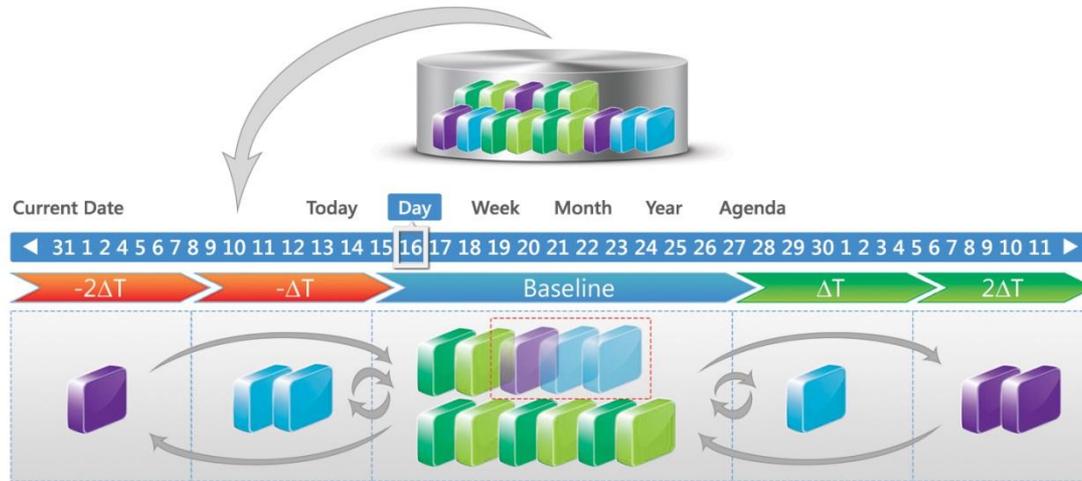


# When-to-release Decisions in Iterative Development

## A Prototype Tool

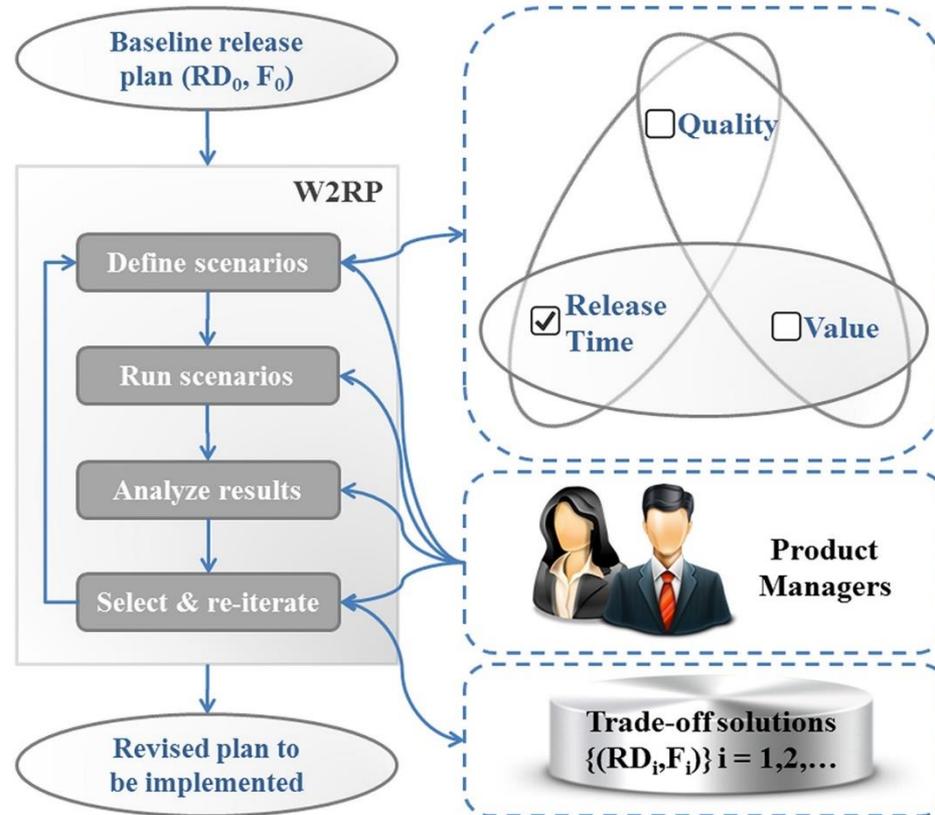
Jason Ho, Shawn Shahnewaz, and Guenther Ruhe  
University of Calgary

- Definitions
  - When-to-release Problem (W2RP)
  - Total Release Value
  - Total Release Quality
- Approach
  - Process Workflow
  - Prototype Implementation
  - Demonstration
- Evaluation - Case Study
- Outlooks
- References
- Q & A



- RQ1: Given a *specific release date*, by varying around a duration, how can we identify an optimized release date?
- RQ2: What is the trade-off between *the value* (stakeholders' satisfaction) and *the assured quality* (reliability) of the release plan?

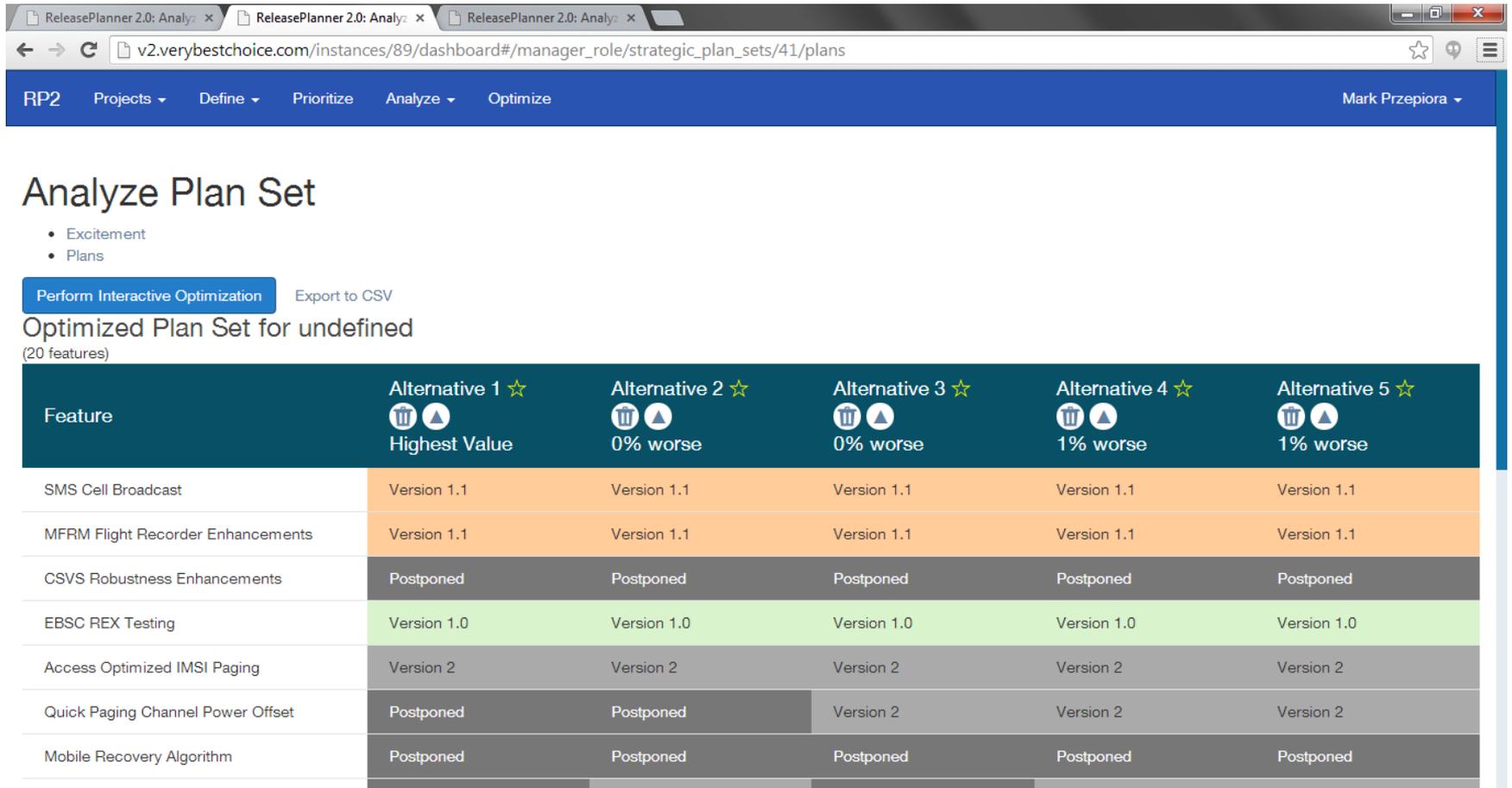
- Time:
  - RD: *Targeted time* to be released by stakeholders (calendar dates)
  - $RD \pm \Delta T$ : The duration in which the release date can be varied to find the *optimized release time*
- Values:
  - Measured by Customers' *weighted satisfaction score*
  - As each feature consumes resources, values is affected by capacity of the resources assigned to that feature set.
- Quality:
  - Approximate expected quality of a release through the result of the effort invested in testing. This relates to number of defects found and fixed [14]
  - By varying the test effort, we can estimate the minimum and maximum release quality by aggregating the quality values of features



**Use case 1:** Fixed feature sets (fix TRV), interactively changing the release date, view predicted release quality (vary TRQ)

**Use case 2:** Interactively vary feature sets (vary TRV), view the predicted release date, at the same TRQ

**Use case 3:** Fix release date, playing what-if scenarios between testing and development efforts



RP2 Projects ▾ Define ▾ Prioritize Analyze ▾ Optimize Mark Przepiora ▾

## Analyze Plan Set

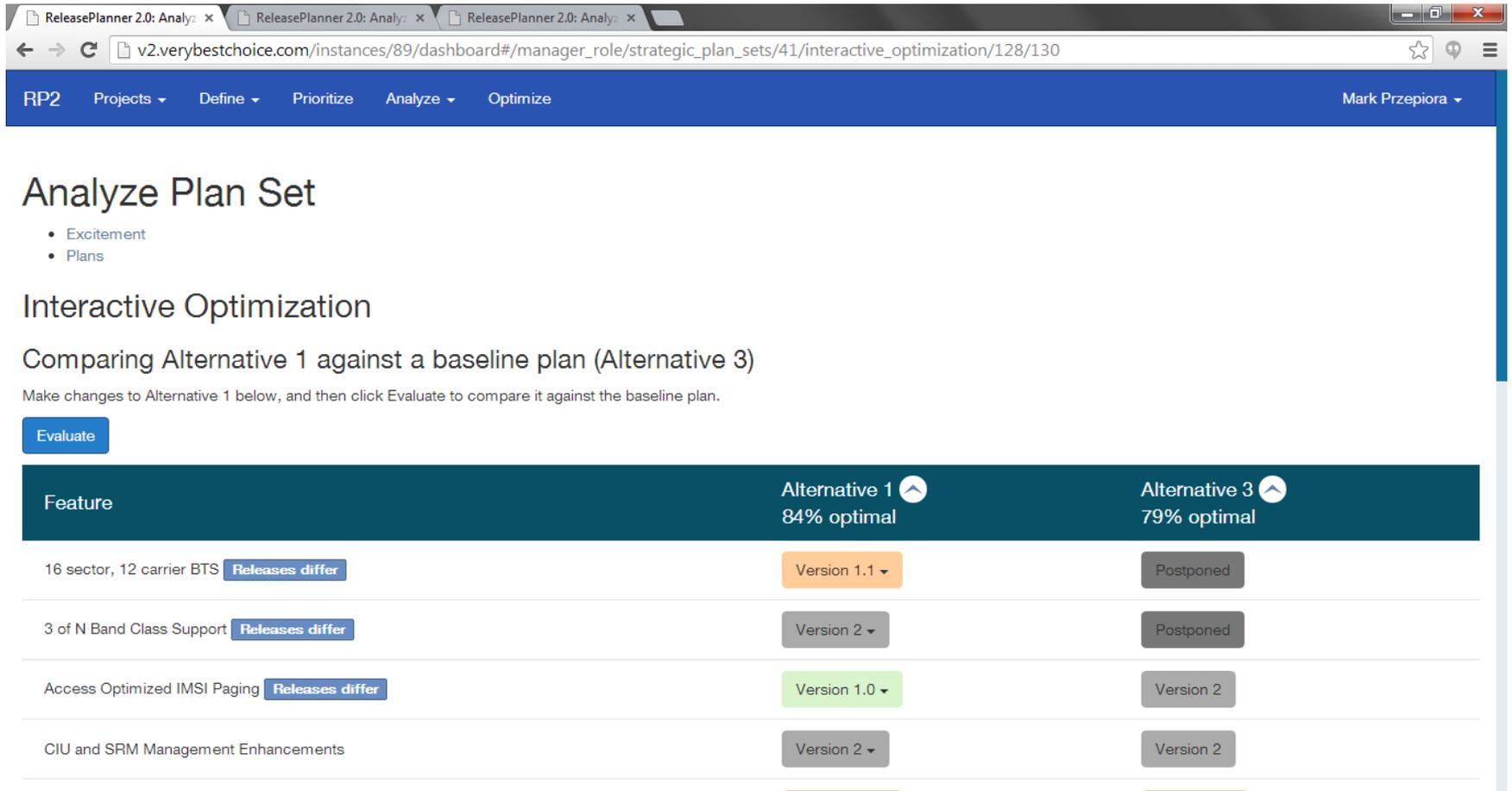
- Excitement
- Plans

Perform Interactive Optimization Export to CSV

### Optimized Plan Set for undefined

(20 features)

Feature	Alternative 1 ☆ Highest Value	Alternative 2 ☆ 0% worse	Alternative 3 ☆ 0% worse	Alternative 4 ☆ 1% worse	Alternative 5 ☆ 1% worse
SMS Cell Broadcast	Version 1.1	Version 1.1	Version 1.1	Version 1.1	Version 1.1
MFRM Flight Recorder Enhancements	Version 1.1	Version 1.1	Version 1.1	Version 1.1	Version 1.1
CSVS Robustness Enhancements	Postponed	Postponed	Postponed	Postponed	Postponed
EBSC REX Testing	Version 1.0	Version 1.0	Version 1.0	Version 1.0	Version 1.0
Access Optimized IMSI Paging	Version 2	Version 2	Version 2	Version 2	Version 2
Quick Paging Channel Power Offset	Postponed	Postponed	Version 2	Version 2	Version 2
Mobile Recovery Algorithm	Postponed	Postponed	Postponed	Postponed	Postponed



ReleasePlanner 2.0: Analyz x ReleasePlanner 2.0: Analyz x ReleasePlanner 2.0: Analyz x

v2.verybestchoice.com/instances/89/dashboard#/manager\_role/strategic\_plan\_sets/41/interactive\_optimization/128/130

RP2 Projects Define Prioritize Analyze Optimize Mark Przepiora

## Analyze Plan Set

- Excitement
- Plans

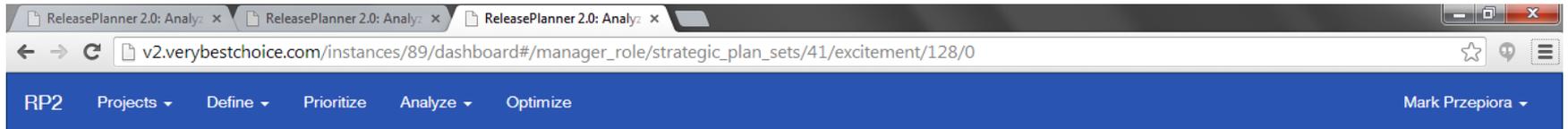
### Interactive Optimization

#### Comparing Alternative 1 against a baseline plan (Alternative 3)

Make changes to Alternative 1 below, and then click Evaluate to compare it against the baseline plan.

Evaluate

Feature	Alternative 1 84% optimal	Alternative 3 79% optimal
16 sector, 12 carrier BTS <span>Releases differ</span>	Version 1.1	Postponed
3 of N Band Class Support <span>Releases differ</span>	Version 2	Postponed
Access Optimized IMSI Paging <span>Releases differ</span>	Version 1.0	Version 2
CIU and SRM Management Enhancements	Version 2	Version 2



## Analyze Plan Set

- Excitement
- Plans

Excitement profile for  and the opinions of each stakeholder about

Excitement Score	Total	Lonnie Cremer	Kornelia Streb	Marylou Viruet	guenther ruhe	Jeanie Linke	Sofia Mazzotta	Christian Gerling	Mark Przepiora	Tia Dauber	Sofia Bencomo	maleknaz	PORKODI THIAGARAJAN
Very Excited	1%	0	0	0	0	1	2	0	0	0	0	1	0
Excited	3%	1	1	0	0	2	2	1	0	1	1	2	0
Neutral	49%	14	17	10	9	10	18	15	16	17	15	16	1
Disappointed	19%	5	4	5	3	5	6	8	7	4	7	8	0
Very Disappointed	16%	4	6	3	1	7	4	2	7	6	3	9	0
Surprised	7%	4	2	0	0	1	1	2	5	1	3	4	0
Very Surprised	4%	3	0	1	0	2	0	0	4	1	2	0	0

When-to-Release Planner 1.0

File Help

## Social Project Manager 1

Project information

**Total Features: 29**  
**Features in current release: 21**  
**Project start date: April 10, 2014**  
**Release duration: 70 Days**

Baseline plan

**TRQ: 5.285 TRV: 136.0 Baseline RD: June 19, 2014**

Name	Value	Testing effort
Feature managem...	6	4
Management of proj...	3	4
Stakeholder manag...	3	2
Resource managem...	8	4
Communications to ...	7	2
Prioritization ...	9	4
Discussion of featur...	9	2
Permissions ...	8	2
Analysis SoPrio ...	7	4
Analysis SPM ...	9	4
Strategic release pl...	8	5
Release time planni...	9	5
Manual plan ...	2	2
Reporting ...	4	4

View Details

Parameters Settings

Range of RD variation:  (Slider: 10 to 30)

Target quality:  (Slider: 75% to 100%)

Defect detection rate:  (Slider: 5% to 20%)

Set Default Values Apply

Timeline Dashboard

Customized Scenarios

**New Release Date: June 09, 2014**

RD: -10d -8d -5d -3d -2d -1d Jun 19 +1d +2d +3d +5d +8d +10d

TRV(%): 70% 75% 80% 85% 90% 95% 100% TRQ(%): 70% 75% 80% 85% 90% 95% 100%

### Trade off Solutions

Type	Del Time	Value	Quality
✓ Varying Quality	-1	136 -1%	
✓ Varying Quality	-2	136 -2%	
✓ Varying Quality	-3	136 -4%	
✓ Varying Quality	-4	136 -5%	
✓ Varying Quality	-5	136 -6%	
✓ Varying Quality	-6	136 -7%	
✓ Varying Quality	-7	136 -8%	
✓ Varying Value	-8	133 0%	
✓ Varying Quality	-8	136 -9%	

Save Compare Solutions Export All Solutions

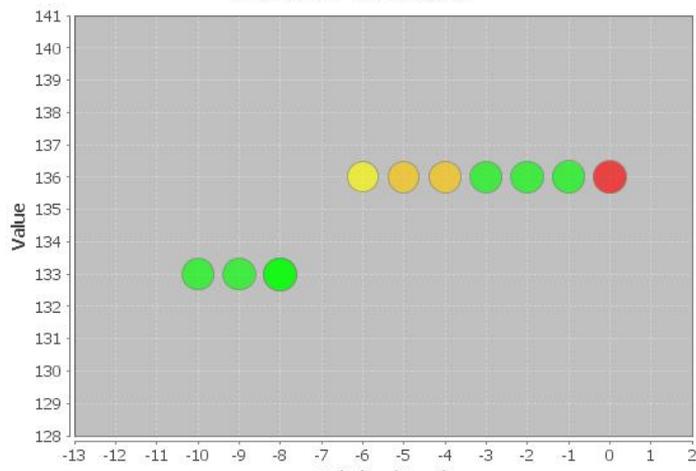
Selected Solution

TRQ: <> TRV: <> New RD: <>

ID	Feature	Value	Initial Test...	Current T...
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View Details Export Plan

### Trade off Solutions



Value

Del Time(Days)

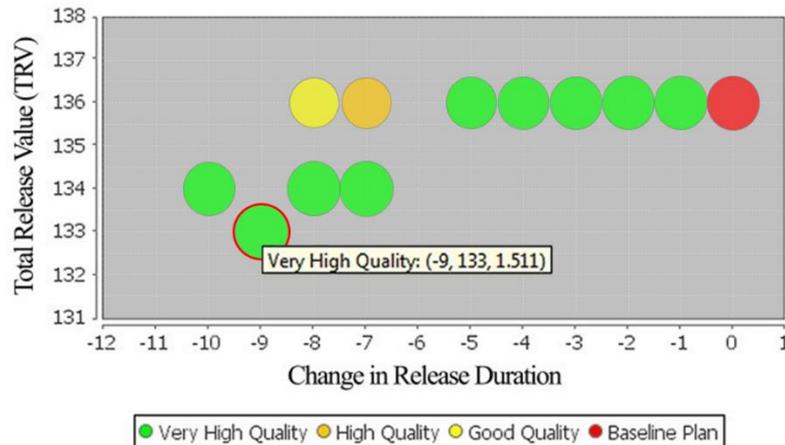
● Very High Quality ● High Quality ● Good Quality ● Baseline Plan

- We evaluate the approach using a Case study from a real life technical product project
- Objectives:
  - Evaluate Optimization approach
  - Collect data on potential Trade-off solutions
- Case set up:

Project Title	Bronco Project
Description	Honeywell's Bronco Project
Maximum Number of Planning Items (Features)	66
Original Release Date $RD_0$	80
Features in next release $F_0$	22
Number of Resources	7
Maximum Number of Stakeholders	40

## ■ Potential trade-off solutions

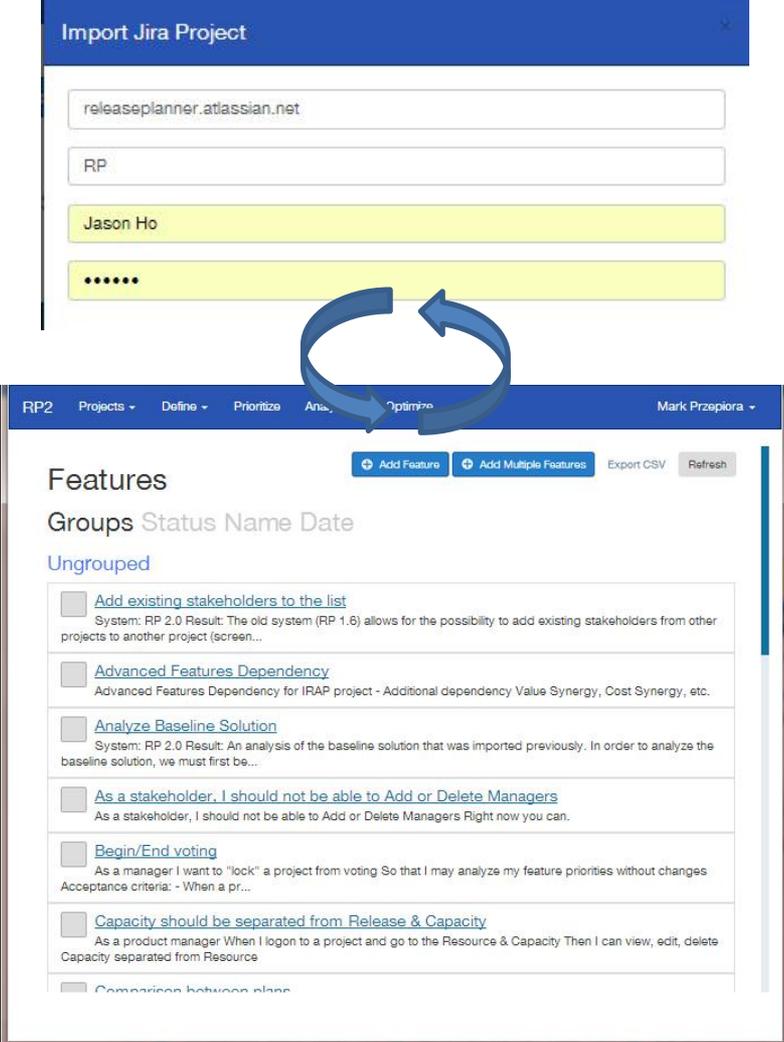
- Maximize Total Release Values  $TRV(F_i)$
- Maximize Total Release Quality  $TRQ(F_i)$
- Minimize Time to release  $RD_i$



Trade off Solutions (TRV = 136)

$\Delta T$	TRV	$\Delta TRV$ (%)	$\Delta TRQ$ (%)	Initial Test effort (person day)	Current test effort (person day)
-1	136	0%	-1%	107	105
-2	136	0%	-2%	107	104
-3	136	0%	-2%	107	103
-5	136	0%	-3%	107	101
-6	136	0%	-4%	107	100
-7	134	-1%	1%	107	101
-8	136	0%	-5%	107	98
-8	134	-1%	1%	107	100
-9	133	-2%	0%	107	102
-9	136	0%	-6%	107	97
2	136	0%	1%	107	109
4	136	0%	3%	107	111
5	136	0%	3%	107	112
6	136	0%	4%	107	113
8	136	0%	6%	107	115
7	144	6%	0%	107	112
9	136	0%	6%	107	116
9	144	6%	1%	107	114

- “Not all defects are created equal”
  - Integration with issues tracking tools (JIRA, Teamtrack, Fogbugz)
- How about Technical Debt and Cross-cutting design concerns?
  - Design  $F_0$  with these concerns as Features with high business value, yet high efforts estimate
- Continuous Release?
  - This design is especially effective for release cycle 2-4 weeks
  - Continuous sync to issues tracking and version control



The image shows two screenshots of a software development tool interface. The top screenshot is titled "Import Jira Project" and contains a form with the following fields: "releaseplanner.atlassian.net", "RP", "Jason Ho", and a password field with six dots. A blue circular arrow icon is overlaid on the bottom right of this form. The bottom screenshot shows a "Features" table with columns for "Groups", "Status", "Name", and "Date". The table is currently empty, with a "Ungrouped" section. Above the table are buttons for "Add Feature", "Add Multiple Features", "Export CSV", and "Refresh". The table content includes several feature entries, each with a checkbox and a description:

Groups	Status	Name	Date
		<a href="#">Add existing stakeholders to the list</a>	
		<a href="#">Advanced Features Dependency</a>	
		<a href="#">Analyze Baseline Solution</a>	
		<a href="#">As a stakeholder, I should not be able to Add or Delete Managers</a>	
		<a href="#">Begin/End voting</a>	
		<a href="#">Capacity should be separated from Release &amp; Capacity</a>	
		<a href="#">Comparisons between plans</a>	

- Software Decision Support Labs (SEDS) - created in July 2001 at the University of Calgary
  - Research team of 10 researchers
  - Research topics: Decision support (systems)
- University start-up company: Expert Decisions Inc. (<http://expertdecisions.com/>)
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