InnoGames

Beyond Spreadsheets:

How to generate operational impact with analytics

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GAME DEVELOPERS CONFERENCE™ EUROPE
CONGRESS-CENTRUM OST KOELNMESSE · COLOGNE, GERMANY
AUGUST 11–13, 2014 · EXPO: AUGUST 11–12, 2014

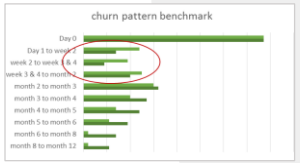
about me …

- Studied **Media Management** with an empirical focus
- 2010-2013 Games Analyst, Lead Games Analyst and Head of Analytics at **Bigpoint** GmbH
- Since 2013 Head of Analytics at **InnoGames** GmbH

about InnoGames …

- Started 2003 as a Hobby-project from our Managing Directors, today the classic Tribal Wars is still growing after 11 years
- F2P-Business-model, started on browser, transition to **cross-platform** developer & publisher
- **330 employees** from 25 nations, 400 until the end of the year
- 130 Mio. registered players, ~**70 million €** in revenues in 2013 (and growing)

about the team …



user-potential & churn-development

define KPIs, benchmark performance

inform relevant stakeholders, identify risks and potentials

consult product owners

WHAT games/ marketing analytics team

support buildup of new data-sets, merge complex data sets

cluster user-segments, predict user-actions

define & analyze A/B- or multivariate tests

HOW data mining team

analytics

WHY market research team

conduct surveys to understand user-motives & needs

differentiate target-groups

perform user tests to explore appeal of products

external market data, market-conditions

churn-patterns & churn-user scoring

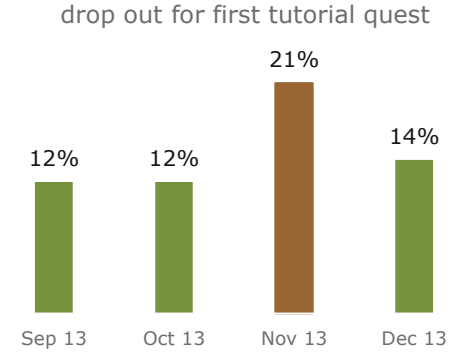
churn-reason survey

spreadsheets are not all that bad …

2 examples of valuable standard-reporting

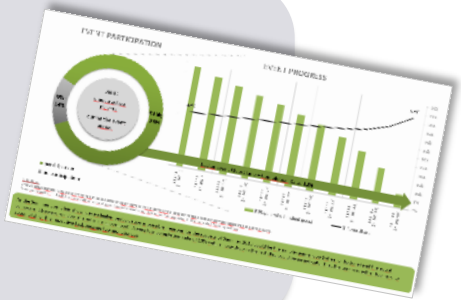
1. **tutorial-conversion-funnel reporting**

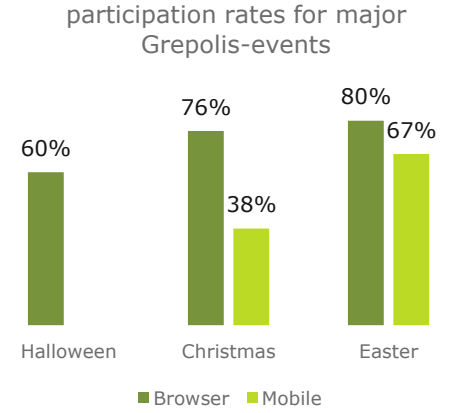
→ 75% higher drop out for FoE in first quest due to synced bug



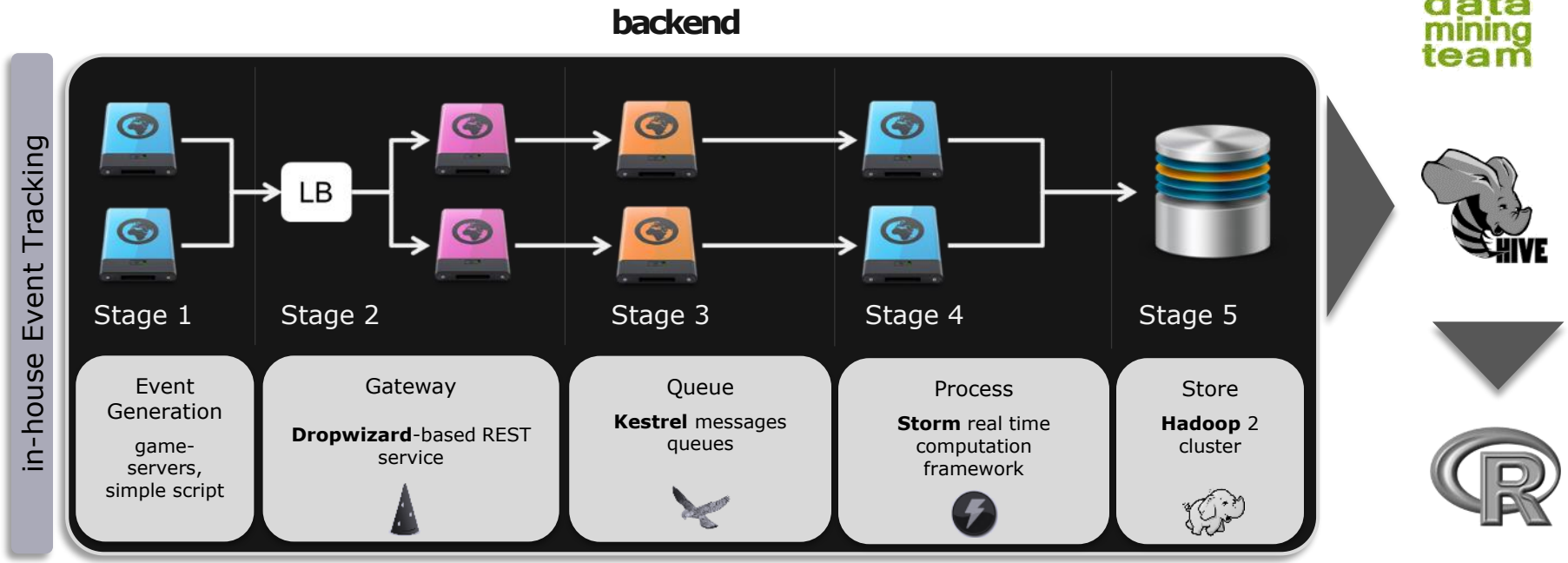
2. **event evaluations**

→ constant improvement of participation rates due to awareness and detail-optimization





still, there's more data …



all stages scale out and use open-source-software

open source

… too good just for fun facts

60 GB new event-data every day

saved on a Hadoop-cluster with currently **44** servers

> 400 M logged events every day

every day …

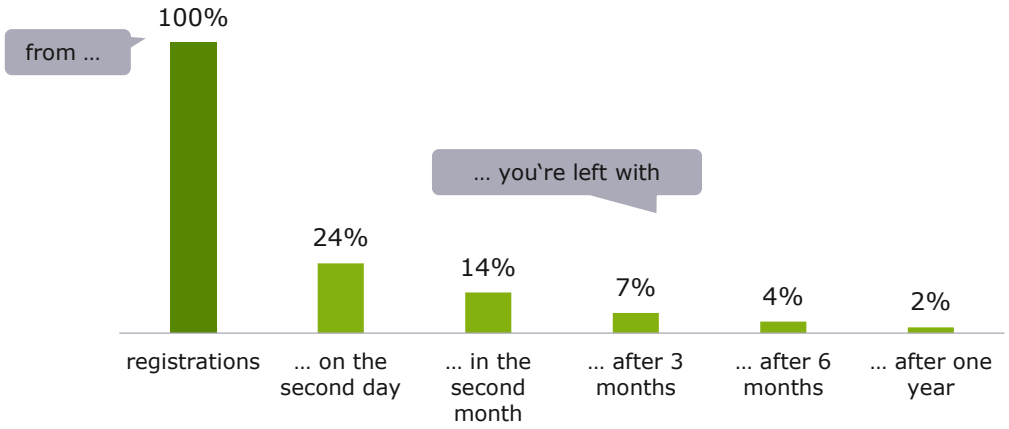
1,1 Mio. hours of InnoGames are played all around the globe

10 Mio. neighbors are visited in Forge of Empires

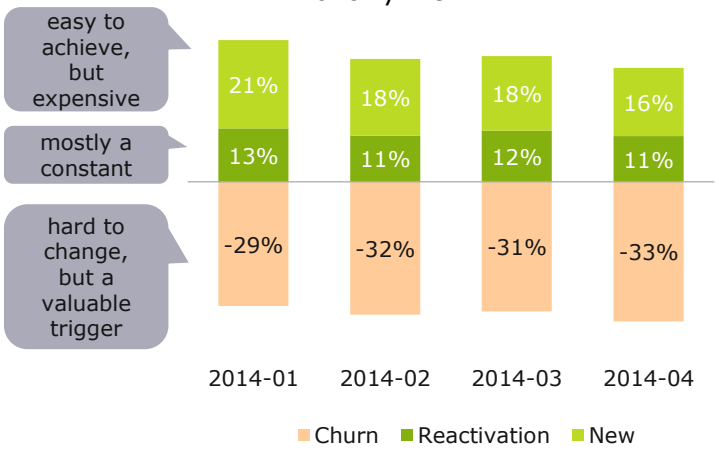
74 Mio. units are recruited in Grepolis

churn: the hard truth about free-to-play

spreading loss is high: cohort-view



a stable user-basis requires constant input: monthly view



churn reasons

Naturally, most churn happens whatever you do …

was conquered/attacked too often, alliance disbanded

boredom, perceived unfairness, not enough freedom, too simple, too complex

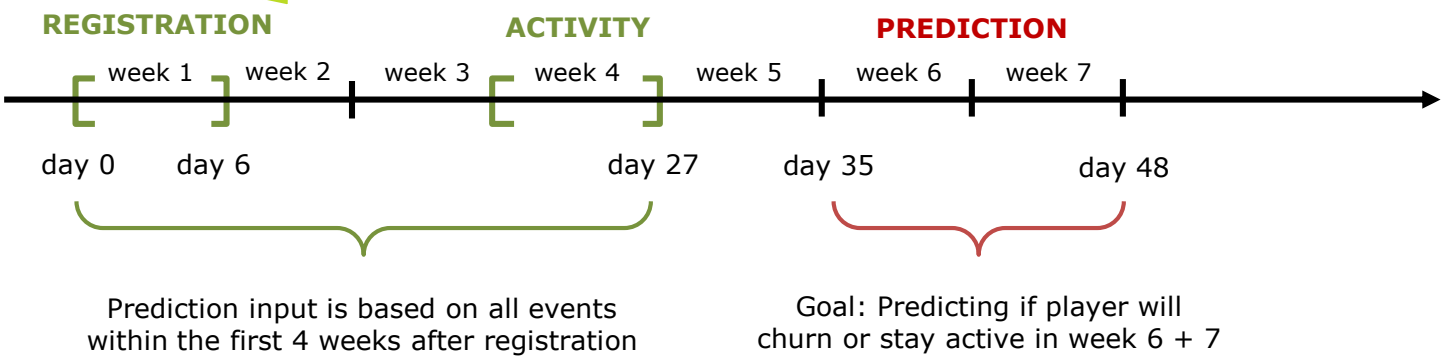
… but there is enough potential where incentives & communication might help

first steps in prediction modelling

GREPOLIS

predict churn of mid-game players at a time where they are still active

43 defined parameters, e.g. playtime, deff-battles, off-battles, completed quests …



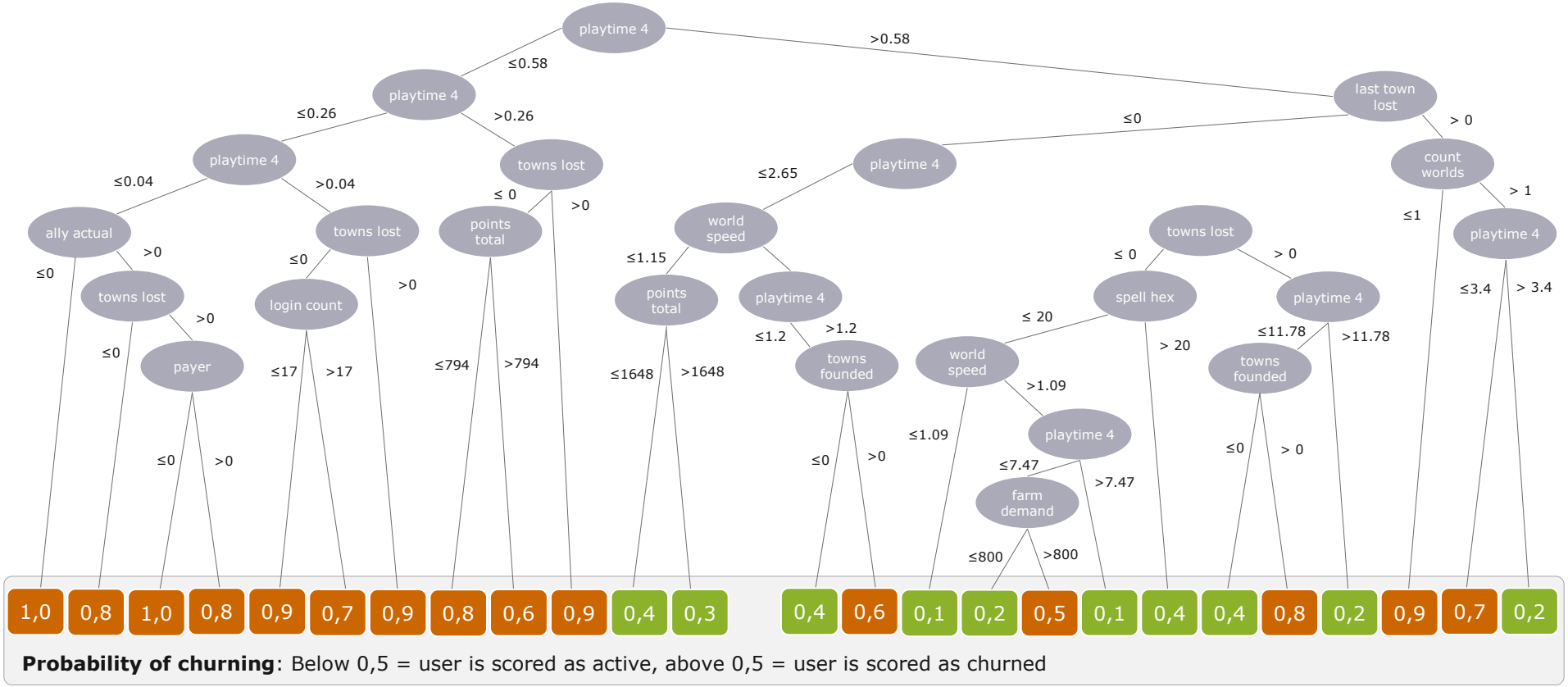
decision tree models
Classification of objects based on decision-rules until ‚optimal' classification is reached

R party-package
works with all types of data, controls for overfitting

benchmark of different parameter-sets to find a sweet-spot between active- and churn-prediction

actually quite simple: a decision tree model

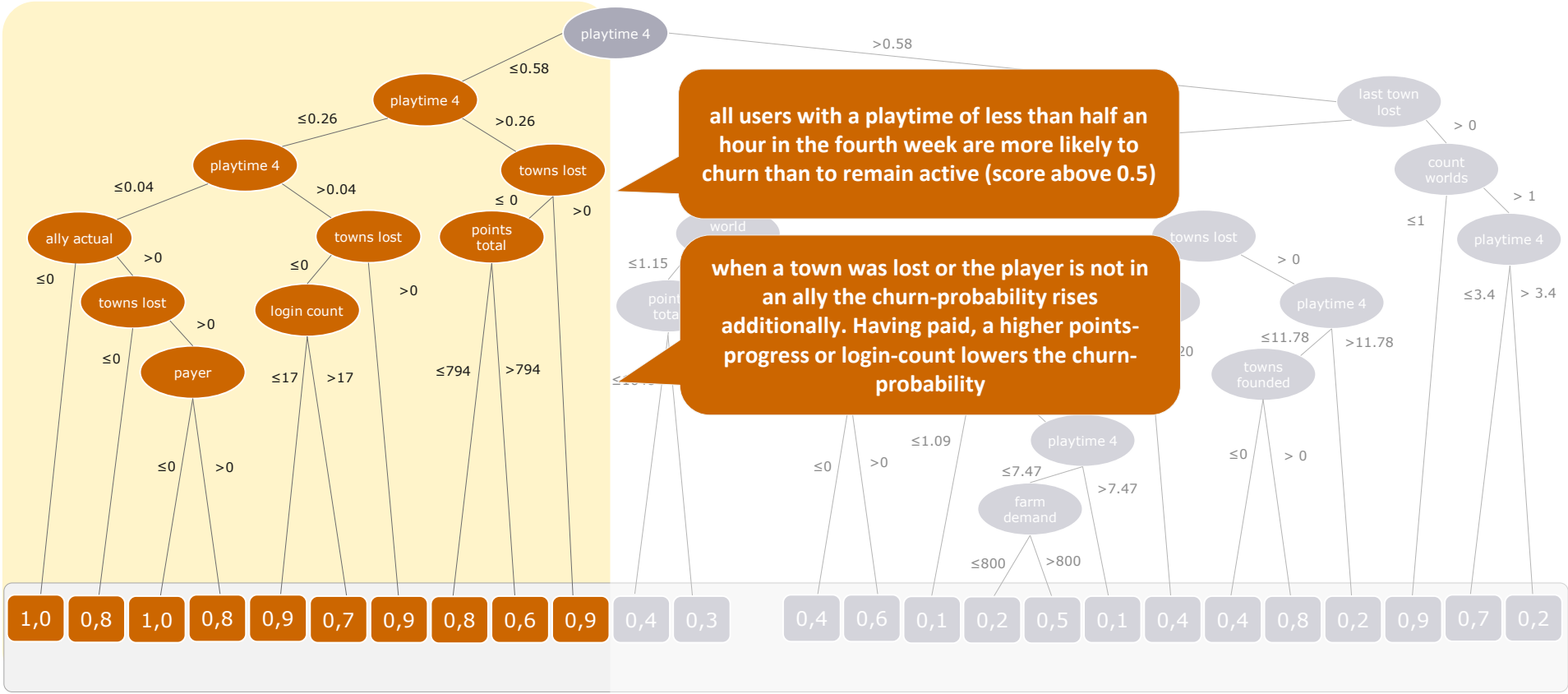
GREPOLIS



Probability of churning: Below 0,5 = user is scored as active, above 0,5 = user is scored as churned

actually quite simple: a decision tree model

GREPOLIS

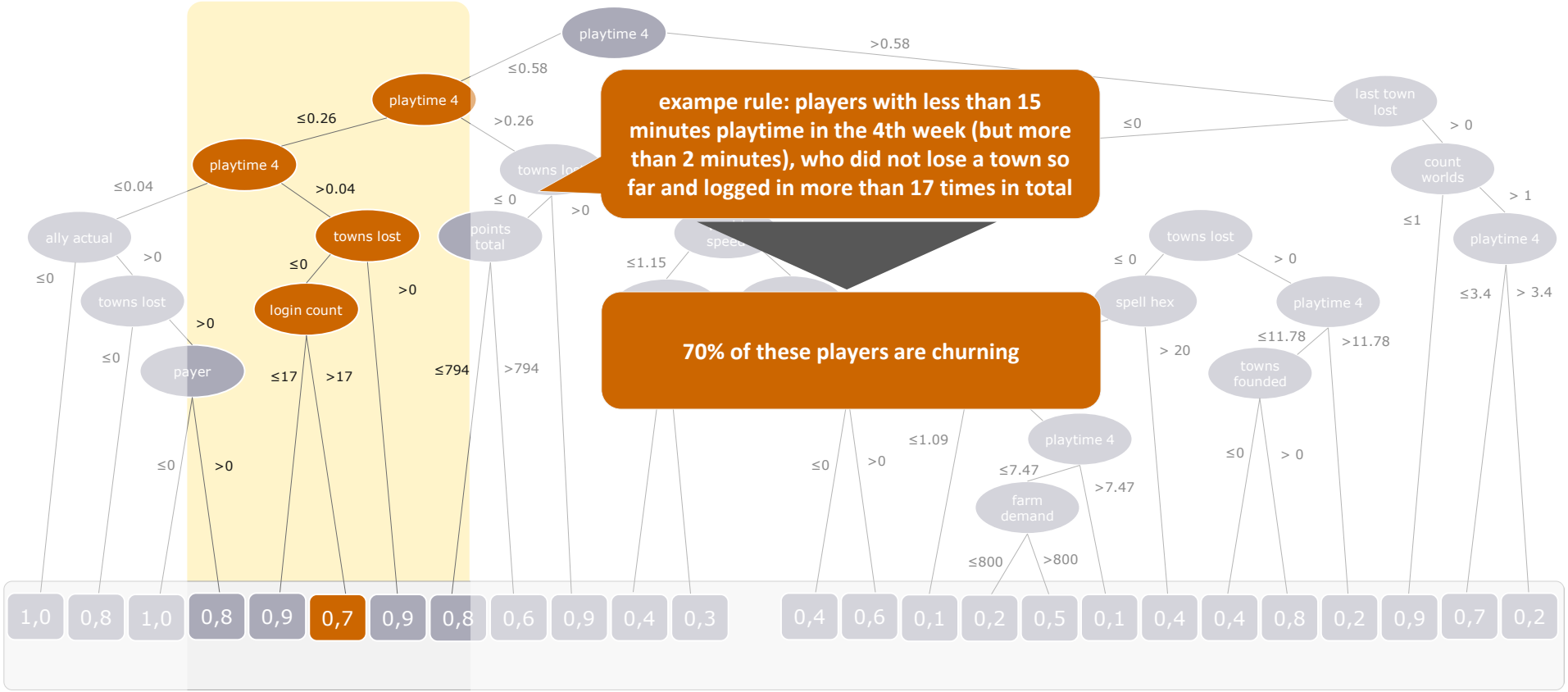


all users with a playtime of less than half an hour in the fourth week are more likely to churn than to remain active (score above 0.5)

when a town was lost or the player is not in an ally the churn-probability rises additionally. Having paid, a higher points-progress or login-count lowers the churn-probability

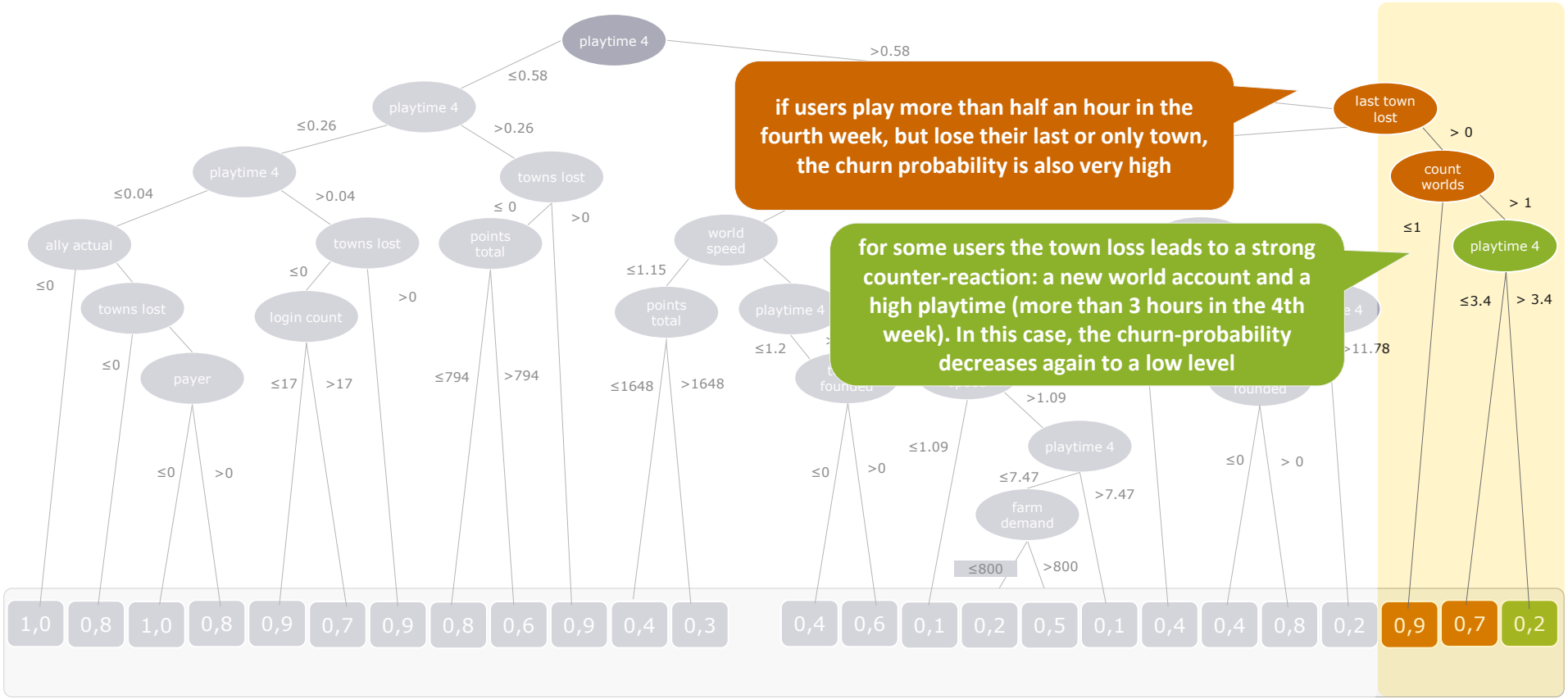
actually quite simple: a decision tree model

GREPOLIS



actually quite simple: a decision tree model

GREPOLIS



if users play more than half an hour in the fourth week, but lose their last or only town, the churn probability is also very high

for some users the town loss leads to a strong counter-reaction: a new world account and a high playtime (more than 3 hours in the 4th week). In this case, the churn-probability decreases again to a low level

prediction power

GREPOLIS

model for mid-game players
(after 4 weeks of playing)

28% of churners are wrongly predicted as non-churners

prediction \ reality	no churn	churn
no churn	70%	28%
churn	30%	72%

30% of non-churners are wrongly predicted as churners

model-hitrate
71%

less playing data = less chances for separation
(e.g. newbie-protection: no fights)

model for early-game players
(after 1 week of playing)

prediction \ reality	no churn	churn
no churn	65%	35%
churn	35%	65%

model-hitrate
65%

first test: nice start …

THE WEST

improved timing/ no cohort-approach

ACTIVITY | MODELLING & LAYER | PREDICTION

week 0 | week 1 | week 2

reality

prediction	no churn	churn
no churn	95%	43%
churn	5%	57%

model-hitrate 80%

model

Predicted churn-players

50%

random assignment

50%

control group

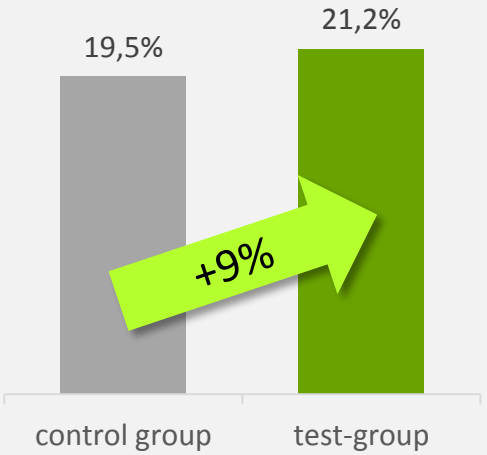
no action

test group

Layer + 1,000 Bonds as incentive

incentive value: ~20 €

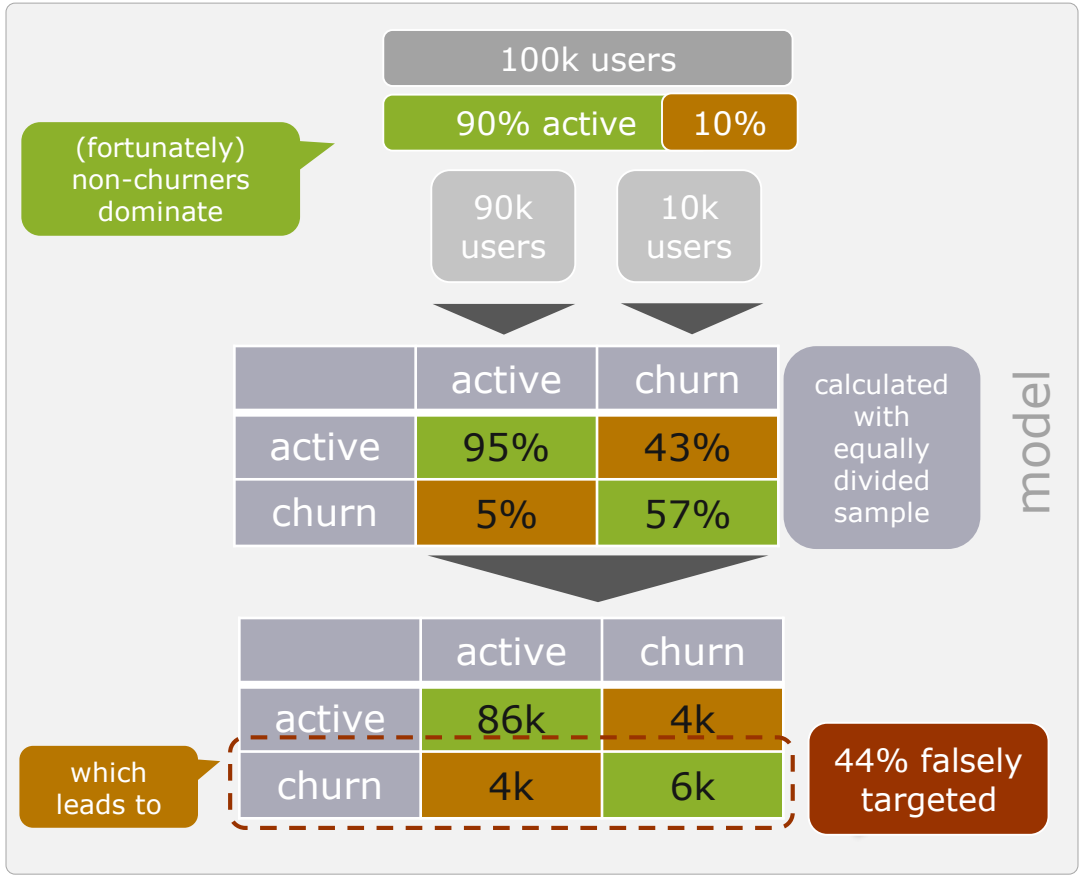
Avg daily retention in week 2



test

… but a lot potential

THE WEST



Sheriff seems to be rather sceptical that you get a reward …

style

only 63% of the users who received the incentive cashed the reward afterwards → user-flow (inventory) was unclear for churn-candidates

usability

second test

THE WEST

- improved model/ scoring: more stable model, based on broader data-set, boosted towards churn-player detection
- improved layer apperance: more friendly appeal
- A/B Test of layer-elements: with red-eye-catcher vs. without

model

	active	churn
active	98%	71%
churn	2%	29%

1st test 80%

model-hitrate 91%

32% wrongly targeted (42% for first test)

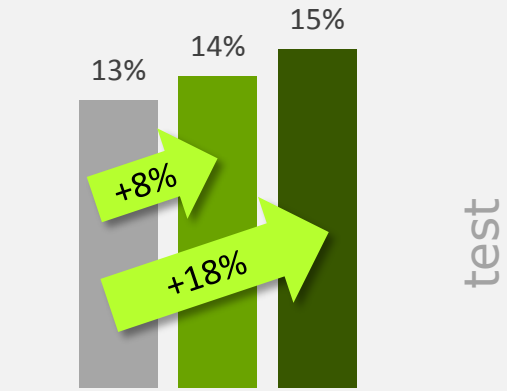
(but a lot of lost potential – see false positives)

test

Group 1

Group 2

Avg daily Retention in week 2



- Control-Group (no action)
- Test Group 1 (Layer + 1,000 Bonds)
- Test Group 2 (Layer + eye-catcher + 1,000 Bonds)

model optimization

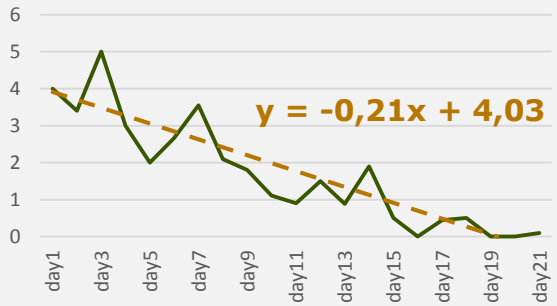
old

Aggregated user-states over a certain-time frame

Churn = no login in a particular time-period

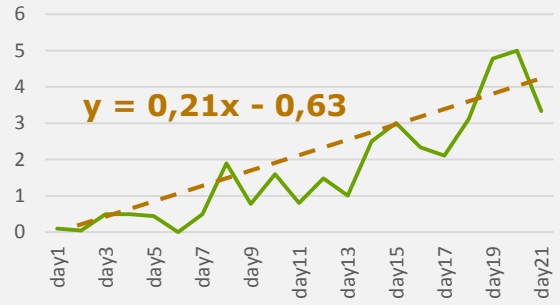
new approach

daily playtime [in hours] of **player A**



playing time last 3 weeks:
35 hours

daily playtime [in hours] of **player B**



playing time last 3 weeks:
36 hours

old approach would consider both users as almost identical; changes in behavior/ playing trend are ignored

Integrate variables for every user which reflect activity development

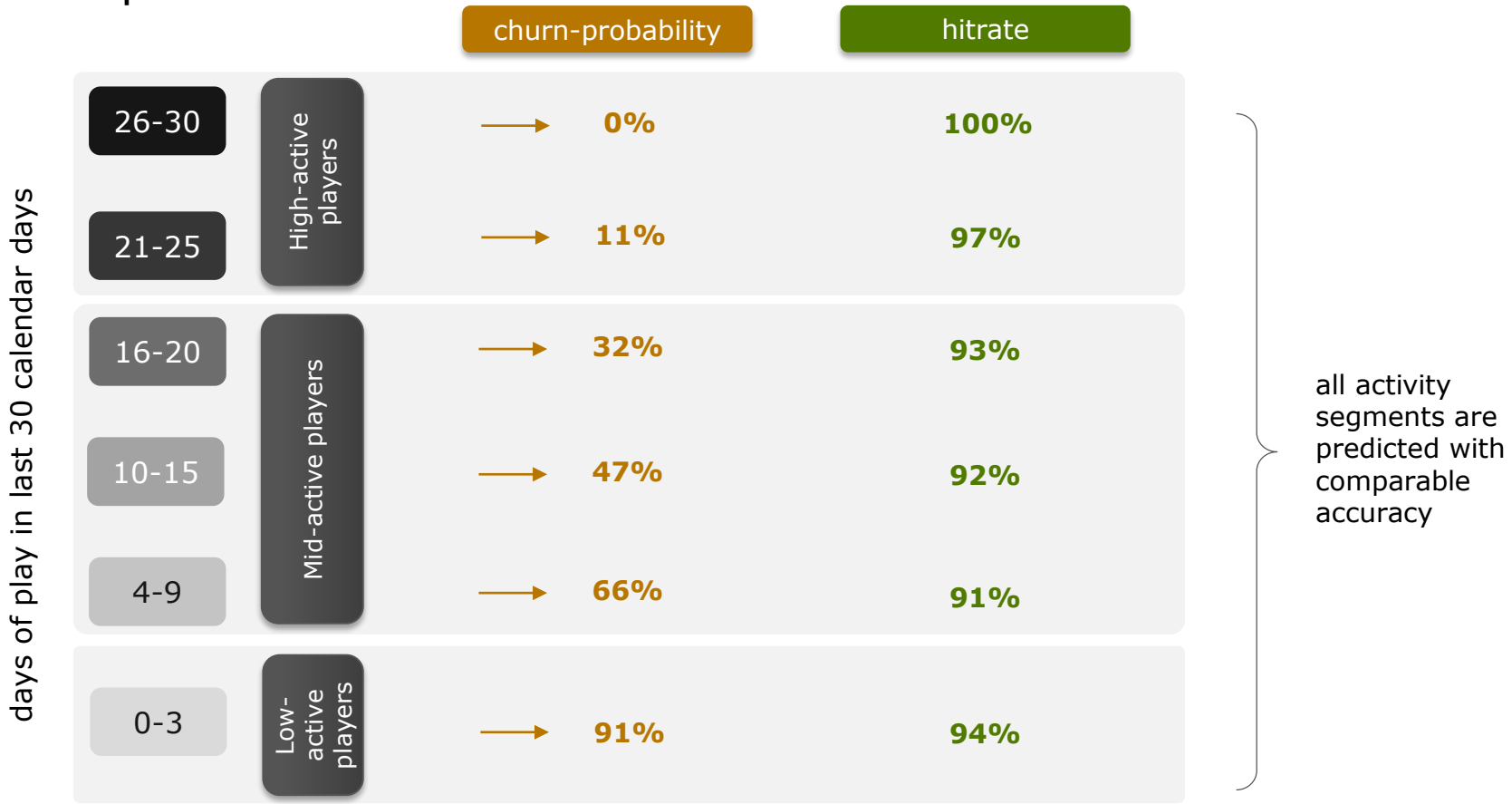
softer churn-criteria

not "*the player has left the game*" but "*the player's activity has dropped below the churn threshold*"

Threshold: not more than 3 days with game logins during the last 30 calendar days

credit to: Dmitry Nozhin [http://www.gamasutra.com/view/feature/176747/predicting_churn_when_do_veterans_.php]

model optimization



third test

THE WEST

- improved model/ scoring: trend variables, churn-threshold instead of churn
- improved layer apperance
- A/B Test of incentive: premium currency vs. item

model

	active	churn
active	96%	6%
churn	4%	94%

2nd test 91%

model-hitrate 95%

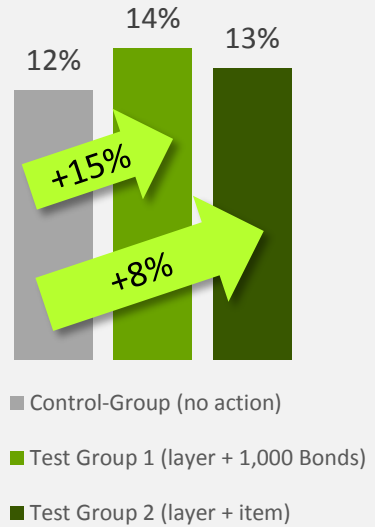
12% wrongly targeted (32% for second test)

test

Group 1

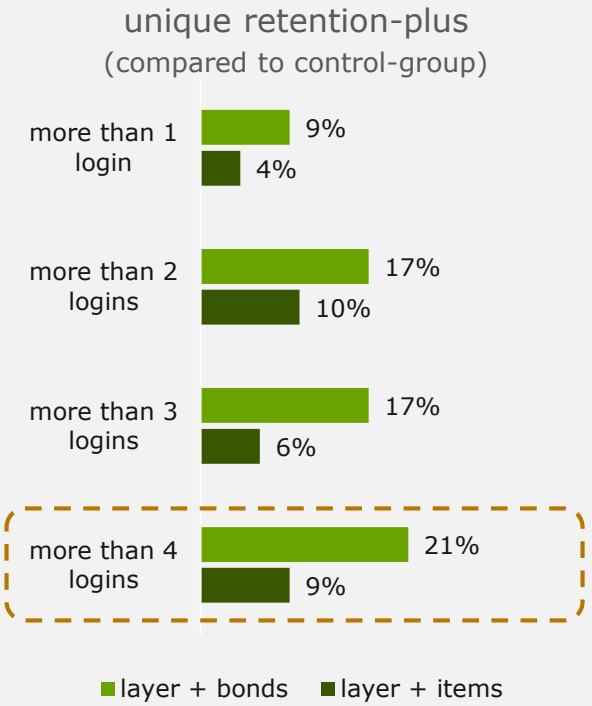
Group 2

Avg. daily retention in week 4

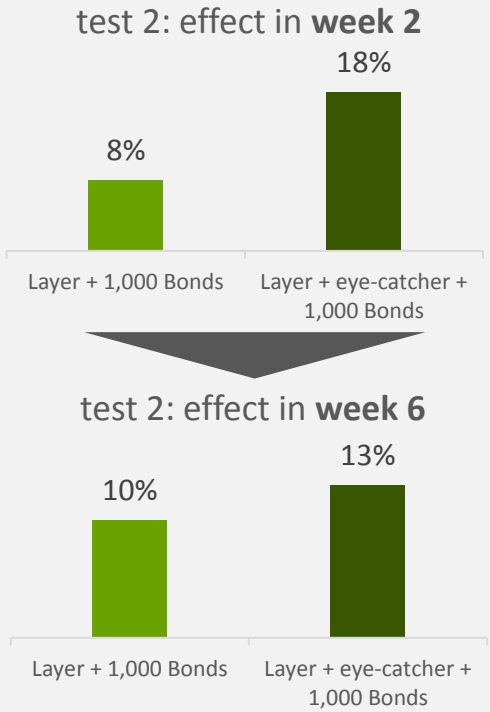


more positive details

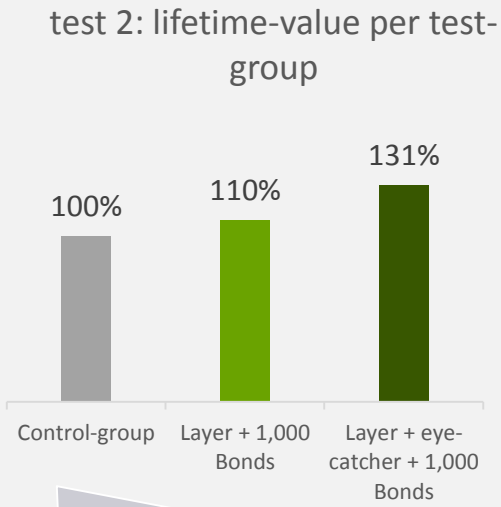
the stricter the retention-criteria, the higher the impact



surprisingly, the impact is sustainable



even though not the target, there is evidence for a monetization-effect



numbers should be taken with a grain of salt as variance for revenue numbers is high.

roll-out

FORGE OF EMPIRES

incentive value ~20 EUR

no significant effect

incentive value ~2 EUR

+5% retention

incentive value ~8 EUR

+9% retention

learnings

- **In general**: Don‘t wait for a perfect all-around solution, just start testing with the existing data and possibilities

- **For event-tracking**: Every additional bit of information helps – track the most important events and expand from there, do not start million €-projects that will deliver results in years
- **Also for event-tracking:** take your time for data-QA – the first implementation will have many flaws. Play the game yourself and monitor the results

- **For modelling:** Include behavior changes and playing trends as input for your models/ target churn threshold instead of 0 logins. Think about the right timing for the process

- **For messaging:** Little variations can have a huge effect – test every element of the interstitial

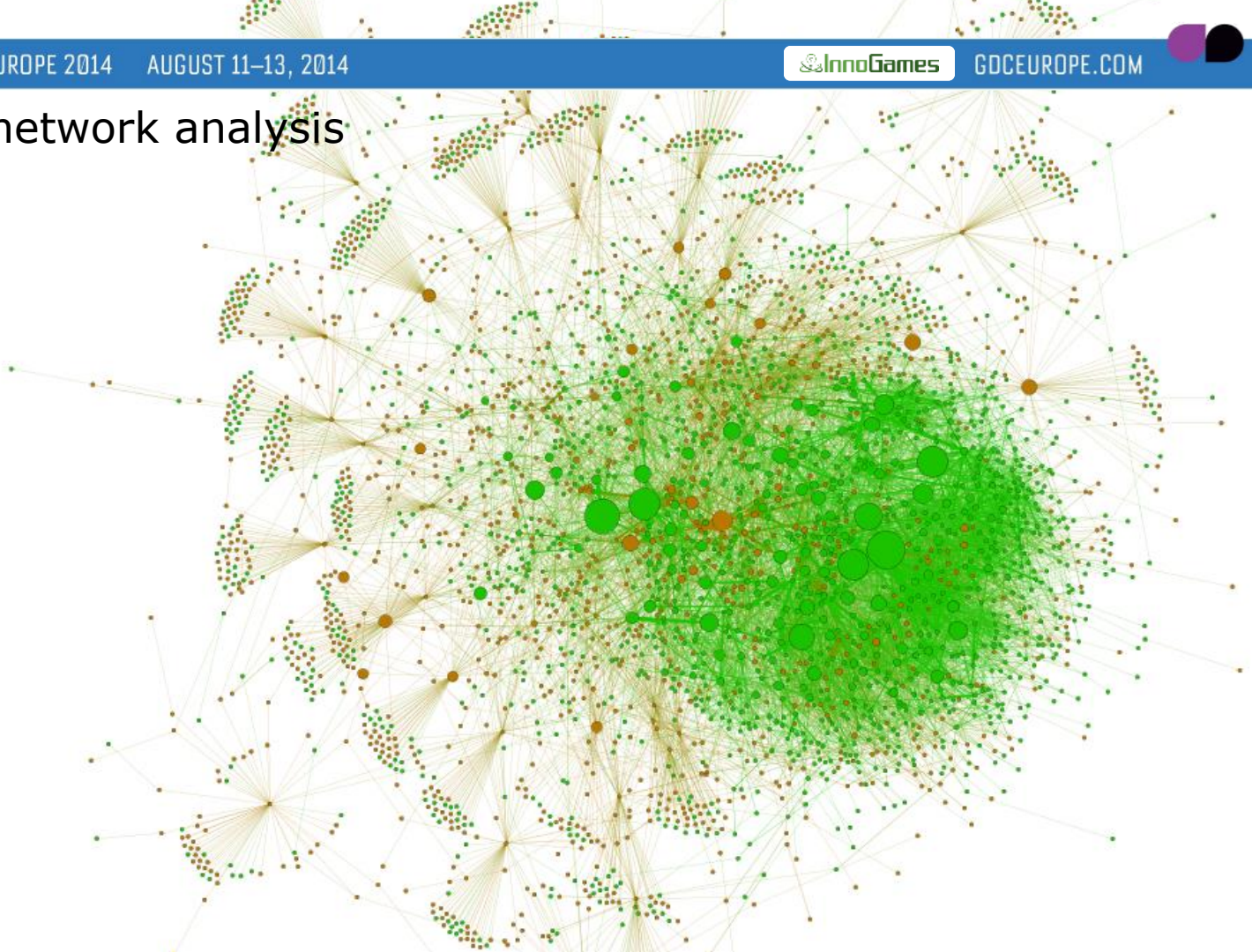
- **For incentives:** The incentive should give the user enough freedom so that he starts exploring the possibilities of your game

outlook/ next steps

outlook/ social network analysis

Tribal Wars

communication-ties between users of one world



thanks to …

… the **analytics team**, especially **Christoph Scholtysik**, for the great work on this and every other project

… the **CRM team**, especially **Thomas Cartwright**, for the excellent collaboration

… the **game teams** for implementing all this stuff

and thanks for your attention!

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