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“Oops” is not a valid answer

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Nieuwegein

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Classification: General



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Purpose

Sharing how testing on embedded software is flavored and conducted.





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Agenda

- About Irdeto
- Explanation of a Conditional Access System
- Flavouring
- Test environments, tools, types & lifecycle
- Recap and future



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About Irdeto

- Started in 1969 by Ir. den Toonder in Dordrecht
- Pioneered the very first Conditional Access (CA) system for digital TV
- 3 product lines: DVB, IPTV & Mobile
- Shipping more than 12 million cards per year
- Solid 3rd player in the market





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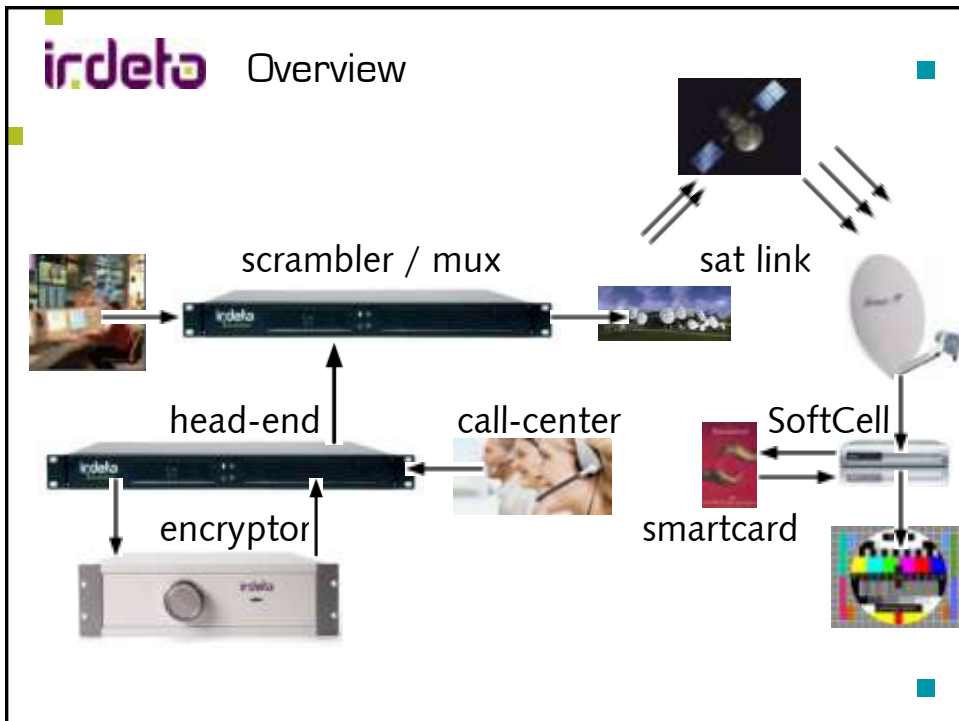
CA System

The purpose of a CA system is to provide ACCESS to its content under CONDITIONS (read \$).

Requires integration into a bigger system that is based on Digital Video Broadcasting (DVB).

(3rd party scrambler, service information)





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\$18.2 billion loss



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Money, $750.000 \times \$100 = \dots$





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Why oops is not allowed

- Piracy; the enemy of monthly revenue
- Scrambling- failure is not allowed by studio's
- New functionality should not jeopardize existing functionality; sustain existing functionality is a MUST
- Smartcard swap is very, very expensive



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Isolated Environment

Automated testing with Conclusion Tool (Collis)

- Advantages:
 - universal test platform, simple basic scripts, very flexible, focus on bit-level, no user actions, quick
- Limitations:
 - single tests, poor time measurement



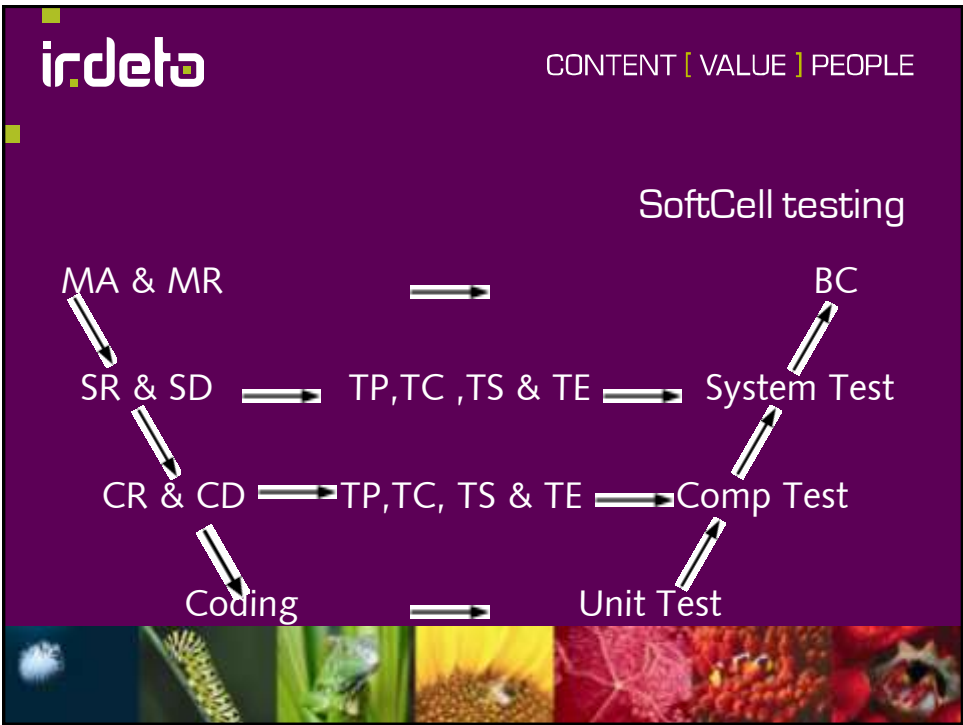
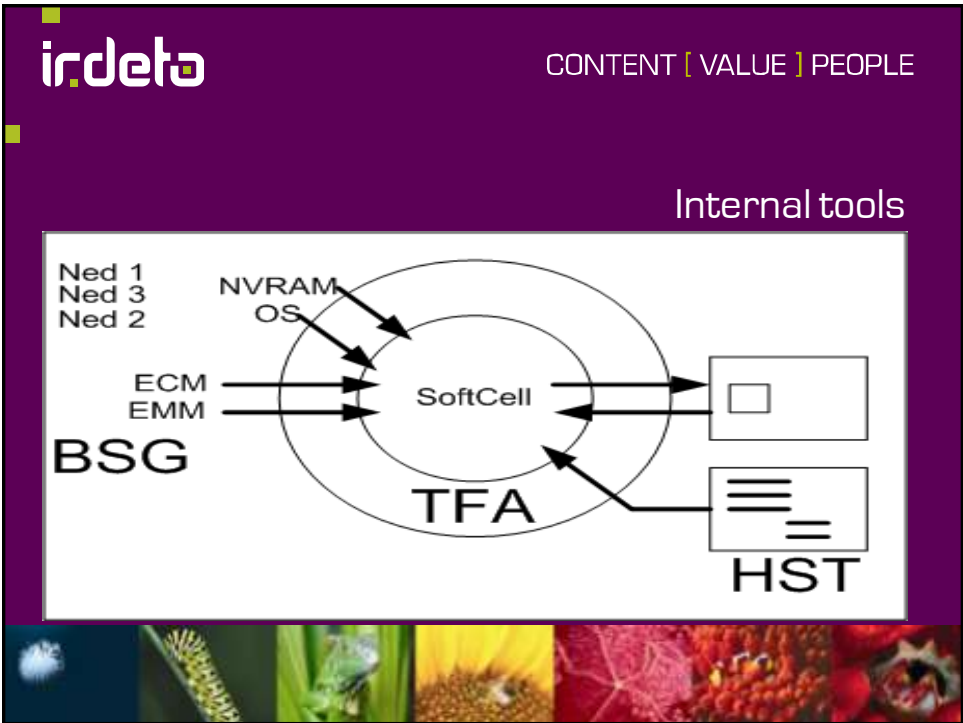
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Live Environment

Complete system to represent the real world

- Advantages:
 - multiple processes running simultaneously (triggers), normal stress-load on the system
- Limitations:
 - difficult to simulate 'heavy' test scenarios, user actions required, time consuming







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SoftCell testing specifics

- Intake test (10%) > new functionality (30%) > regression test (70%) > bug fixes
- Testing with a tool needs to be followed-up
- New decoder implementations need to be verified in separate process



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Embedded testing highlights

- Partial product = more test types
 - focus on functionality & implementation
 - high number of tests; automation required
- Lack of (User) Interfaces
 - testing with tools is a must, but a fool...
 - functional expertise is required, focus on low level bits & bytes



Embedded testing in the future

- SW solutions preferred over HW solutions
- Smartcard will be integrated in decoder (SW)
- Better SW protection required as SW solutions are prone to piracy



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Questions?

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THANK YOU!

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