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# Gaming Analytics

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# Outline

1. Introduction to Gaming Industry

2. DS/BA in Gaming Industry:
   - By Functions
   - By Period
   - Common Analytics Approach

3. Job/Career in Gaming Industry

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# Introduction to Gaming Industry

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# Introduction to Gaming industry

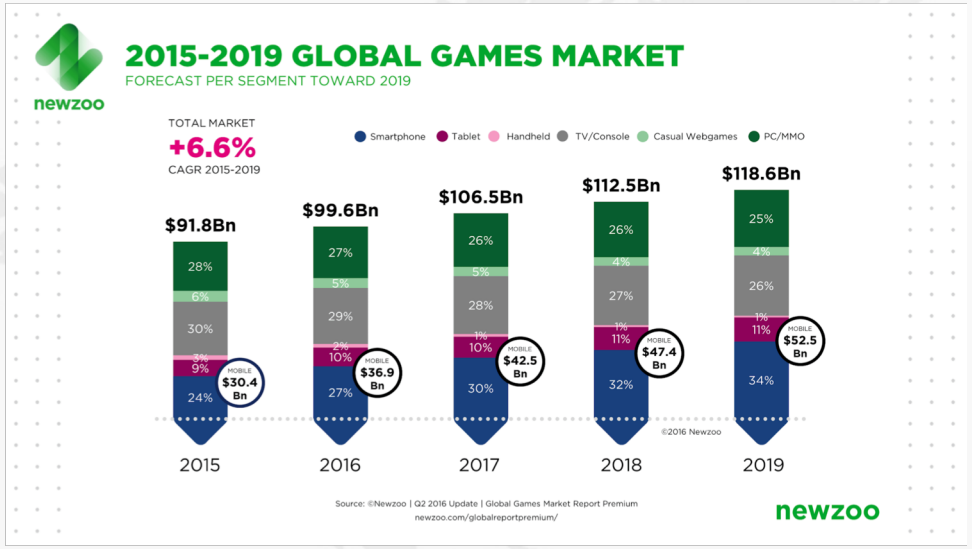
**The game industry is divided into four major hardware segments**

Games for personal computers

Games for mobile devices

Games for dedicated devices (TV console systems)

Future potential for introduction of new hardware segments (VR, streaming devices etc)




- The worldwide video game software market is expected to grow at 9% CAGR 2014-2019 to $118 billion
- In 2015 worldwide game software sales reached record **$91.8 billion**
- Games are about far more than just software sales
- Game consumers drive spending on many different devices
- eSports and information around games has always been a major opportunity

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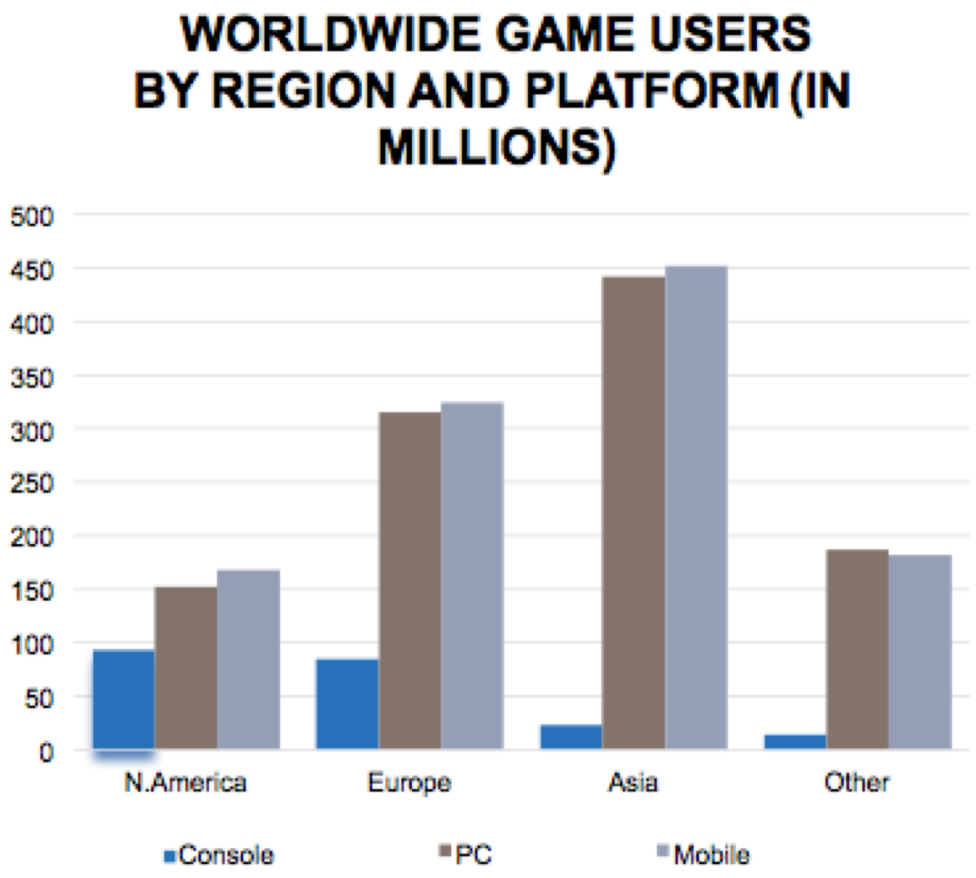
# Game Consumer




Source: DFC Intelligence Consumer Segmentation Service 2016

| PLATFORM | USERS (in millions) |
|---|---|
| Console Users | 215 |
| PC Users | 1,096 |
| Mobile | 1,126 |
| Total Unique Users (not a sum) | 1,506 |

- **DFC estimates 1.5 billion gamers worldwide with a great deal of platform overlap**
- **Most users play games for free or very little money**
- **Core audience of about 300 million generates the bulk of revenue**

# Gaming & Entertainment Market Landscape

## Digital Gaming

### Social

zynga, RUMBLE, Playdom, Social Quantum, DeNA, rockyou, Arkadium, imvu, KABAM

### Mobile

MOJANG, Wooga, Tencent 腾讯, SGN, King, GREE, GungHo, KABAM, SUPERCELL, PocketGems

### Casual

pogo, PopCap, King, BIG FISH, ROVIO, oberon, GOOD GAME, zynga, PlayFirst, MINICLIP

### MMO

BLIZZARD, CCP, SQUARE ENIX, JAGEX, WARGAMING.NET, TRION, ARENANET, RIOT GAMES, MOJANG

### Console Developers

HARMONIX, EPIC, VALVE, BUNGIE

### Console Publishers

ACTIVISION BLIZZARD, EA, WB, T2, SQUARE ENIX, UBISOFT

### Console Manufacturers

Microsoft, SEGA, Nintendo, SONY

## Digital Distribution

### Social Platform

Google, hi5, f

### Cloud-Based

onLive, GAIKAI, amazon web services

### App Store

Google play, amazon, Apple

### Portals & Aggregators

Roku, VALVE, twitch, GAMESPOT, IGN

## Console Distribution

### Online/Virtual

Microsoft, Nintendo, SEGA

### Physical

Walmart, BEST BUY, GameStop, TARGET

# Game Release Operation Cycle

Three Periods of time before a game goes to public:

- Pre-heating period
- Closed beta period
- Open beta period

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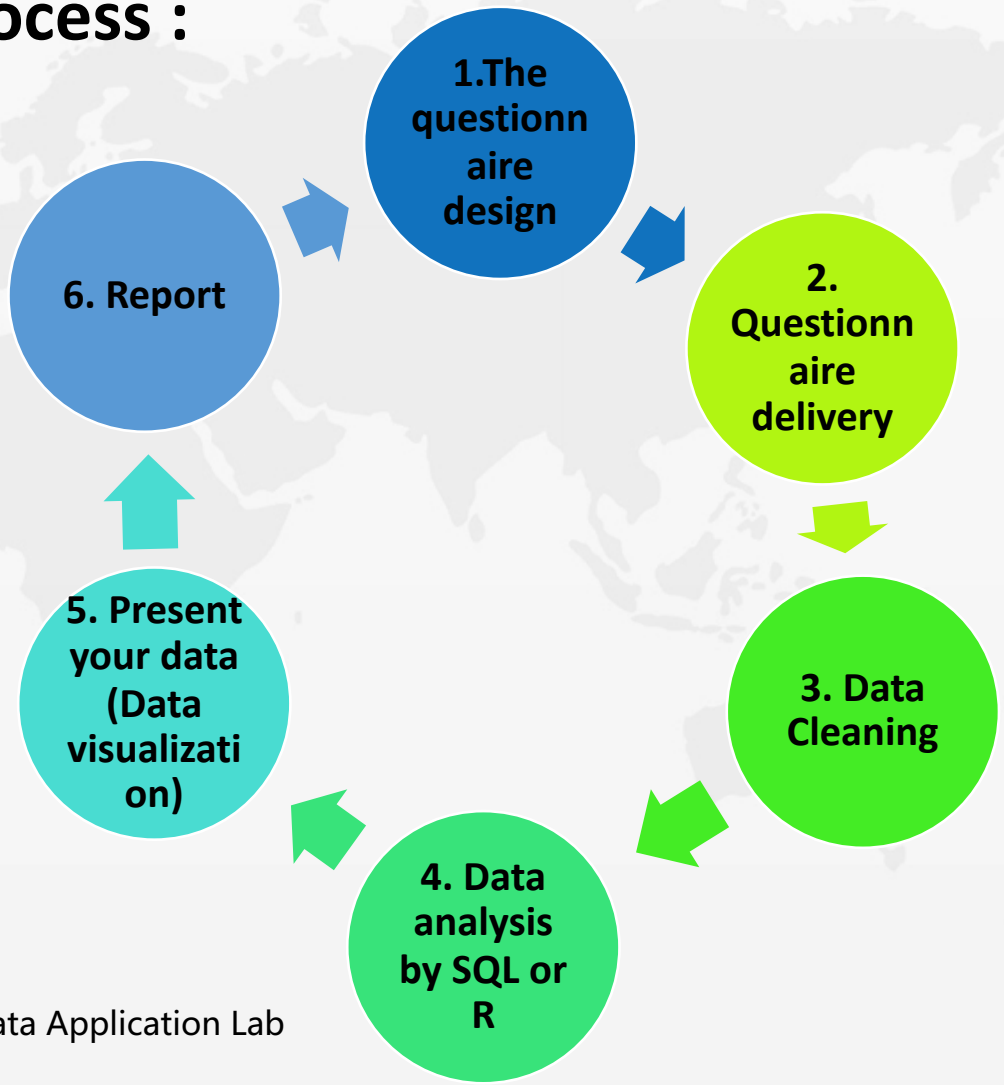
# Operation Cycle: Pre-heating period

- **The process :**




## The Purpose:

- Where: Determine affiliate provider
- Who: Determine the right target consumers
- When: Determine when is the best time to advertise
- How: Determine the best way to advertise the game to the public

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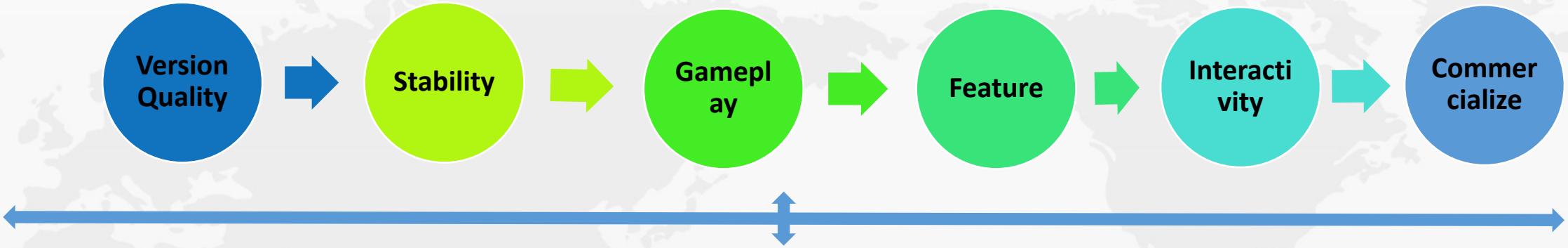
# Operation Cycle: Closed Beta period




Purpose of closed Beta (CB):

- Testing the version quality, stability, gameplay, feature, interactivity and commercialize of the game
- Testing the key indicators for this game, for example, user periodic survival analysis, pay user rate, ARPPU, ARPU
- With the testing to achieve a certain purpose of preheating publicity, to develop and explore needs.
- According to the user's game behavior data and questionnaire feedback data to help design a clear direction

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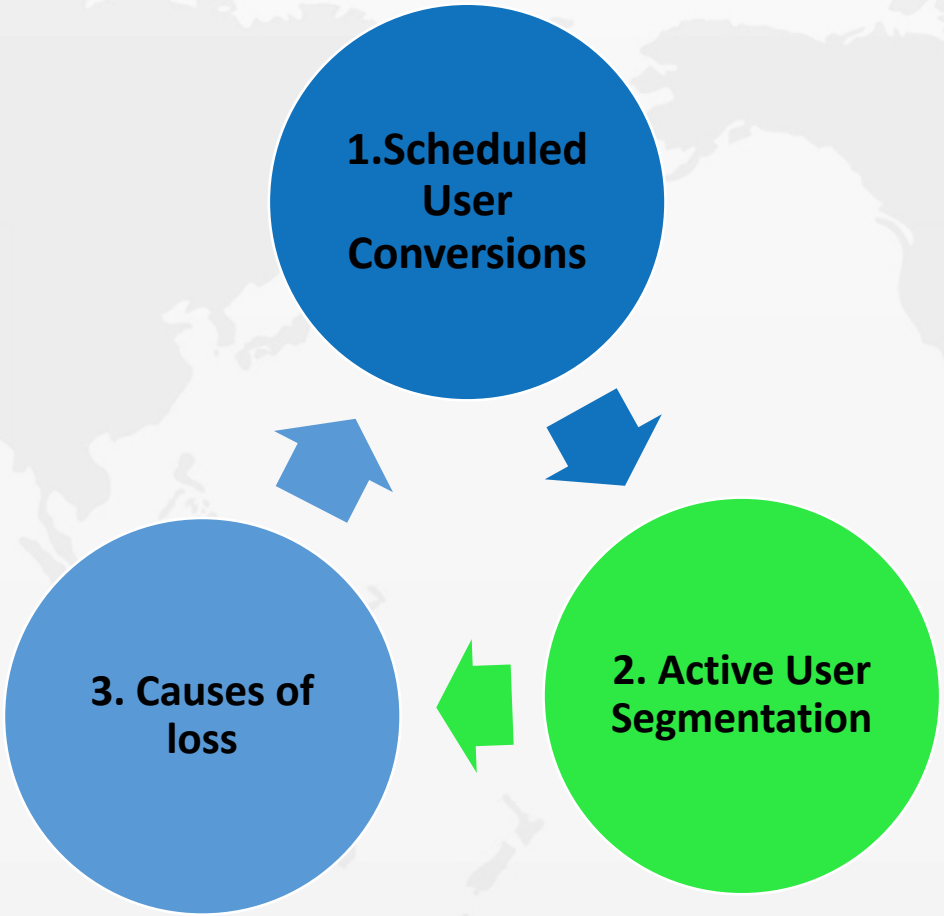
# Operation Cycle: Open Beta period

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# What’s the differences with IT companies?

- Amazon
- Uber
- Facebook
- Google
- Apple

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# Features of Gaming Industry

- What is the key selling point?

  Experience

- What is the consumer target?

  User

- What are the features of gaming industry?

  High competition, Rapidly changing environment, shorter life cycle

- What are the two most important functions of a gaming company?

  Product & Marketing

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# Monetization of Gaming Companies

What is the business/monetization model of gaming companies?

- In-app purchase
- Paid app / license
- Subscription service
- Ads / Traffic
- Offline products / merchandise
- Other (e.g. increase engagement of social network)

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# BA/DS in Gaming Industry

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# DS/BA work by Function Areas

| Growth | Experience | Monetization | Infrastructure |
|---|---|---|---|
| • Paid Growth<br>  • Ads/SEO/SEM<br>  • Referral<br>• Organic Growth<br>• Marketing<br>  • User Segmentation<br>  • Targeting | • Development<br>• Recommendation/ Personalization<br>• Game balance<br>• Engagement<br>• Retention | • Paid conversion Funnel<br>• Price Optimization<br>• Coupon / Bonus<br>• Events | • Capability<br>• Stability<br>• Speed |

## Tracking & Reporting

- Build data pipelines
- Dashboard / Visualizations
- Monitoring / Reporting / answer Ad-hoc questions

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# DS/BA work by Period

**Design Pre-Heating Period**

- User profiling
- Targeting
- Competitor analysis

**Beta/Open Test Period**

- Game Experience
- Price optimization
- Marketing

**Open Period**

- User Engagement
- Monetization

**Matured Period**

- User Retention

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# Common Framework

- Funnel Analysis
- Cohort Analysis
- Waterfall
- A/B Testing
- Break-even method
- User Segmentation

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# Growth - Metrics

- Daily active user (DAU), Monthly active user (MAU)
- Peak active user (PAU)
- # of signups
- Paid growth
  - Return over Investment (ROI)
  - Cost per acquisition
  - Lifetime value (LTV)
- Marketing
  - Reach
  - Click Through Rate (CTR)
  - Conversion Rate

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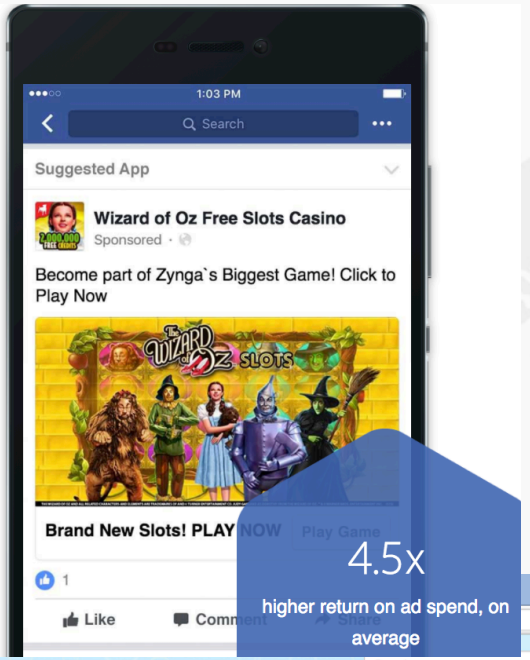
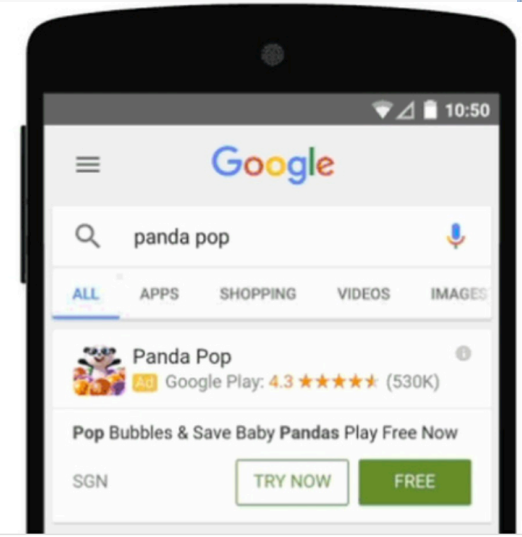
# Growth – Ads Optimization

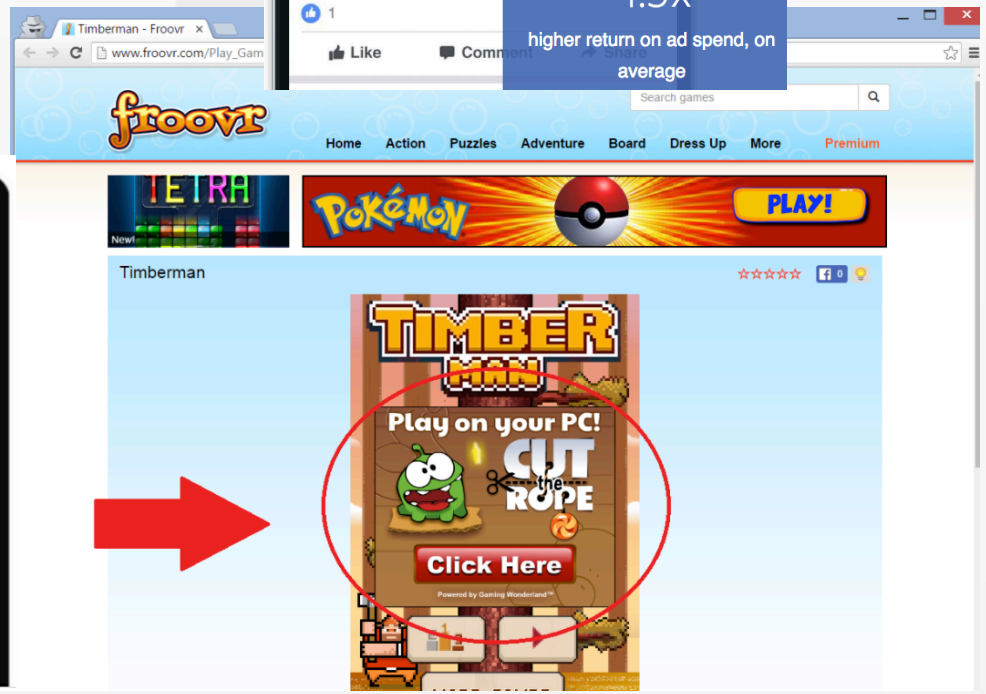
- Digital Ads
  - Social Network (Facebook, etc)
  - Search Engine (Google, etc)
  - Game console
  - Third-party apps / websites

- Offline Ads
  - Posters
  - Events




4.5x
higher return on ad spend, on average

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# Growth – Ads Optimization

- How to optimize ads spending?
  - User Targeting – Qualitative / User Research / Historical Data
  - Budget Allocation
  - Design / Format / Content optimization
- What is the evaluation criteria?
  - ROI
- What are the success metrics?
  - CTR
  - Cost per install
  - Reach
- How to evaluate effectiveness?
  - Campaign performance measurement

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# Referral Coupon Analysis

**Referral Program**: A referral program is a deliberate, systematic way of getting people to make referrals to your business.

**MMORPGs: World of Warcraft's referral program rewards you with exclusive in-game items**

Interesting use of language. You *RECRUIT* a friend. Great way to match the "clan" and "team" language within the product. You'll get free game time when a friend signs up, which is pretty lucrative. The reward is saving money.

**Key Question:**

**How much value should the referral coupon be?**

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# Break-Even Method

Acquisition Cost = Customer's LTV

ROI = LTV/Cost

Basic model for LTV:

- LTV = Average Revenue Per User Per Period / Churn Rate

Advanced

LTV = $\sum_i Average\ Revenue\ Per\ User\ in\ Period\ i$

LTV vary by demographic & characteristics of users

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# Growth – Sample Interview Question

- You have $1M budget for marketing. How would you spend it?
- You and your marketing partner designed 4 attribution portfolios. How would you decide which one to use?
- How would you measure the effectiveness of your marketing campaign?
- You had some historical campaign data. How would you use it to optimize future campaigns?

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# Experience - Metrics

- Engagement Metrics
  - Time spend
  - Login frequency
  - Sessions
  - Session duration
  - # of friends / # of messages
- Retention
  - Churn rate
  - Average tenure
- Play Experience
  - Start, Fail and Complete
  - Source, Sink and Flow
- Game Balance
  - Average level / grade
  - Distribution of Top/Bottom users
  - Diversity

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# Slice & Dice

You find the average time spend increased by 5% last week. Is this good? How would you analyze this?

Breakdown by user segments, like new-user & experienced user, heavy user & light user, device, country, etc

Example

| Segment | # of Active Users | Average Time Spend |
|---|---|---|
| New User | 10000 | 60min |
| Experienced User | 10000 | 20min |

Overall Average Time Spend = 40mins

| Segment | # of Active Users | Average Time Spend |
|---|---|---|
| New User | 10000 | 60min |
| Experienced User | 5000 | 20min |

Overall Average Time Spend ~ 50mins

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# Slice & Dice (Continued)

- What to do?
- If only a subgroup change, investigate the issue & recommend solution
  - Ex. Time spend on Android had significant drop. Other platforms OK.
    - Is there a bug? Is there a new version?
    - Talk to engineers & PMs
  - Ex. Time spend from new users significant drop. Experienced OK
    - Change in acquisition channel? Fraud register?
    - Talk to marketing manager
- What if it is universal change?
  - Slice & dice from a different dimension
  - User walk track
  - Other more complex analysis, etc

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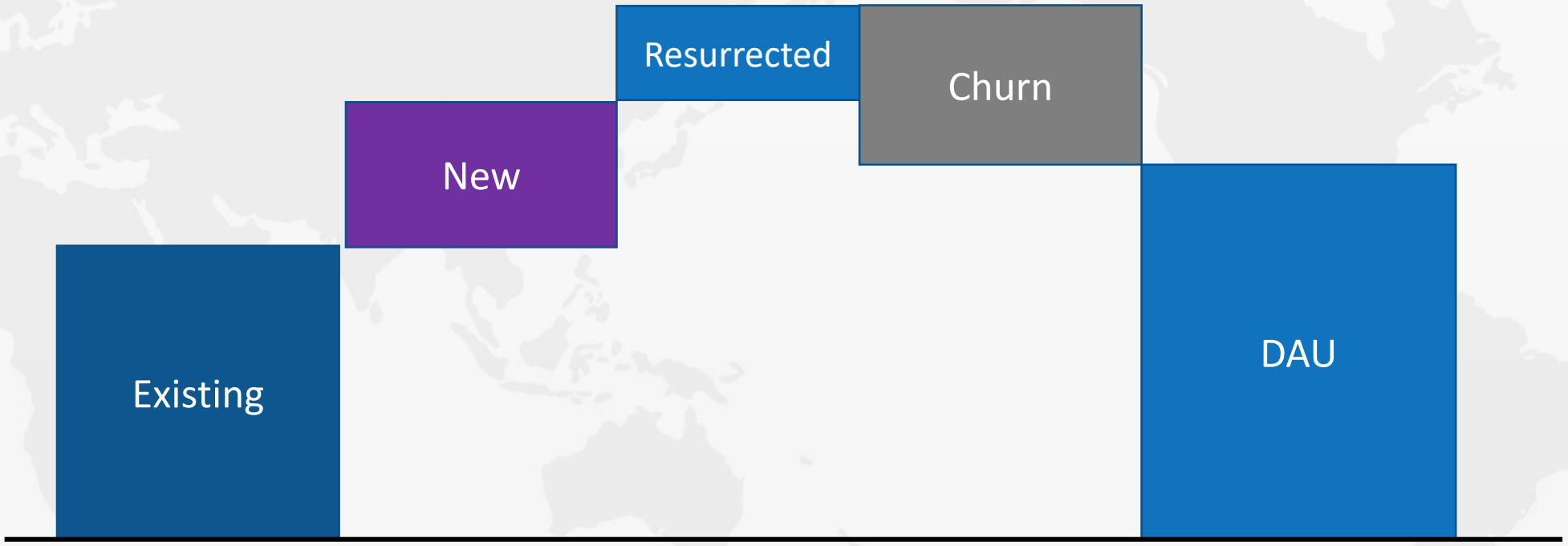
# Waterfall

- Your DAU increased by 5% last week. How would you analyze this?




DAU = Existing + New + Resurrected - Churn

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# Understand Churn & Resurrection

What do you want to learn from churn & resurrection data?

- Understand when / where / in what situation the user churned
- Understand what could bring the user back

Tactics to resurrect users:

- App notification
- Marketing email
- Social network
- Bonus credit
- Event

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# Game Experience

- Start  - # of Users who started a challenge
- Fail - # of Users who failed a challenge
- Complete - # of Users who completed a challenge

What are the ideal metrics?

Start: higher  Fail & Complete rate match the design

What are the problems with these metrics being too low/too high?

Start low: less user engagement

Fail % high: may cause churn

Complete % high: lower engagement

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# Game Balance

Phenomena of imbalance game

- Small portion of users dominate the game
- New users harder to progress
- Low diversity

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# Monetization - Metrics

- Revenue
- Profit
- Customer lifetime value LTV
- User acquisition cost (UAC)
- # of paid users / # of first time paid user
- Conversion rate of paid users
- ARPDAU - Average Revenue Per Daily Active User
- ARPPU - Average Revenue Per Paying User
- Paid frequency
- Coupon
  - Coupon claim rate
  - ROI

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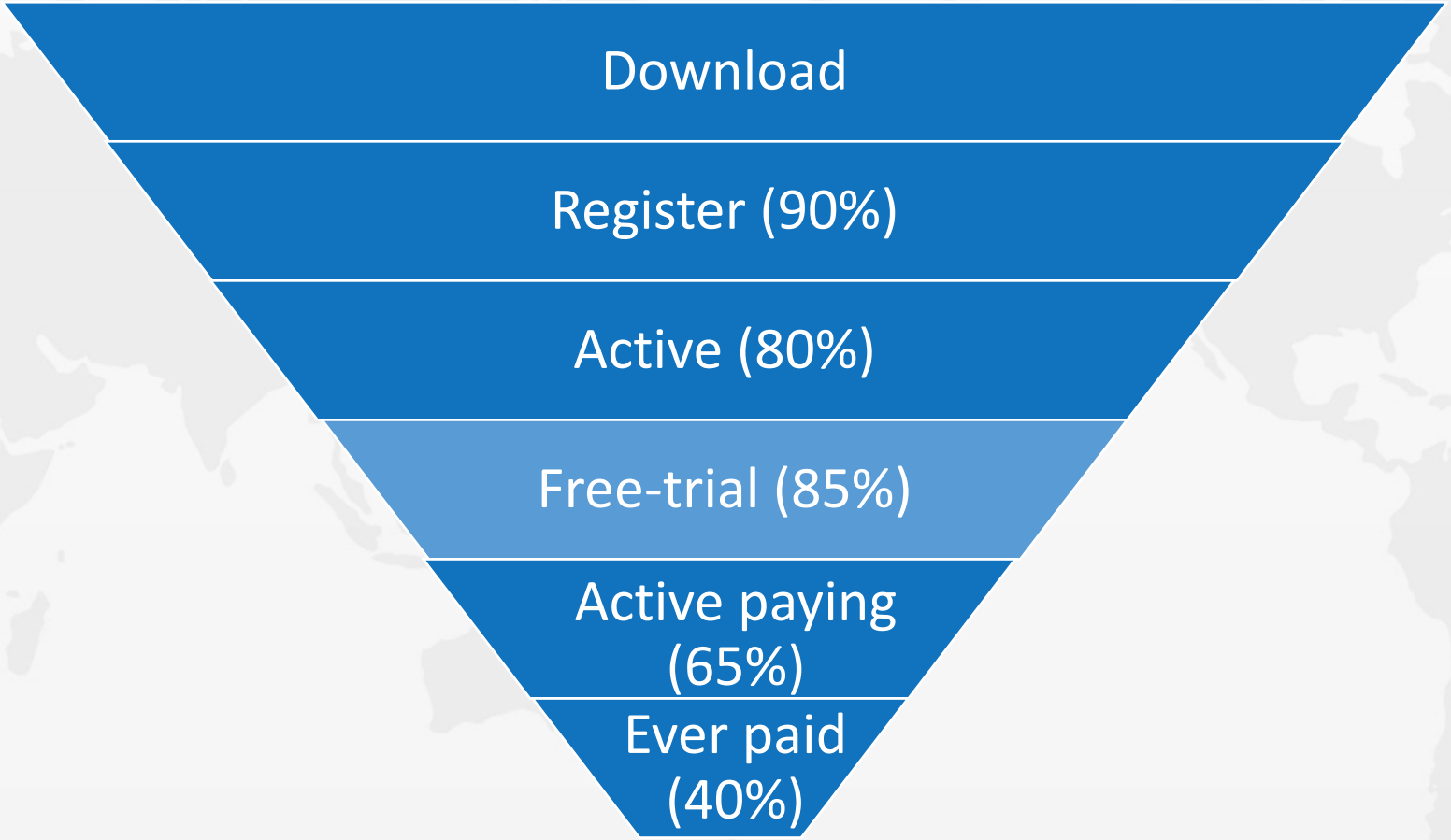
# Funnel Analysis

- How to increase paid user conversion rate?

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# Free-trial targeting

1. Which users would you give free trial (or a discount)?
2. How much discount would you give?
3. How long would you set your free trial?

    1. Predict if the user will convert if given free trial or discount
    2. Price sensitivity model, Price Optimization
    3. Time series of conversion rate by days since first free trial

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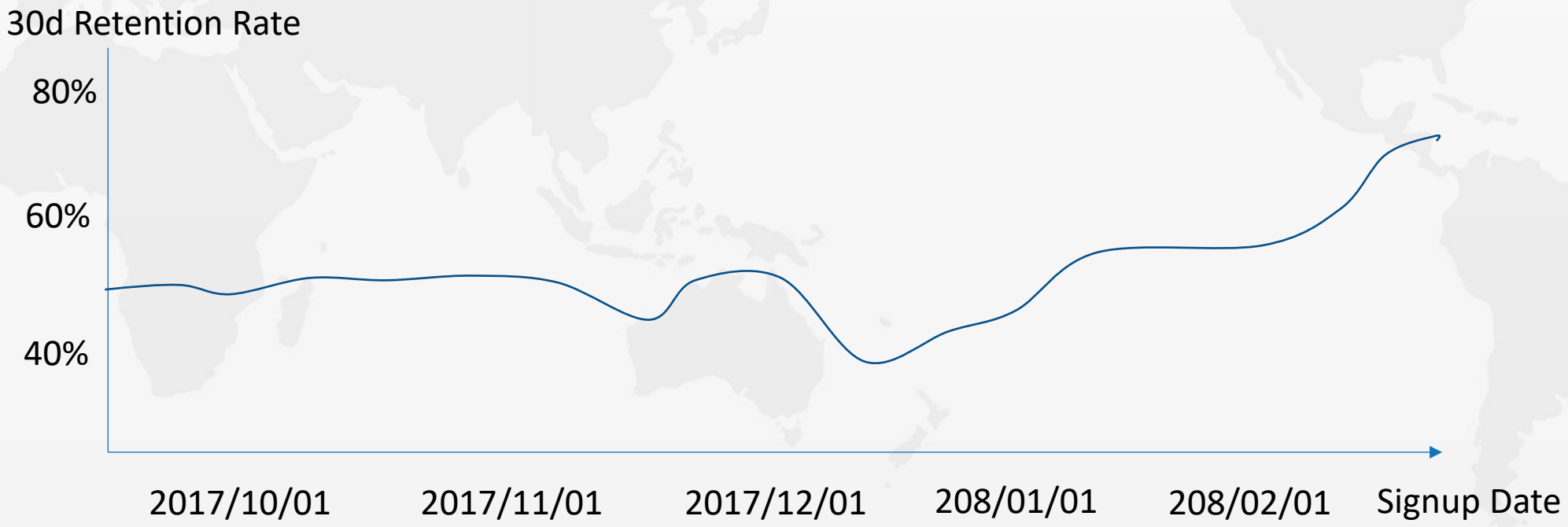
# Cohort Analysis

Cohort isolates user groups based on a common characteristic such as signup date, country, or usage levels and then compares each group's behavior over time

Ex. What is the 30d retention for cohorts grouped by signup date?

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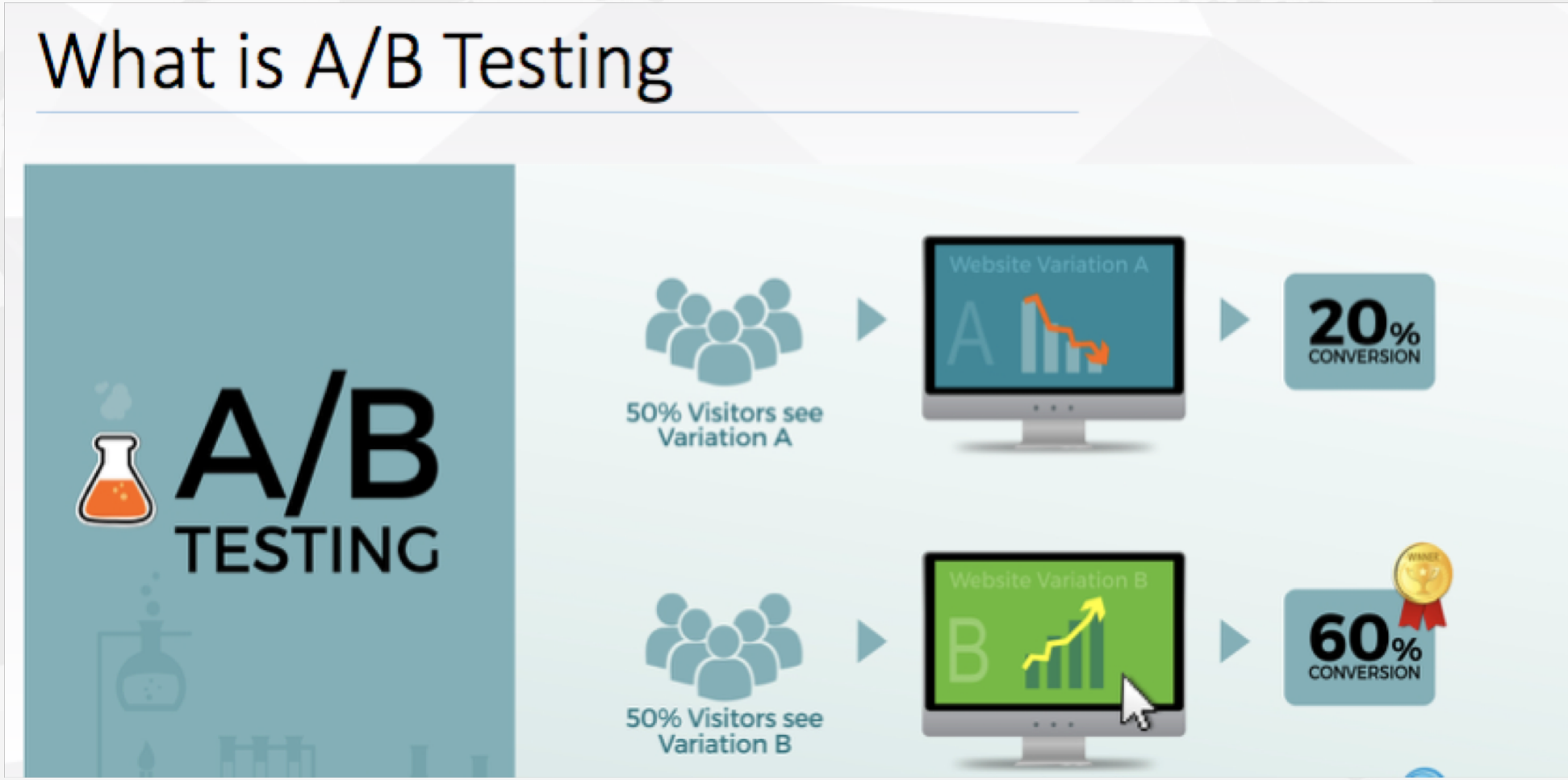
# A/B Testing

You had a product change. How would you measure if its performance?

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# A/B Testing

**1. Assignment**

- How to assign test units?
- % of test / control?
- How do you make sure you assignment is random?
- Problems?

**2. Sample Size**

- What is the minimum sample size?
- What factors will impact your sample size?
- How long are you going to run your experiment?
- What's your roll-out plan?
- What kind of issues may you anticipate in an A/B testing experiment?

$$n = \frac{2\sigma^2 (Z_\beta + Z_{\alpha/2})^2}{\text{difference}^2}$$

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# A/B Testing - Continued

**3. Measurement**

- What will you do to balance between user experience and quick learning?
- What kind of test to use?
- Imbalanced samples
- What if your result show X?

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# Infrastructure - Metrics

- Peak active user (PAU)
- Server utilization rate
- Lagging time / Response time
- App crash rate

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# Job & Career in Gaming Industry

3

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# Job Hunting

- Skill set is similar to BA/DS in other tech companies
- Analytical experience is transferrable
- How to prepare?
  - Understand their business model
  - Understand their stage
  - Understand your role
    - Work with Eng/PM?
    - Work with marketing?
  - Try their products

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# Career

- Similar to BA/DS in other tech companies
- Growth could be fast as company pace is usually fast
- Career path:
  - Technical IC
  - People manager
  - Other roles: PM/marketing

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# DS/BA work by Function Areas

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# Common Framework

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# GAME OVER

# Thank you

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