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How you choose the right level of quality for your non-functional requirements – the QUPER model

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very bad bad good very good

worse
expensive
slower

better
cheaper
faster

“The mp3 player shall start to play music in 2.5 seconds”

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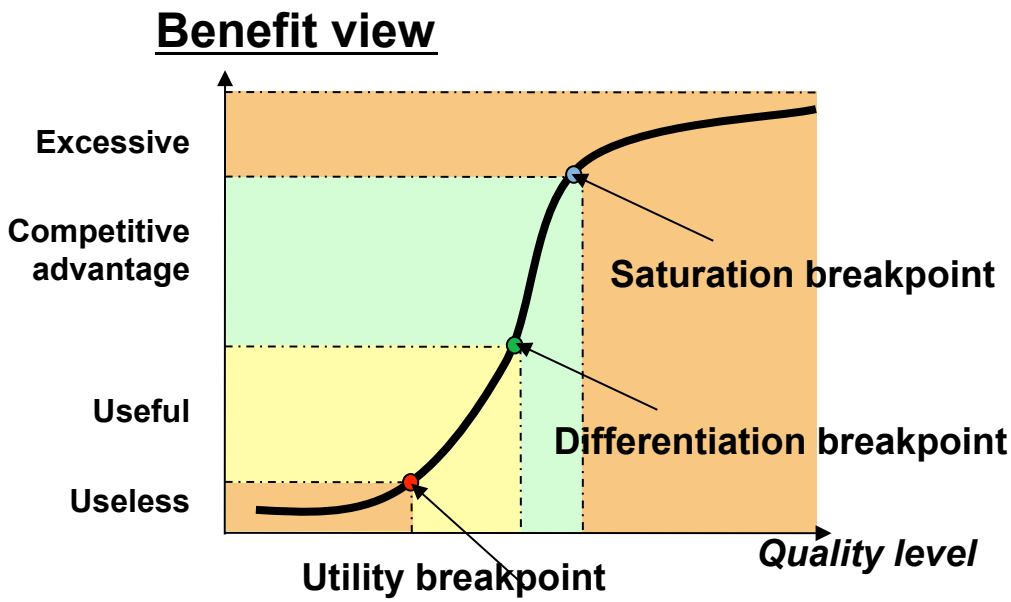
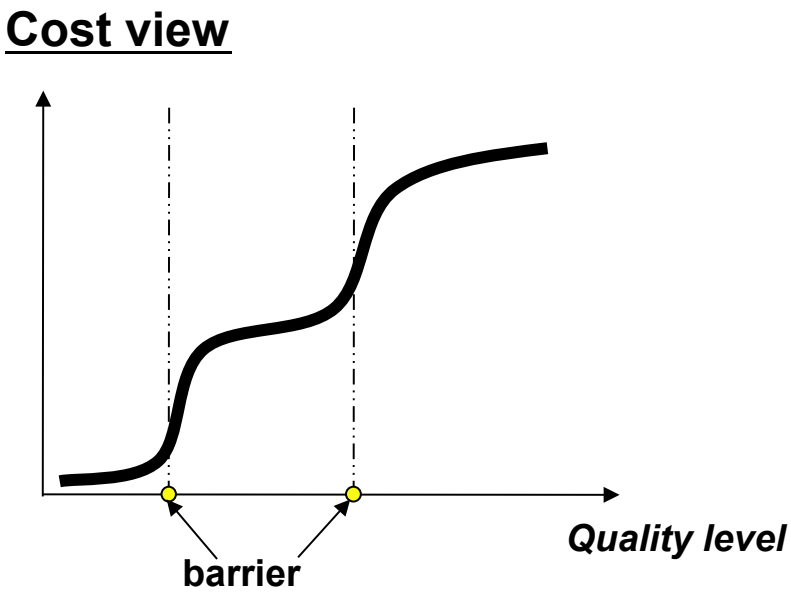
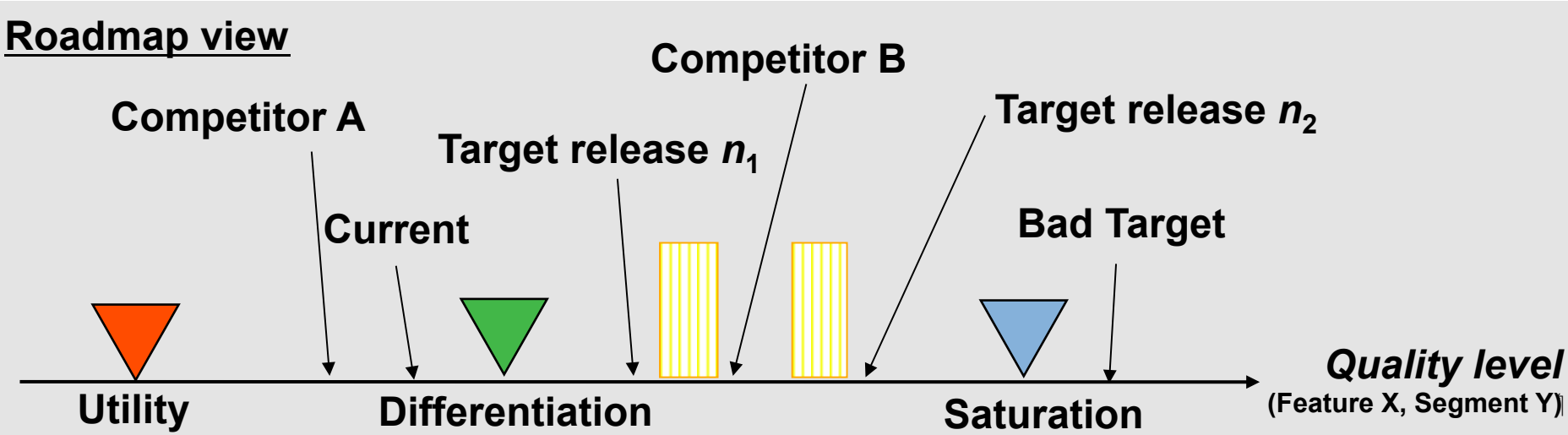
QUality PERformance (QUPER) model







Practical Guidelines

FEATURE: Mobile TV Time Shift
ID: MTV_12
QUALITY REQUIREMENT: Time shift buffer size

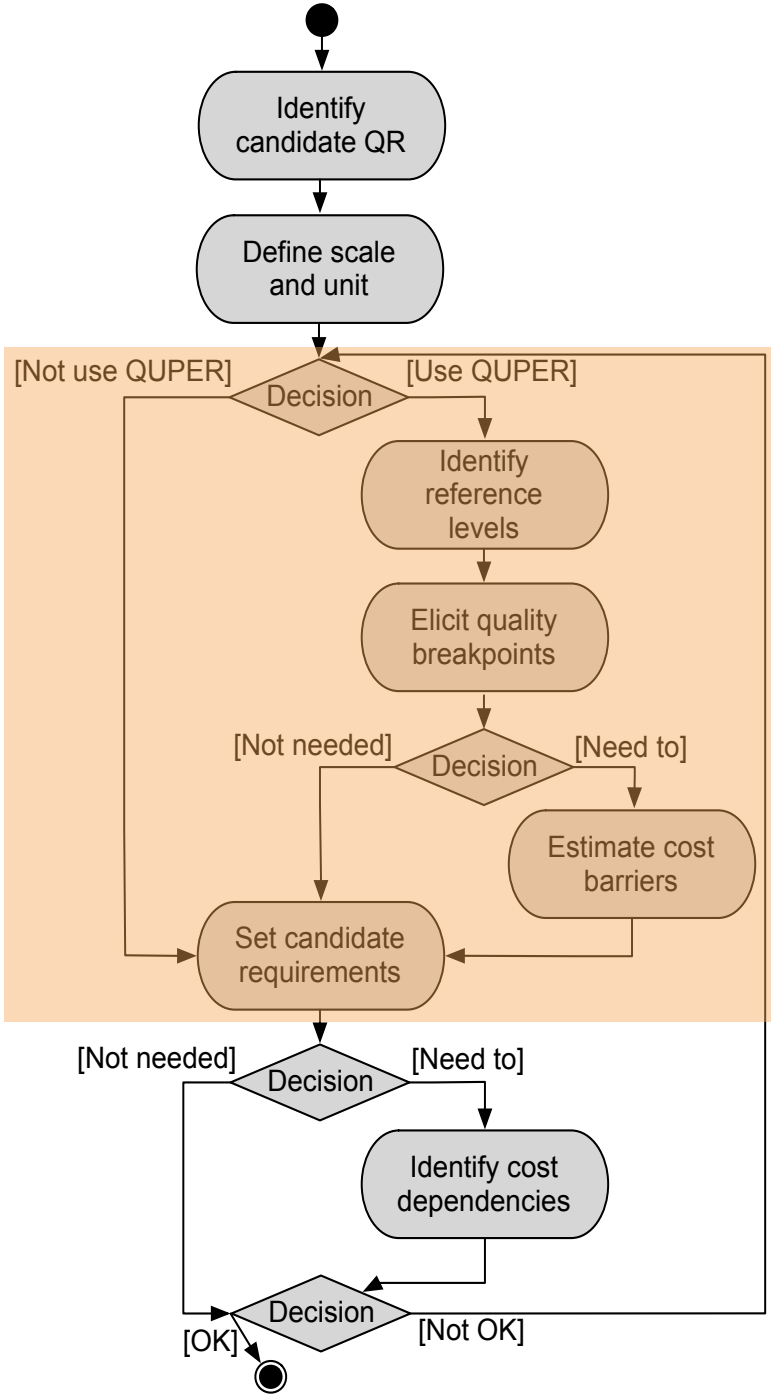
DEFINITION: The number of minutes of HDTV buffered

REFERENCE LEVELS
PRODUCT: Competitor X **LEVEL:** 20 min
PRODUCT: Own product Y **LEVEL:** 40 min
PRODUCT: Competitor Z **LEVEL:** 160 min

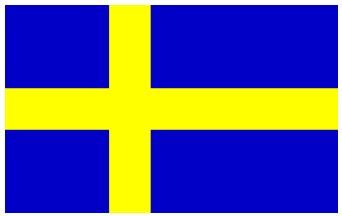
QUALITY BREAKPOINTS
UTILITY: 15 min **RATIONALE:** all products are able
SATURATION: 200 min **RATIONALE:** films are shorter
DIFFERENTIATION: 50 min **RATIONALE:** high price point

BARRIER
Qref: 40 min
Q1: 90 min **RATIONALE:** new SW architecture needed
C1: 4 weeks
Q2: 180 min **RATIONALE:** new HW component needed
C2: 24 weeks

TARGET
GOOD: 80 min **RATIONALE:** will beat most
STRETCH: 90 min **RATIONALE:** if SW architecture is feasible

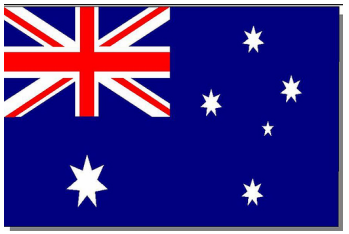


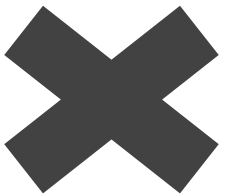
QUPER in Industry



Part of development
‘BV’ + ‘RV’
2008

Introduced
‘BV’, ‘CV’, ‘RV’
2009





Presentation
‘BV’ + ‘RV’
2009

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Quality indicator: Time to play music
Definition: Measured from player invoke button pressed until music is played using 2 GB memory with 100 tracks with average duration of 3 min

Current reference products
Competitor product X: 4 seconds
Competitor product Y: 2 seconds
Own product z (Qref): 3 seconds

Current market expectations
Utility breakpoint: 5 seconds
Differentiation breakpoint: 1.5 seconds
Saturation breakpoint: 0.2 seconds

Candidate target
Min target: 2 seconds – This target is possible without new architecture, but needs some software optimization
Max target: 1 second – If we create a new architecture, this target (which is better than differentiation) will be easy to reach. Users might require this level of quality within 2 years.

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Feature	Quality indicator	Measurement	Interface				
Upgradability	Time	Time measured in minutes	P	Q	R	S	T
	Download success rate	Success rate	P	Q	R	S	T
Transaction Processing	Speed A	Time measured in seconds	P	Q	R	S	T
	Speed B	Time measured in seconds	P	Q	R	S	T

Breakpoints	Download success rate (per interface)				
	P	Q	R	S	T
Utility	60	60	60	40	50
Differentiation	90	90	90	75	90
Saturation	100	100	100	80	95

Interface	Qref	Q1	Q2	CB
P	85	90	95	10% of the total software optimization budget
Q	95	90	95	
R	89	90	95	
S	40	90	95	
T	50	90	95	

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Interface	Qref	Good target	Stretch target	Direct cost
P	85	90	100	€273,360
Q	95	90	100	
R	89	90	100	
S	40	80	95	
T	50	80	95	

$$
\begin{aligned}
&(\text{Number of months needed}) \\
&\qquad \times ((\text{number of needed employees})) \\
&\qquad \times (\text{working hours per month}) \\
&\quad = \text{numbers of needed man} - \text{hours}
\end{aligned}
$$

$$
\begin{aligned}
&(\text{Number of needed man} - \text{hours}) \times (\text{cost per hour}) \\
&\quad = \text{direct cost.}
\end{aligned}
$$

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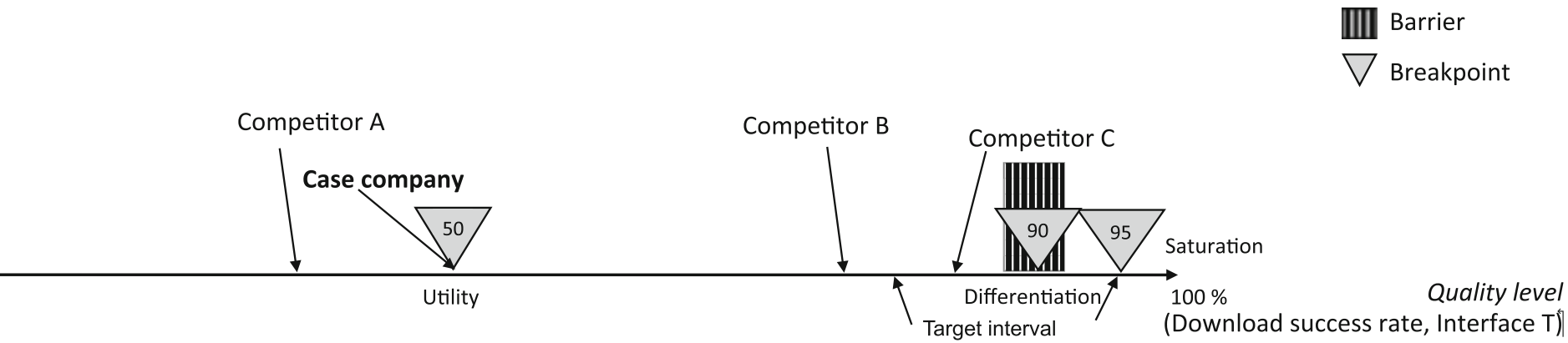

“the QUPER way of thinking is essential because it forces you to know where you stand on the market, what you want to achieve, and how much it would cost you to get there” - A product manager

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Pros and Cons

Strengths

- Same ‘language’
- Understanding the market situation

Weaknesses

- Mainly Performance
- Dependencies

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QUPER Prototype tool

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Do you want to try QUPER?

Contact: rbsv@cs.lth.se

Visit: http://quper.org

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