Requirements Verification and Validation

In4Mtx 113

February 2010

Agenda

- Definitions of V&V
- Why do we care?
- Verification Methods
- VCRMs
- Verification Techniques
  - Success Criteria
  - Early Verification Planning in the RE Process
- What Makes Requirements Verification Difficult

Definitions

- Verification:
  - The process of determining whether or not the products of a given phase of the software development cycle fulfill the requirements established during the previous phase.

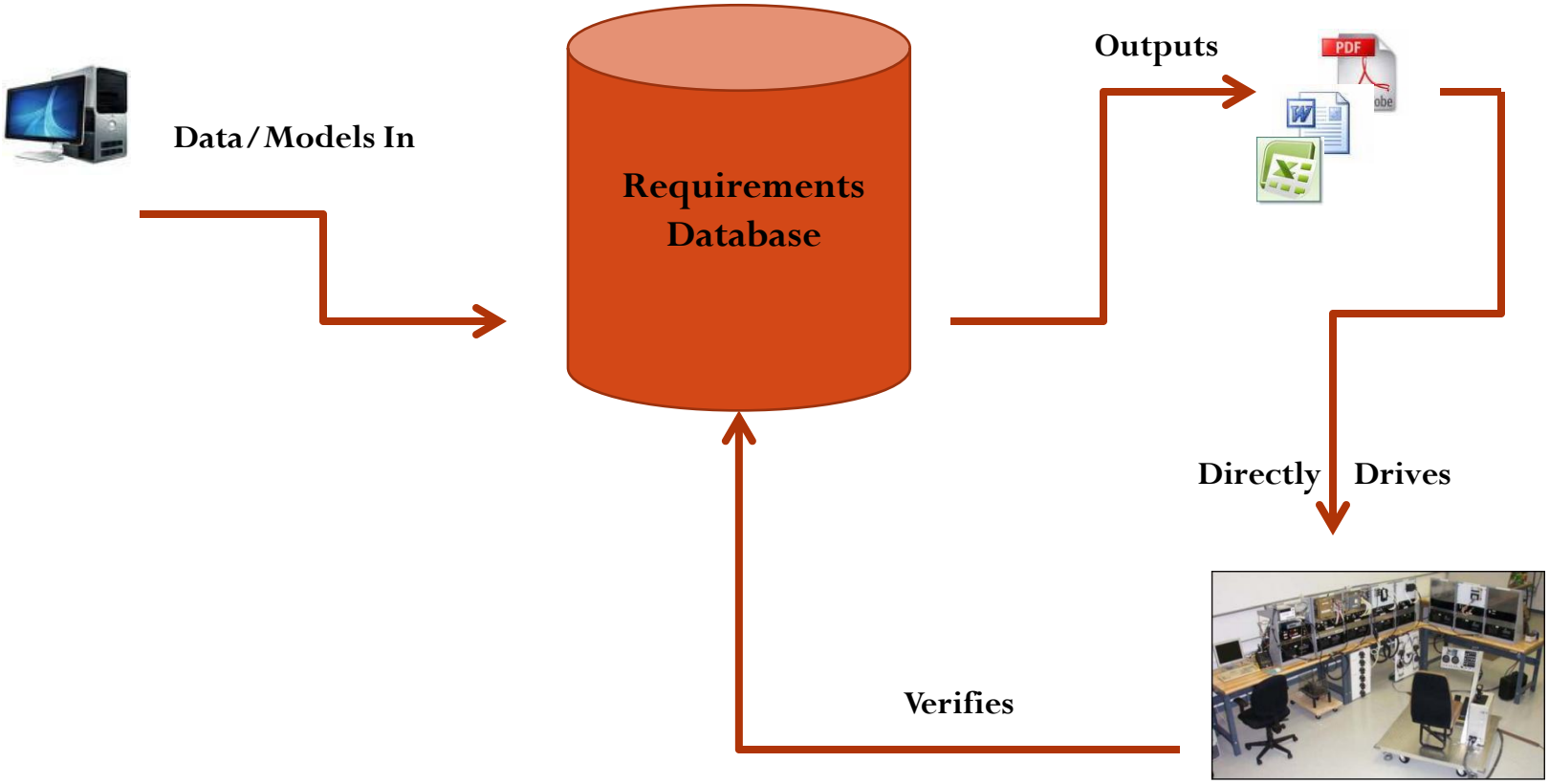
- Validation:
  - The process of evaluating software at the end of the software development process to ensure compliance with software requirements.

These definitions are taken from : **Verifying and validating software requirements and design specifications.** Boehm, B W **IEEE Software. Vol. 1, no. 1, pp. 75-88. 1984**

Basically...

- Verification: "Am I building the product right?"
- Validation: "Am I building the right product?"

Why do we care?



Remember this process?

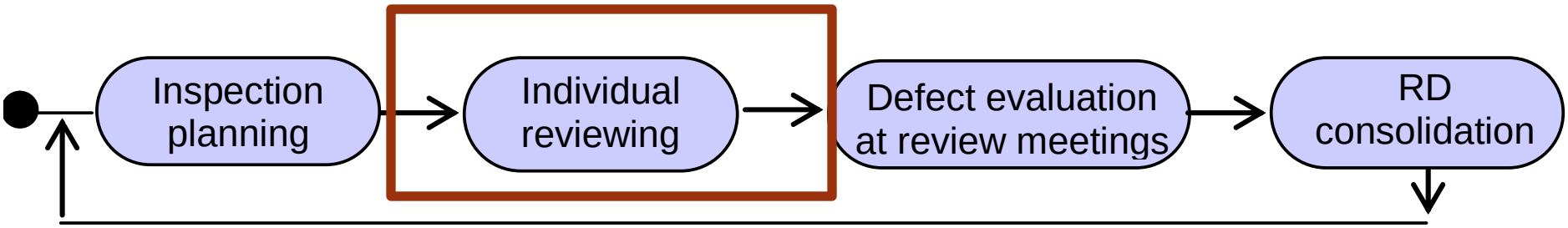


Figure 5.1 – Requirements inspection, review, and consolidation

Your testers are key stakeholders

Verification Methods

- Industry accepted methods are:
  - Test
  - Analysis
  - Demonstration
  - Inspection
  - S
    - Any guesses to the "S" in T.A.D.I.S?

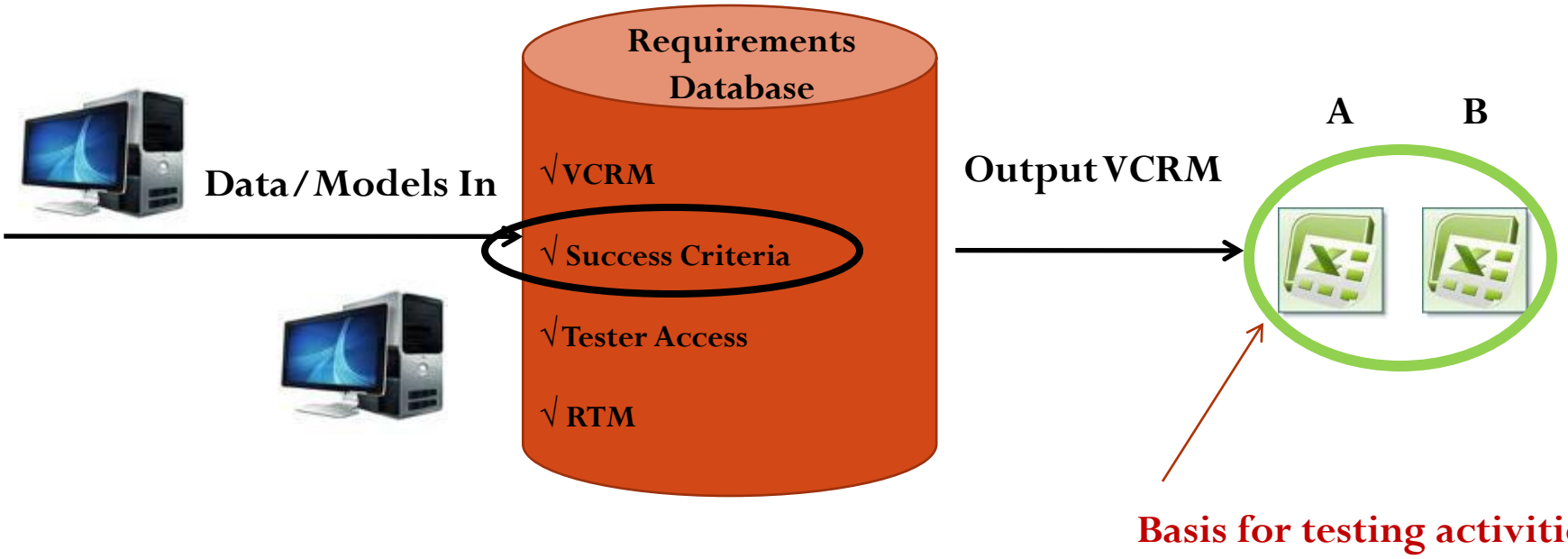
VCRM

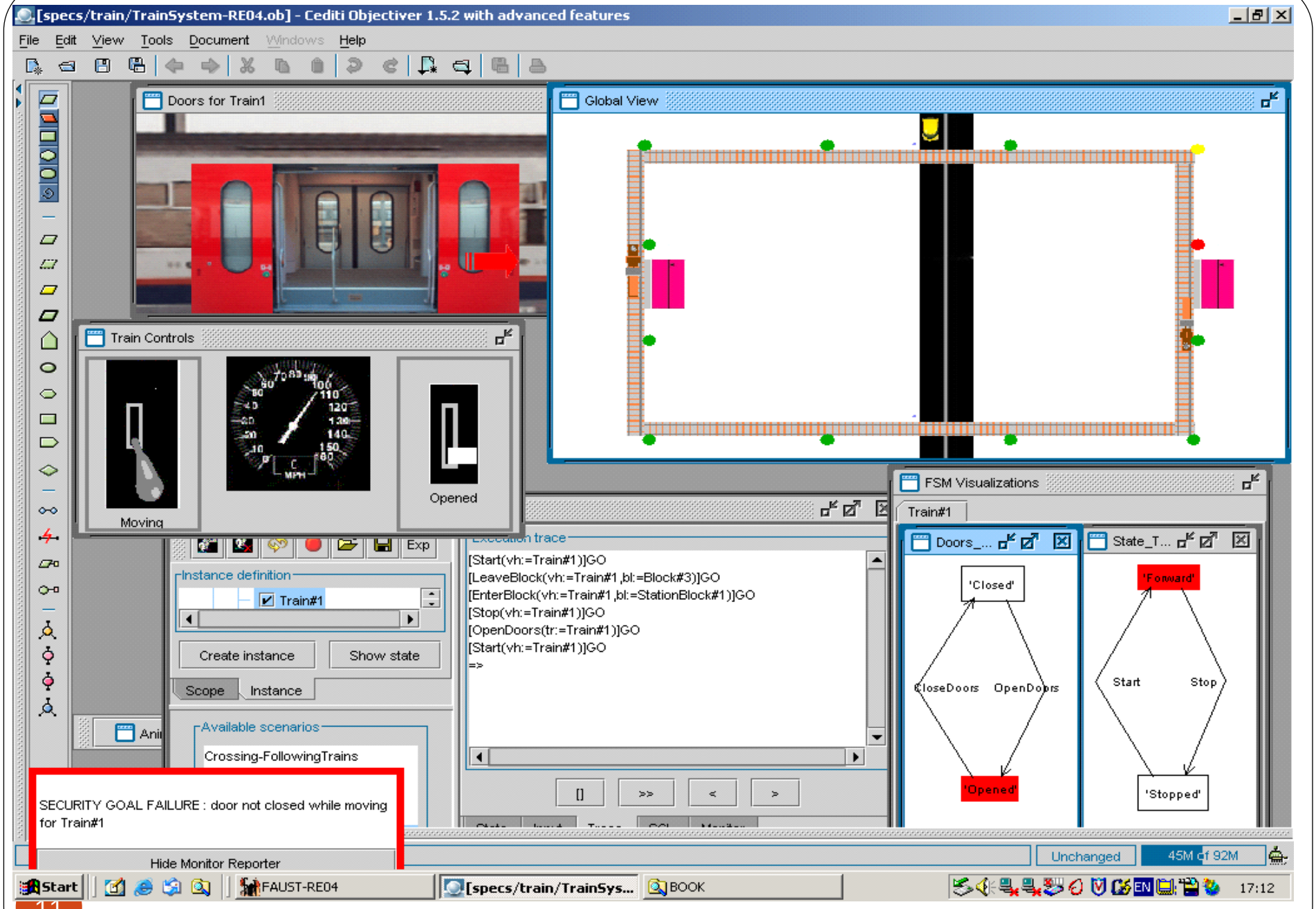
- Verification Cross Reference Matrix
- Supplemental to the RD
- This will be required on any RD you'll ever produce.
  - Guarantee it: 100%
- Can be combined with the Requirements Traceability Matrix

Sample VCRM

Req ID	Requirement	Verification Method	Allocation	Success Criteria
1	The train doors shall remain closed during all operational activities.	D, T	Controller SW	Once ground speed >= 1mph, train doors lock and remain closed.
2	The train doors shall open when the train is stopped.	D, T	Controller SW	Once ground speed = = 0mph, the train doors open.
3	The train door activator sensor shall alert the front train deck when the train door is open.	T, I	Sensor SW	Test 1: Train Doors Open: Sensors shall detect position of train doors as open, and sends a notification to the front deck. Test 2: Train Doors Closed: Sensors detect position of train doors, and sends a notification to the front deck. Inspect front deck display panel for train doors status.

Requirements Verification Techniques




[specs/train/TrainSystem-RE04.ob] - Cediti Objectiver 1.5.2 with advanced features
File Edit View Tools Document Windows Help
Doors for Train1
Global View
Train Controls
Moving
Opened
FSM Visualizations
Train#1
Doors_...
State_T...
'Closed'
'Opened'
CloseDoors
OpenDoors
'Forward'
'Stopped'
Start
Stop
Instance definition
Train#1
Create instance
Show state
Scope
Instance
Available scenarios
Crossing-FollowingTrains
Execution trace
[Start(vh:=Train#1)]GO
[LeaveBlock(vh:=Train#1,bl:=Block#3)]GO
[EnterBlock(vh:=Train#1,bl:=StationBlock#1)]GO
[Stop(vh:=Train#1)]GO
[OpenDoors(tr:=Train#1)]GO
[Start(vh:=Train#1)]GO
=>
SECURITY GOAL FAILURE : door not closed while moving for Train#1
Hide Monitor Reporter
Unchanged
45M of 92M
Start
FAUST-RE04
[specs/train/TrainSys...
BOOK
17:12

Difficulties

- Remembering to think like a tester.
- Compliance:
  - Planning
  - Approach
  - Coordination of VCRM
    - Includes Peer Reviews