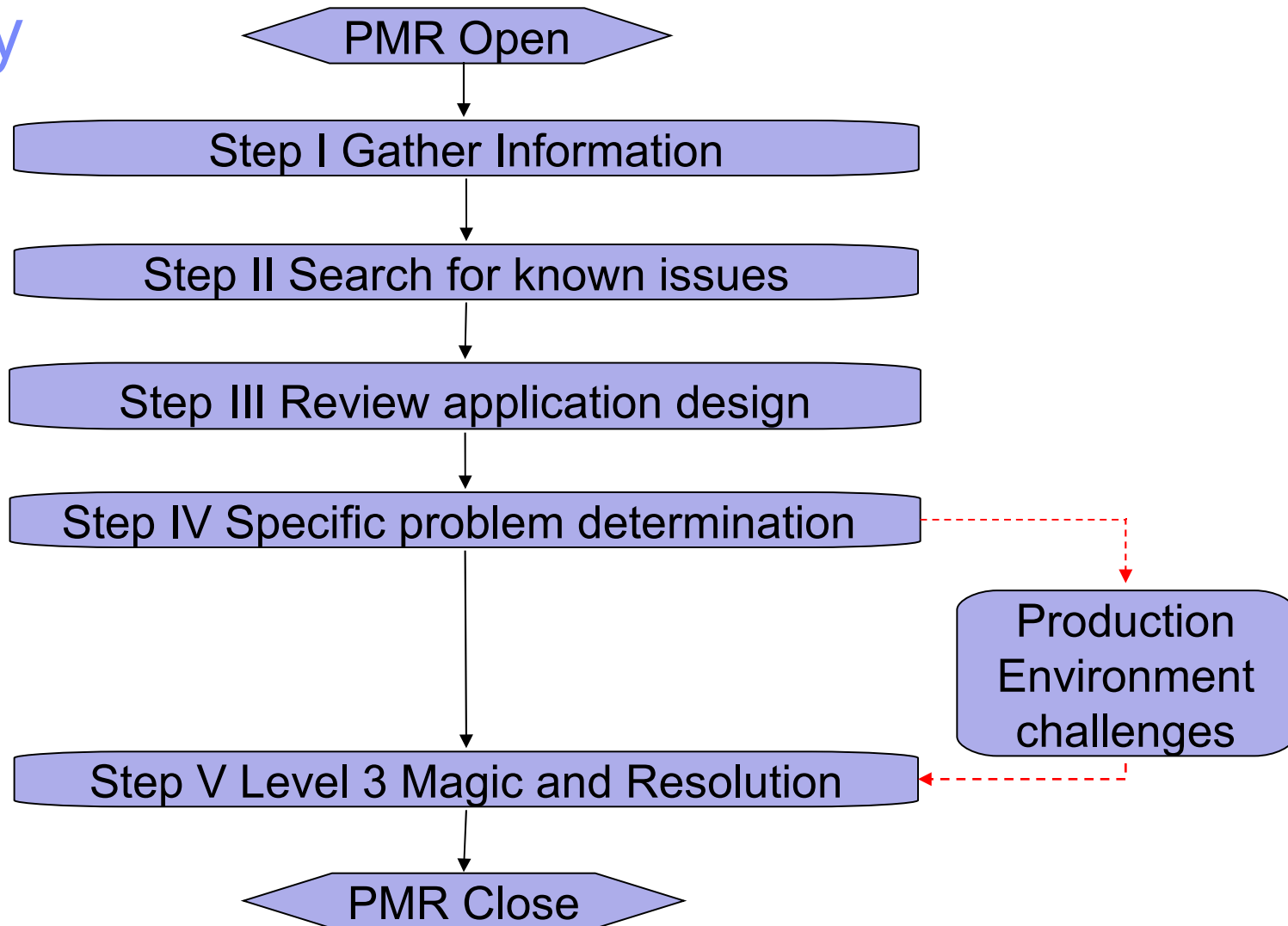- Don't drop the database tables

Reason for Don'ts

- Where does the failure data goes
  - ▶ Failed event manager
  - ▶ BPC Retention and Hold queues
  - ▶ System exception destination

Do's in production environment

- IBM WebSphere Process Server Best Practices in Error Prevention Strategies and Solution Recovery[9]
- IT monitoring tool to monitor queue depths
- Sanity check
  - ▶ Backend services
  - ▶ Database
  - ▶ Networking issues
  - ▶ Changes made recently
- Quiescing the system
- Replay messages from BPC queues and FEM

Summary

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References

1. Mustgather
2. Support Portal
3. Invocation Styles
4. Blog
5. Transactions in WebSphere Process Server
6. Asynchronous processing in WebSphere Process Server
7. Timeout in the mediation component
8. IBM Guided Activity Assistant
9. IBM WebSphere Process Server Best Practices in Error Prevention Strategies and Solution Recovery
10. SIB Explorer
11. SIB Destination Handler
12. Routing path
13. Stored messages

Additional WebSphere Product Resources

- Learn about upcoming WebSphere Support Technical Exchange webcasts, and access previously recorded presentations at:
http://www.ibm.com/software/websphere/support/supp_tech.html

- Discover the latest trends in WebSphere Technology and implementation, participate in technically-focused briefings, webcasts and podcasts at:
http://www.ibm.com/developerworks/websphere/community/

- Join the Global WebSphere Community:
http://www.websphereusergroup.org

- Access key product show-me demos and tutorials by visiting IBM® Education Assistant:
http://www.ibm.com/software/info/education/assistant

- View a webcast replay with step-by-step instructions for using the Service Request (SR) tool for submitting problems electronically:
http://www.ibm.com/software/websphere/support/d2w.html

- Sign up to receive weekly technical My Notifications emails:
http://www.ibm.com/software/support/einfo.html

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