Agility and MBT
applied to software communication client project
at Alcatel-Lucent Enterprise

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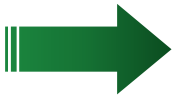
Agenda

- Previous MBT experiences in our team
- A new target : OpenTouch™ Conversation, Windows PC edition
- OTC PC – why Model-Based-Testing ?
- High-level modeling on video feature
- MBT application
- Tests generation
- Some figures
- Lessons learned

Alcatel-Lucent Enterprise R&D:
previous MBT experiences in our team

- Previous experiences on several Alcatel-Lucent Enterprise projects
- Well targeted subjects identified on suitable criteria
- Modeling
  - IBM Rhapsody
- Tests generation
  - Conformiq© Designer

Successful stories !



Decision to **industrialize the process**
within Software Clients development projects
following **Agility constraints**

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A new target :

OpenTouch™ Conversation, Windows PC edition

- Aka OTC PC
- **New Alcatel-Lucent Enterprise communication client on PC**
- **Start** of project **August 2012**
- **Agile** process, development in **2-weeks sprints**

OTC PC – a component of OpenTouch solution

USER-CENTRIC	**User-centric** communication platform
MULTIPARTY	**Native conferencing capabilities** during the conversation, at any time
MULTIDEVICE	**Rapid session shift** between devices while keeping the context
MULTIMEDIA	**Audio, video, instant messaging, collaboration** **Escalation** from voice to video, or from any media to any other during the conversation

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OTC PC – why Model-Based-Testing ?

- Definition
  - 140 marketing requirements, 605 user stories, in 43 families
  - **User stories are interdependent**
  - Scenario = **concatenation** of user stories

Easiness of modeling with scenario approach

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- Agility
  - SCRUM
  - User stories are **delivered sprint after sprint**
  - Some user stories **evolve**, some disappear, new ones appear

✓ Easiness of modeling with scenario approach

✓ Progressive and dynamic test plan

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- Quality Assurance
  - In sync with development
  - **Strong control** of coverage

✓ Easiness of modeling with scenario approach

✓ Progressive and dynamic test plan

✓ Requirements traceability and control

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- Quality Assurance
  - In sync with development
  - **Strong control** of coverage
  - **Automated tests**

✓ Easiness of modeling with scenario approach

✓ Progressive and dynamic test plan

✓ Requirements traceability and control

✓ Scripts automatic generation

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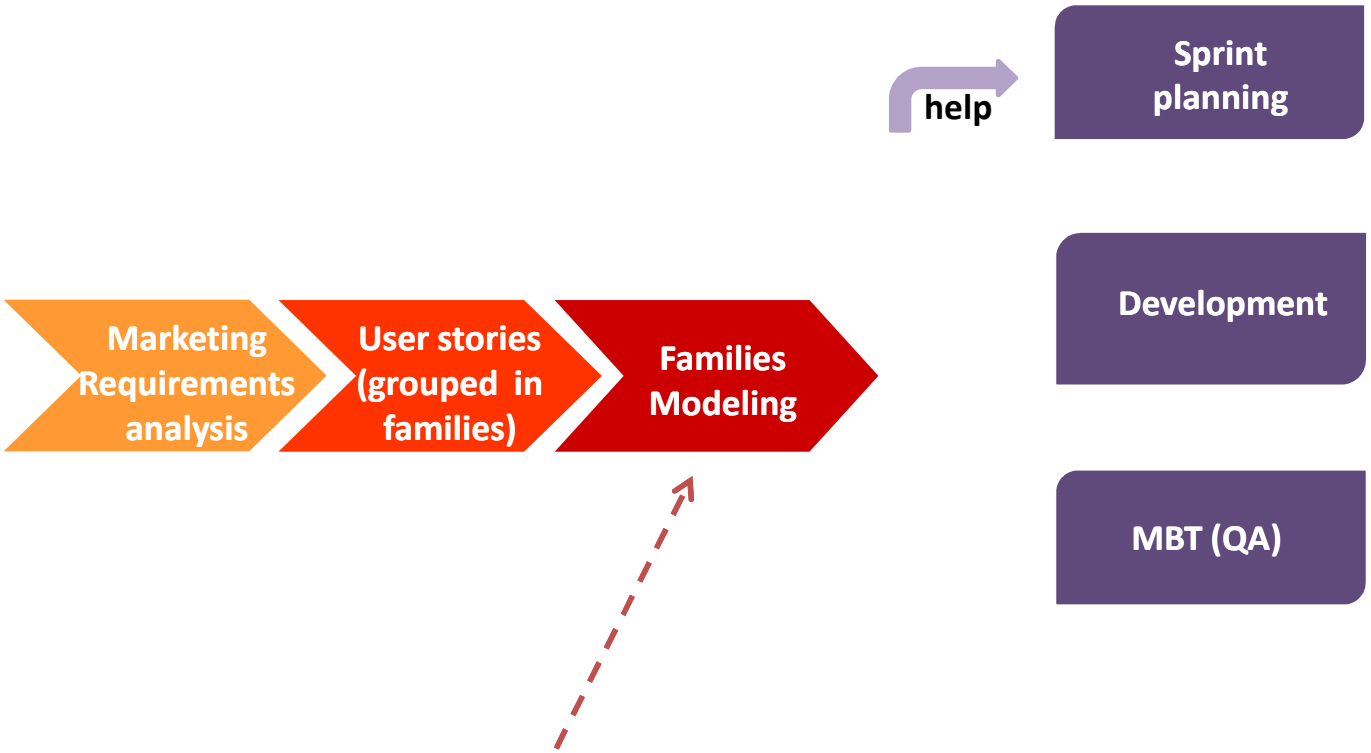
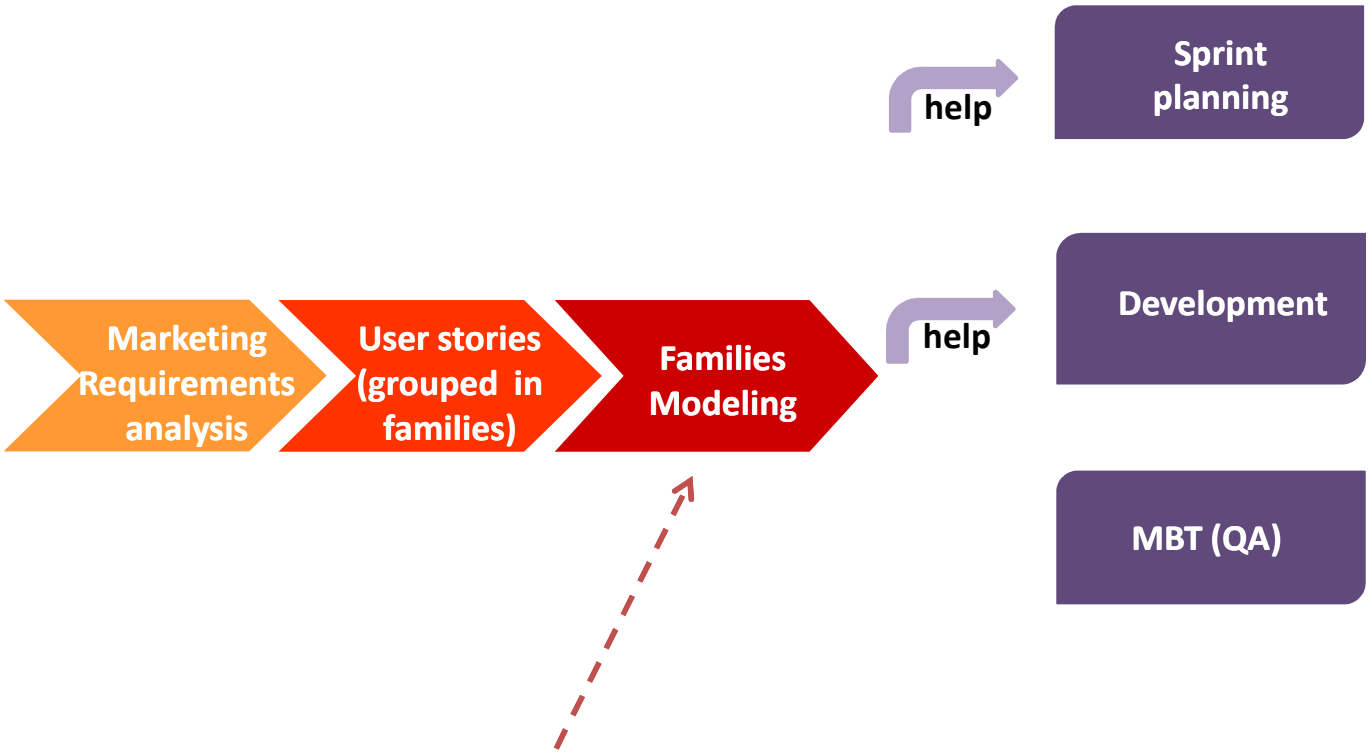
OTC PC – Process – Model for MBT … but not only



High-level model

- ✓ is a **graphics rendering** of a user stories' **family**

OTC PC – Process – Model for MBT … but not only



High-level model

- ✓ is a **graphics rendering** of a user stories' **family**
- ✓ gives the **context** (before/after) of each user story

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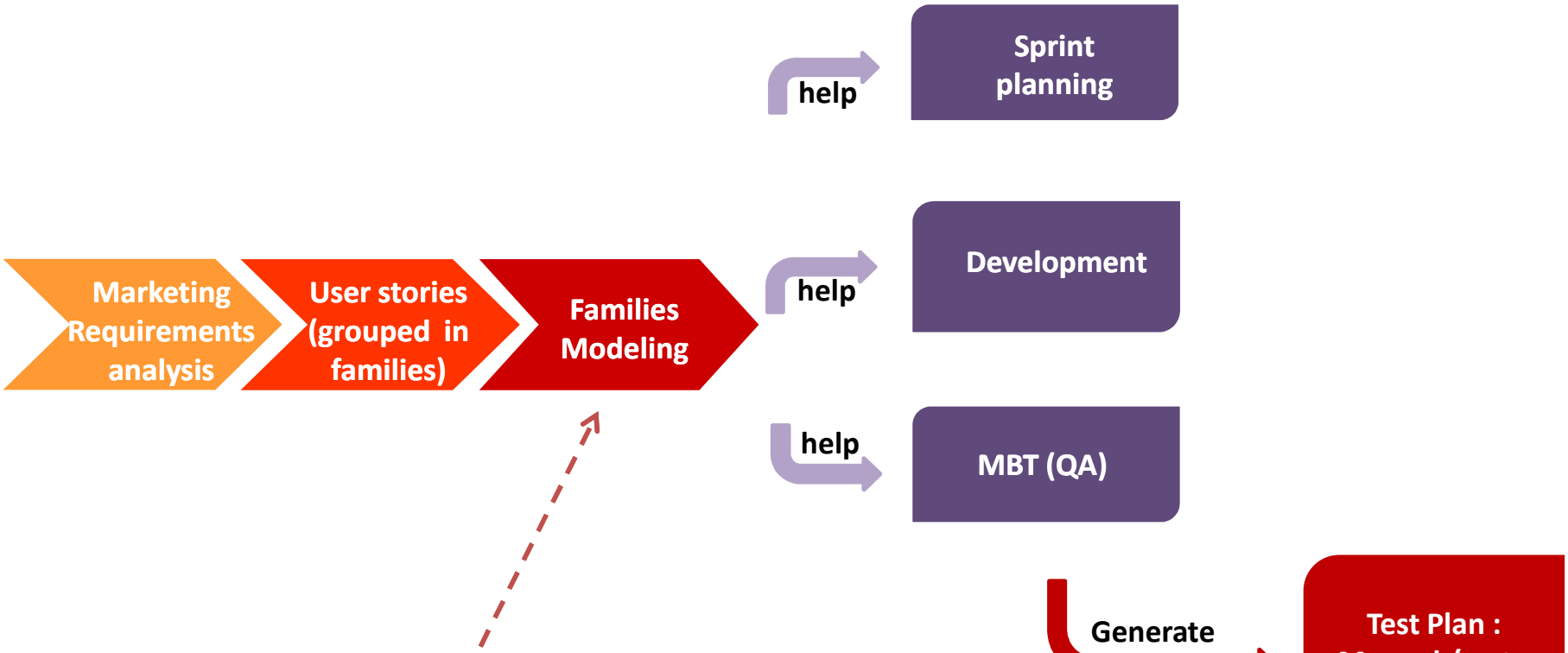
OTC PC – Process – Model for MBT … but not only



High-level model

- ✓ is a **graphics rendering** of a user stories' **family**
- ✓ gives the **context** (before/after) of each user story
- ✓ helps to **identify scenario**

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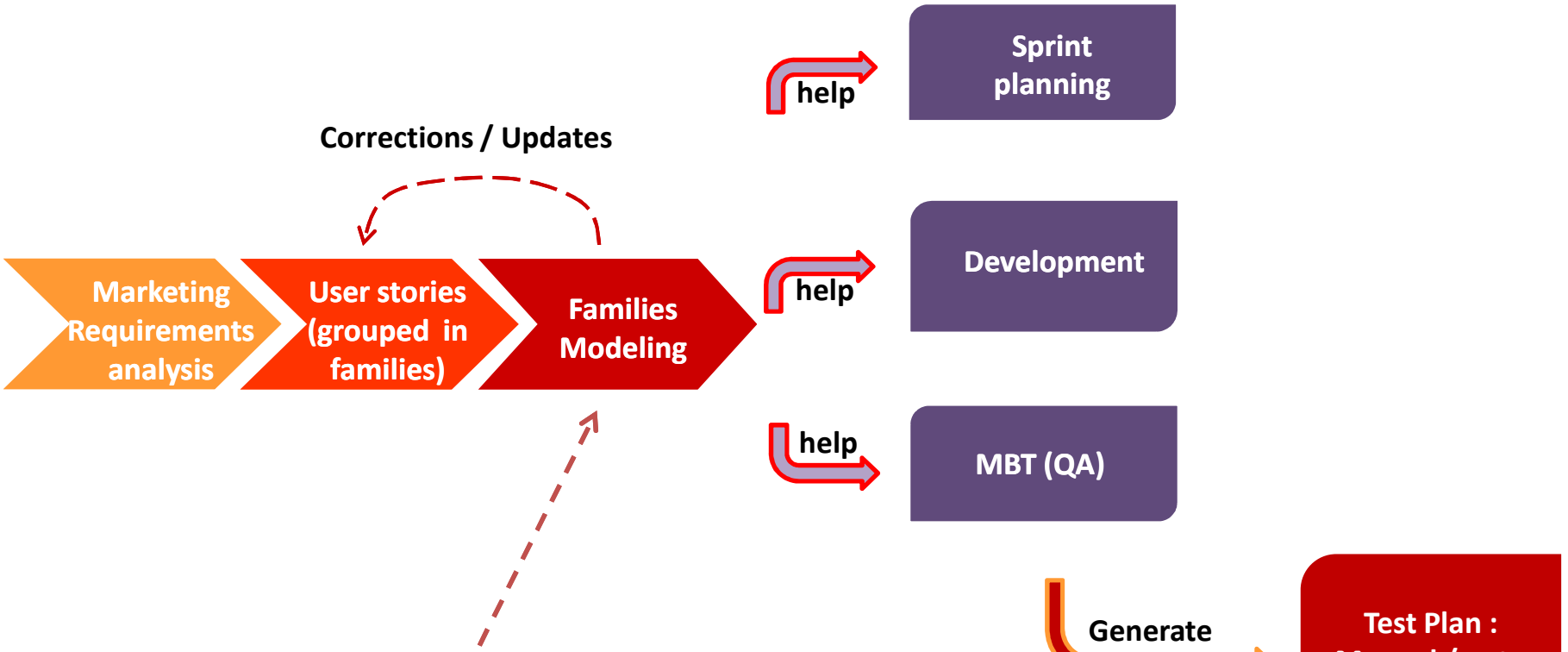
OTC PC – Process – Model for MBT … but not only



High-level model

- ✓ is a **graphics rendering** of a user stories' **family**
- ✓ gives the **context** (before/after) of each user story
- ✓ helps to **identify scenario**
- ✓ allows to **detect missing User Stories**

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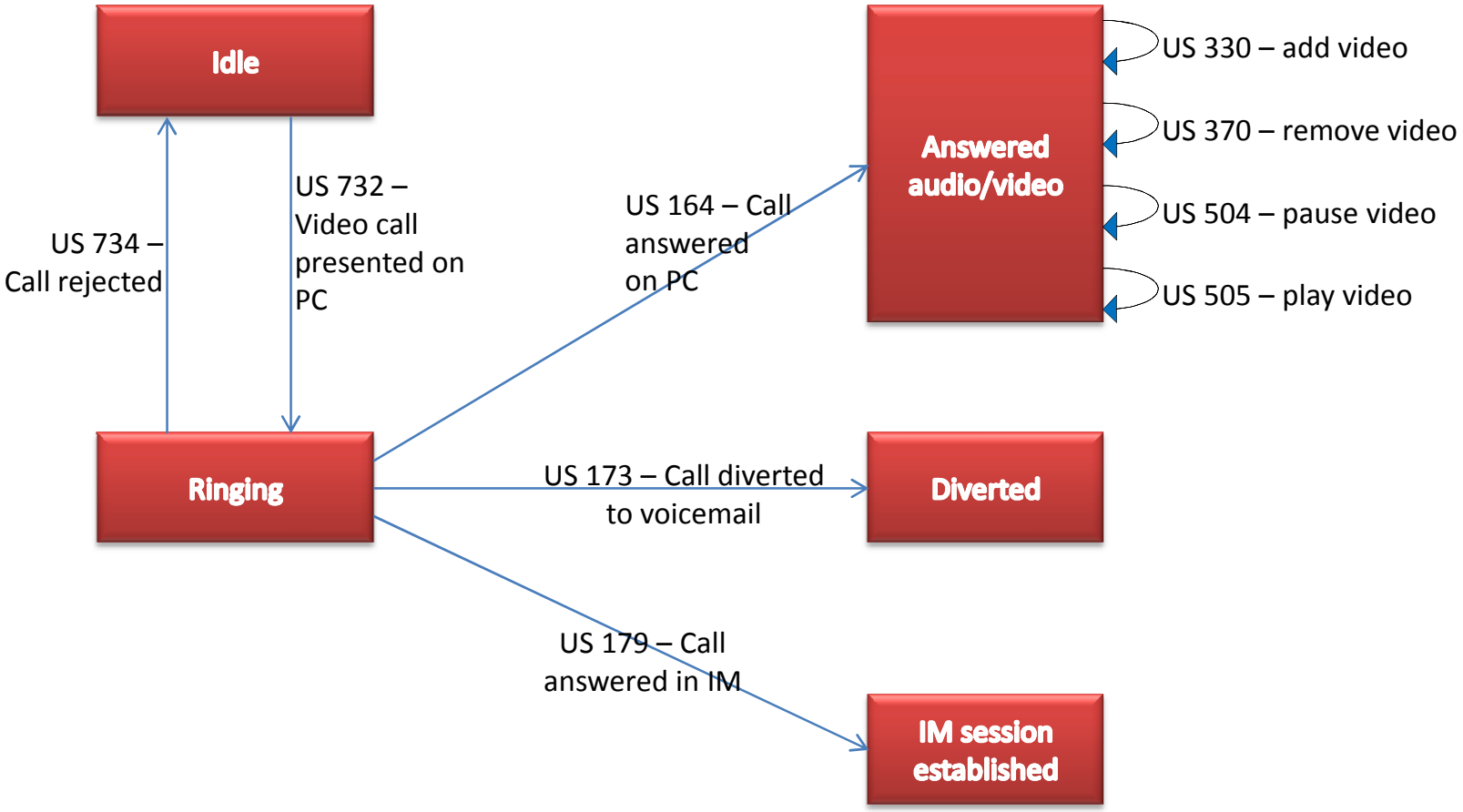
High-level modeling : a first step to Model-Based-Testing



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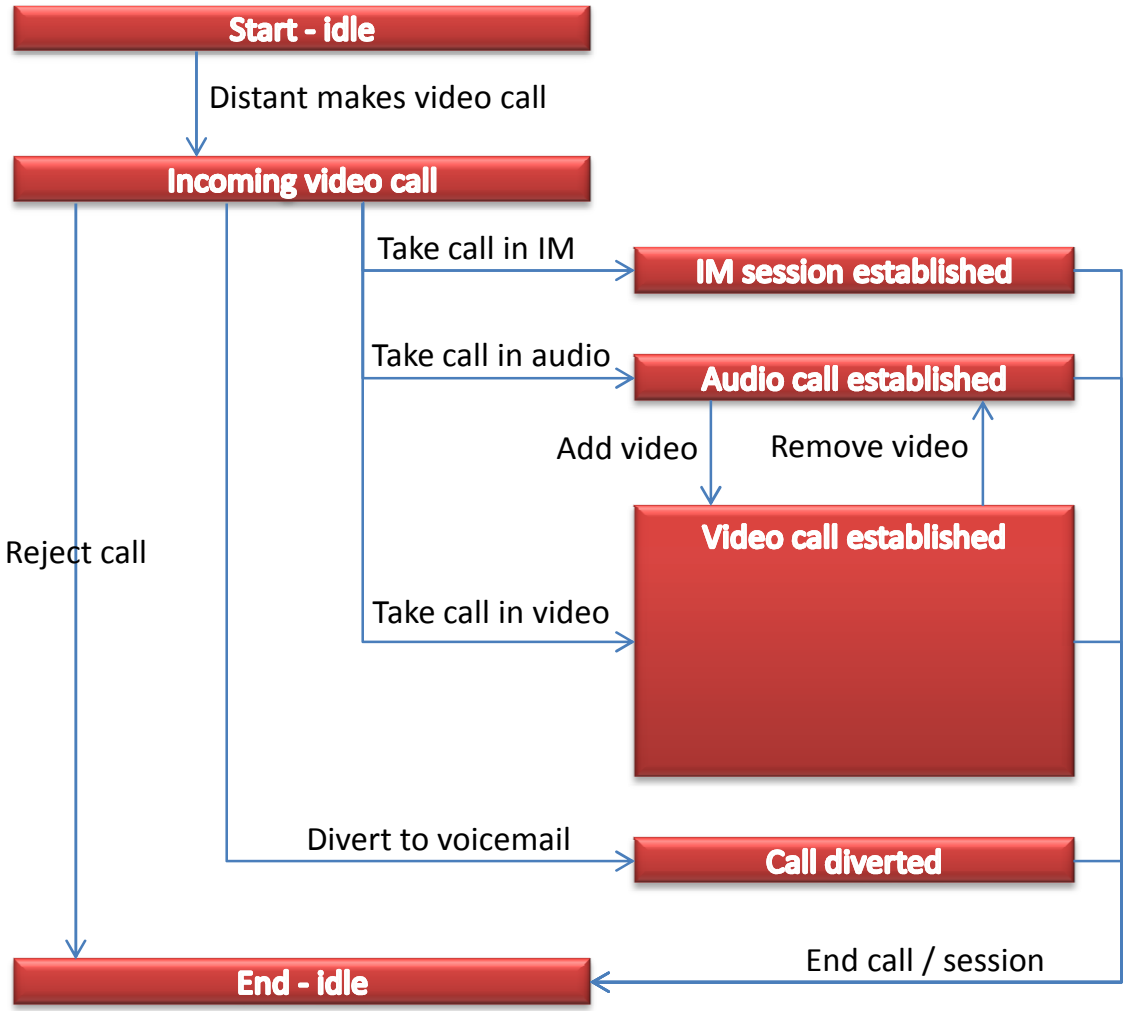
Model-Based-Testing - application to video feature (1)



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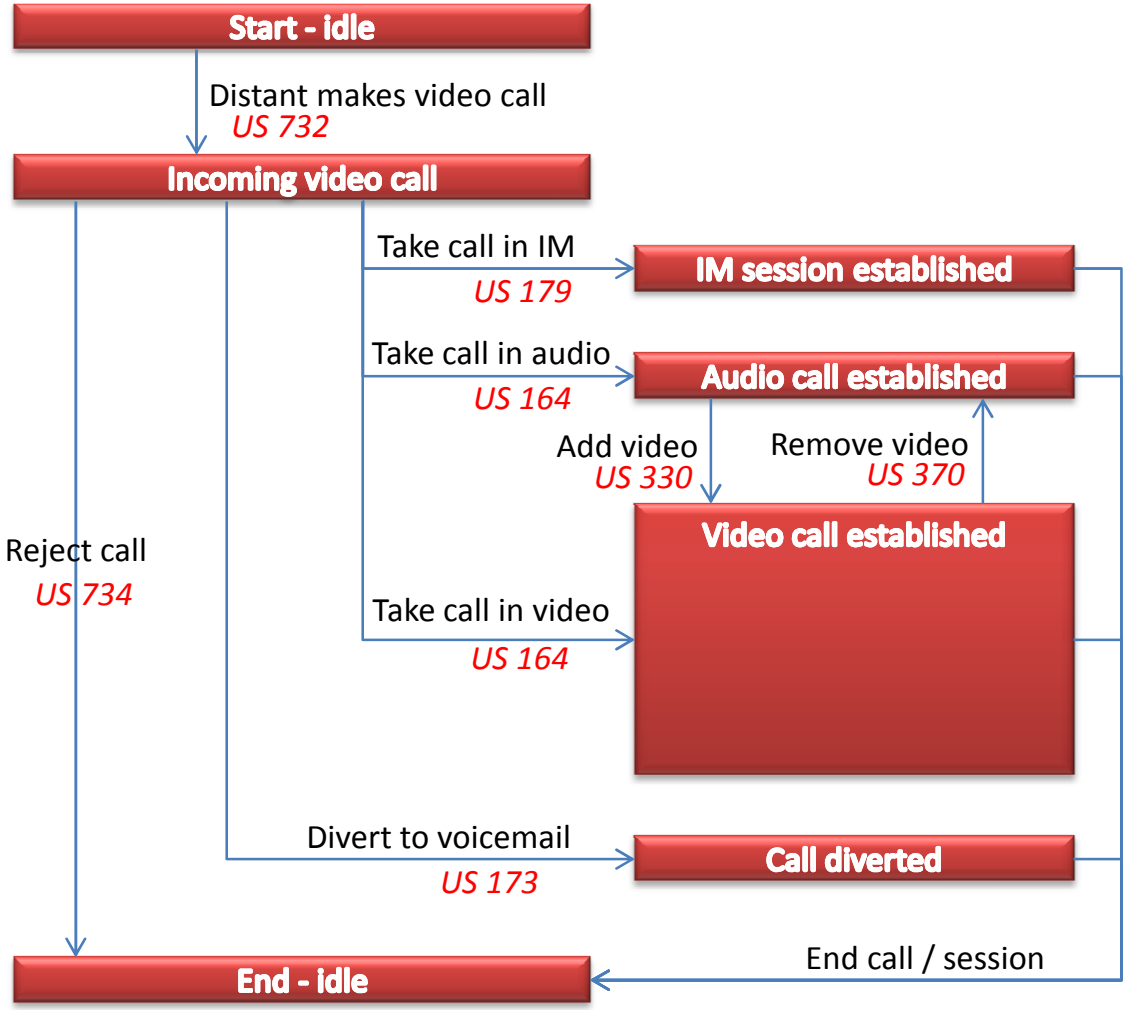

Requirements:

US 732 – Video call presented

US 179 – Call answered in IM
US 164 – Call answered on PC

US 330 – Add video
US 370 – Remove video

US 173 – Call diverted to VM
US 734 – Call rejected

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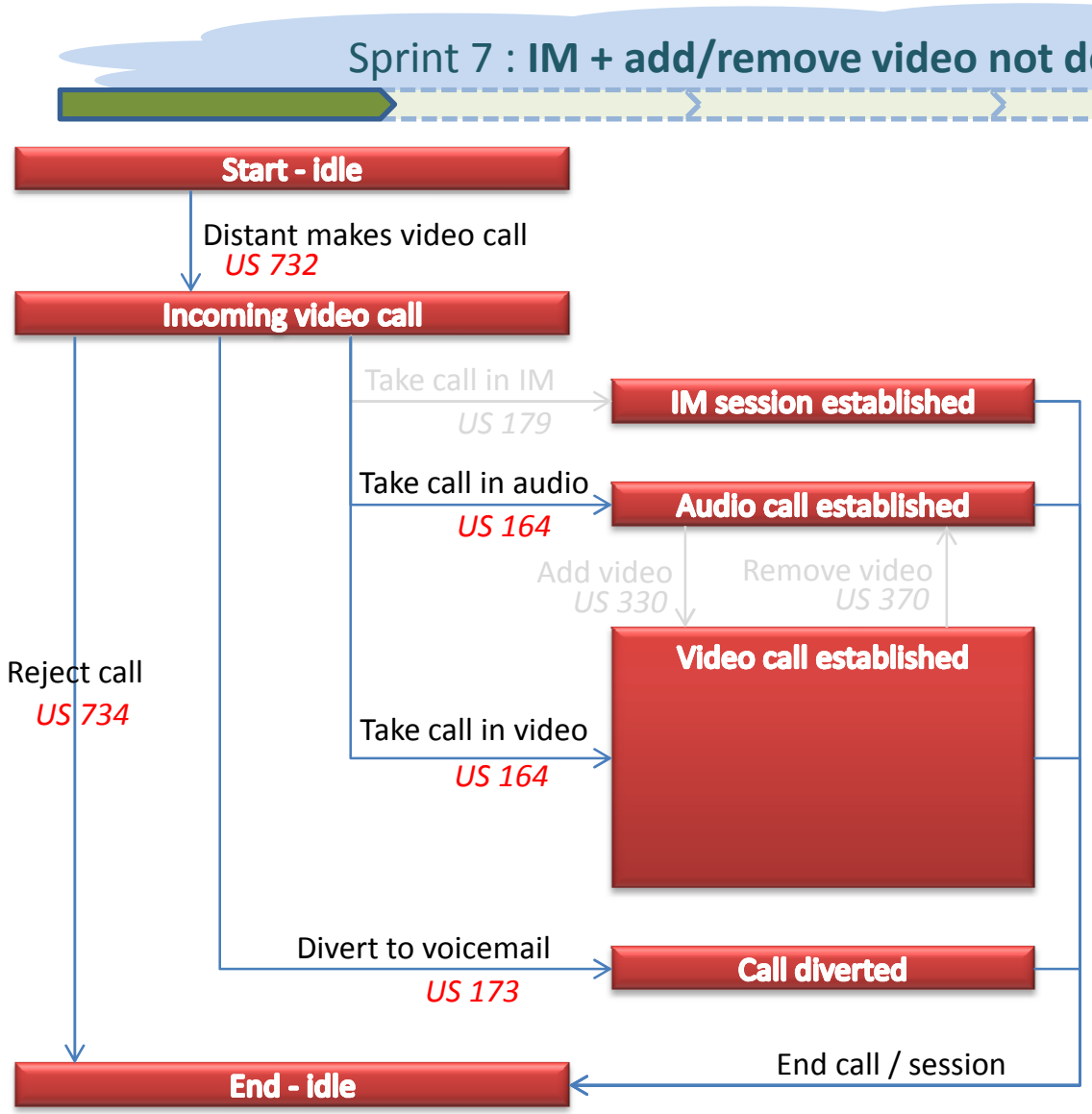
Model-Based-Testing - application to video feature (1)



Requirements:

US 732 – Video call presented ✓

US 179 – Call answered in IM ✗
US 164 – Call answered on PC ✓

US 330 – Add video ✗
US 370 – Remove video ✗

US 173 – Call diverted to VM ✓
US 734 – Call rejected ✓

CONFORMIQ Automated Test Design™

25 tests generated

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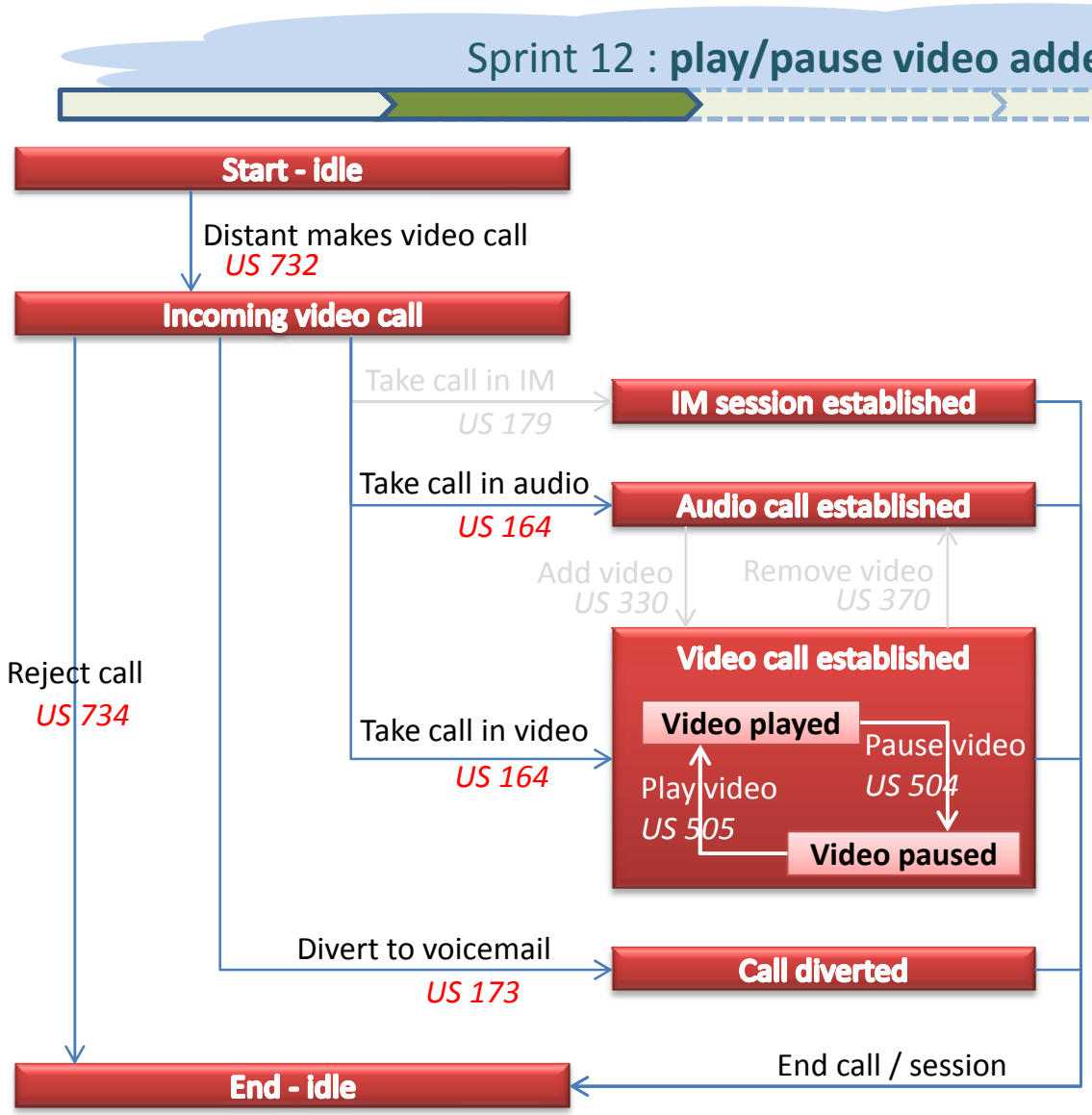
Model-Based-Testing - application to video feature (2)



Requirements:

US 732 – Video call presented ✓

US 179 – Call answered in IM ✗
US 164 – Call answered on PC ✓

US 330 – Add video ✗
US 370 – Remove video ✗
US 505 – Play video ✓
US 504 – Pause video ✓

US 173 – Call diverted to VM ✓
US 734 – Call rejected ✓

30 tests generated
(+ 5 tests)

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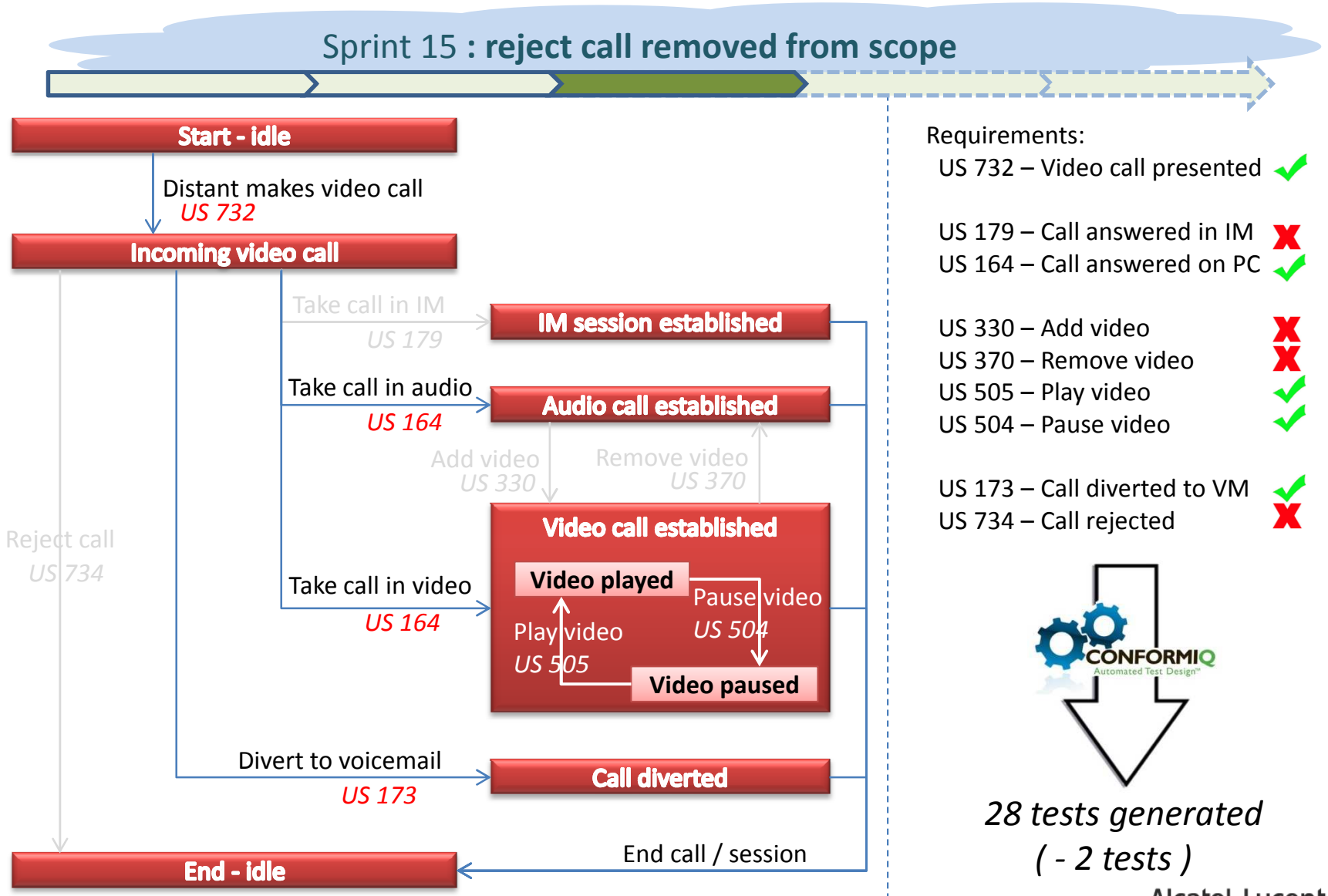
Model-Based-Testing - application to video feature (3)



Requirements:

US 732 – Video call presented ✓

US 179 – Call answered in IM ✗
US 164 – Call answered on PC ✓

US 330 – Add video ✗
US 370 – Remove video ✗
US 505 – Play video ✓
US 504 – Pause video ✓

US 173 – Call diverted to VM ✓
US 734 – Call rejected ✗

CONFORMIQ Automated Test Design

28 tests generated
(- 2 tests)

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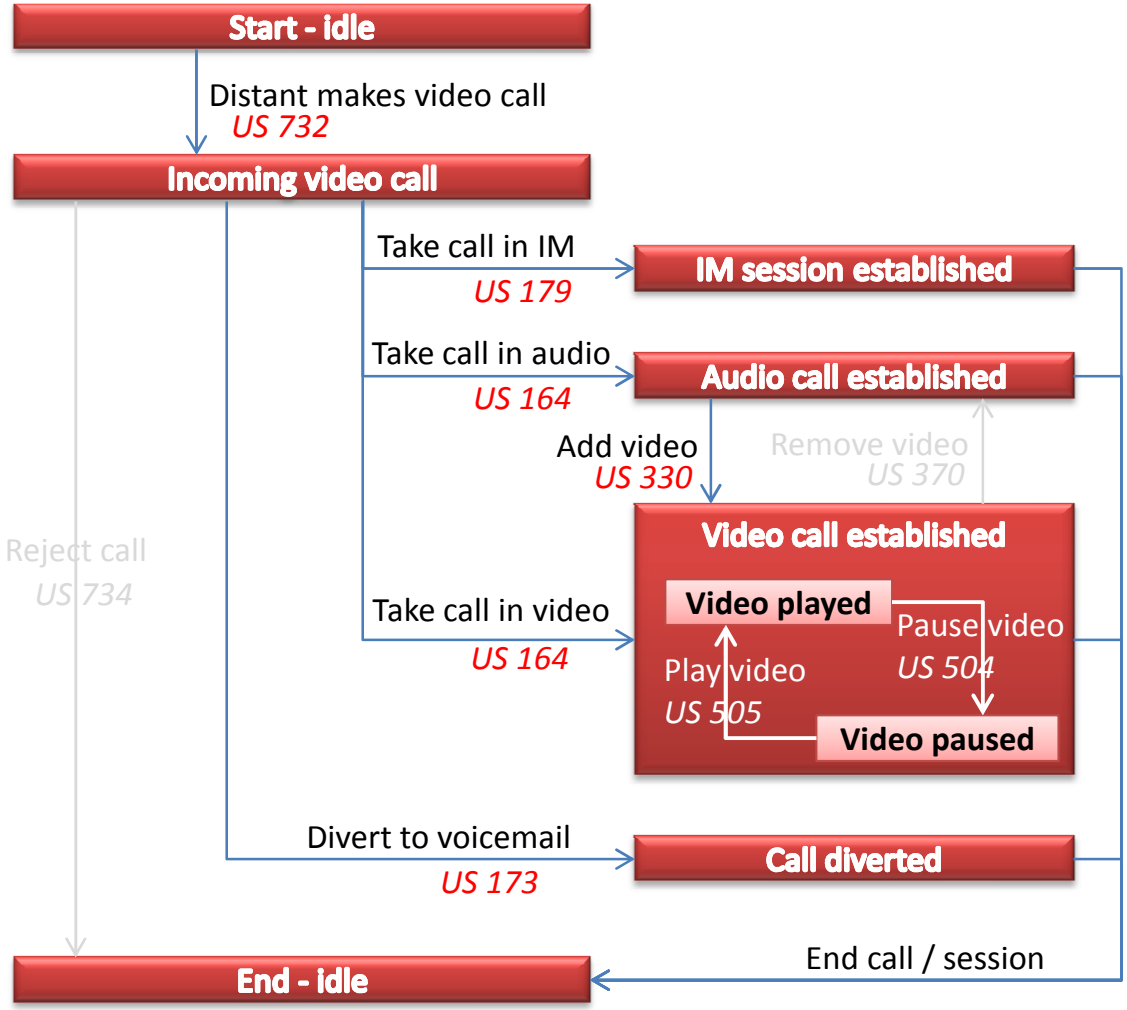
Model-Based-Testing - application to video feature (4)

Sprint 19 : **IM + add video finally delivered !**



Requirements:

US 732 – Video call presented ✓

US 179 – Call answered in IM ✓
US 164 – Call answered on PC ✓

US 330 – Add video ✓
US 370 – Remove video ✗
US 505 – Play video ✓
US 504 – Pause video ✓

US 173 – Call diverted to VM ✓
US 734 – Call rejected ✗

CONFORMIQ Automated Test Design™

36 tests generated
(+ 8 tests)

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Tests generation – **Automatic and manual tests**

- High level scripts automatic generation

```
source(findFile("scripts","QT_Video.js"));

function main(){
beginSetup();
in_initConfiguration( "OTUser1", "OTUser2NotFavorite", "no", "", "no", "");
// requirement: Preconditions/User/User is/OTUser1// (covered)
// requirement: Preconditions/Distant/User is/OTUser2NotFavorite// (covered)
// requirement: Preconditions/User/Active Call/No active video call// (covered)
// requirement: Preconditions/Distant/Forward/No forward// (covered)
// requirement: Preconditions/Distant/Active call/No active call// (covered)
// requirement: Preconditions/User/Forward/No forward// (covered)
in_CorrespondantMakeAVideoCall( "OTUser2NotFavorite", "OTUser1");
// requirement: Transitions/OTCStartedUsersLoggedIn - CorrespondantMakeACall -> IncomingCallToastDisplayed// (covered)
// requirement: User Stories/Epic 38 video/732 - PC ringing - toast for video// (covered)
// requirement: User Actions/Idle/Incoming video call// (covered)
out_ToastDisplayed( "OTUser1", "OTUser2NotFavorite", "video");
out_ConvCardCreatedInWall( "OTUser1", "OTUser2NotFavorite");
in_UserAnswerInIMFromToast( "OTUser1", "OTUser2NotFavorite");
// requirement: User Stories/Epic 39 video advanced functionalities/179 - incoming video - answer in IM// (covered)
// requirement: User Actions/Incoming video call/From toast/answered in IM// (covered)
out_IMSessionOpened( "OTUser1", "OTUser2NotFavorite");
in_CloseIMSession( "OTUser1", "OTUser2NotFavorite");
// requirement: User Actions/IM established/Close IM// (covered)
out_IMSessionWindowClosed( "OTUser1", "OTUser2NotFavorite");
out_ConvCardNoMoreActiveInWall( "OTUser1", "OTUser2NotFavorite");
endSetup();
}
```

Tests generation – **Automatic and manual tests**

- High level scripts automatic generation

```
2  source(findFile("scripts","QT_Video.js"));
3
4  function main(){
5  beginSetup();
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9  // requirement: Preconditions/User/Active Call/No active video call// (covered)
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27 endSetup();
28 }
```

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Some figures

- **Modeling :**
  - ✓ Project total size : 43 families, 605 user stories
  - ✓ Candidates for MBT : 22 families, 250 user stories
  - ✓ Yet modeled : 14 families, 133 user stories

- **Regression automatic tests campaign**
  - ✓ 10 sub-campaigns
  - ✓ 364 tests operational and running

- **Bug reports**
  - ✓ 107 bug reports thanks to automatic tests
  - ✓ ~ 60% found during modeling / test automation development phase
  - ✓ ~ 40% are regressions found with automatic tests campaign

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Lessons learned

- Model brought at the **project level**
  - ✓ **Overall view** of user stories
  - ✓ **Rigor** in user stories writing
  - ✓ Help for planning, development, QA

- MBT in agile process
  - ✓ **Confidence** in tests coverage
  - ✓ Big **focus on automation**
  - ✓ **Rigorous** implementation of libraries

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Back-up slides

Tests generation – **Automatic and manual tests**

- High level library skeleton automatic generation

```
26  /**
27   * DESCRIPTION_HERE
28   *
29   * @param who   can take values "OTUser2NotFavorite", "OTUser7Favorite", "Anonymous". DESCRIPTION_HERE
30   * @param callee    can take values "OTUser1". DESCRIPTION_HERE
31   *
32   * @return nothing
33   * @throws nothing
34   */
35  function in_CorrespondantMakeAVideoCall(who, callee)
36  {
37      try
38      {
39
40      }
41      catch(e)
42      {
43          test.fail(calleeFunction(arguments), e);
44      }
45  }
46
47  /**
48   * DESCRIPTION_HERE
49   *
50   * @param who   can take values "OTUser1". DESCRIPTION_HERE
51   * @param Distant   can take values "OTUser2NotFavorite", "OTUser7Favorite", "Anonymous". DESCRIPTION_HERE
52   *
```

Tests generation – **Automatic and manual tests**

- Manual tests Excel file generation – steps of description / expected result

Test Name	Description	Step Name	Step description	Expected Result
005_IncomingVideoCallFromOT7_AnswIM_CloseIMSess	Covered user stories: Epic 38 video/732 - PC ringing - toast for video Epic 39 video advanced functionalities/179 - incoming video - answer in IM	Step 1	Incoming video call from OTUser 7 in favorite list	Incoming video Call toast Displayed - Conv Card corresponding to the conversation created in the wall -
		Step 2	User answer in IM through the toast of incoming video call	IM Session Opened -
		Step 3	User close the IM session	IM session closed

Problematics

- **Manual tests - one generation ?**
  - Brand new campaign at each new generation
  - Redundant work for tester
  - Only one generation, with tests partly postponed ?

- **Automatic (and manual) campaign status**
  - **One test** covers **several user stories**
  - Failed test, how to easily identify the impacted user story ?

MBT in agility process – conclusion

- **Agile process, a new way of working**
  - User stories can evolve
  - New user stories can be added
  - Decisions to scope-out some user stories

MBT, for a fast update of test plan

- ✓ Statecharts modification
- ✓ Generation triggers re-calibration
- ✓ New test plan generation

- **Traceability : management strong request !**

User stories as requirements in statecharts

- ✓ Possibility to use them as triggers
- ✓ Each test includes the user stories it covers

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