Why does everyone use the same app?

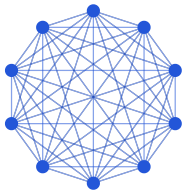
Every user adds value for the others: why connections grow faster than users, why a better app can stay empty, the two equilibria of a chat game, lock-in, networks that won and lost. Question 2 of the ten to ask about any app.

1 Network effect

more users, more value

- **Lagoon Chat** = chat app on **Coralia** (toy island) · **Noa**'s 10 closest friends all on it
- **Network effect** = a product whose value to each user **grows with the number of other users**
- 1 pair of users = 1 way to talk → `ways = n × (n − 1) ÷ 2` (pair counted once)
- `4 → 6` · `10 → 45` · `20 → 190` · `100 → 4,950` · practice: `8 → 28` · `16 → 120`
- **Metcalfe's law** · Robert Metcalfe, American engineer, co-inventor of Ethernet (office computer cables, **1973**) · named by George Gilder (US tech writer, **1993**) → value ≈ users² · **rule of thumb**: connections not all worth the same

10 users → 45 ways to talk

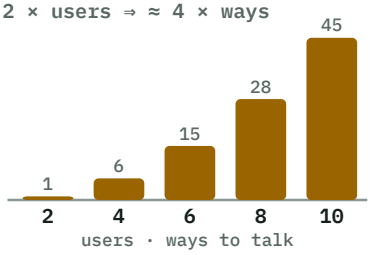


2 Faster than users

one more user

- **2 × users ⇒ ≈ 4 × ways** · `45 → 190` (`190 ÷ 45` a little over 4) · `28 → 120`
- New user → **1 new way per user already there** · 11th: `55 − 45 = 10` · 101st: `5,050 − 4,950 = 100`
- ⇒ same person worth **more to a big network** → the big one pulls ahead
- Works **in reverse** · practice **Shell Talk**: 20 → 10 users ⇒ `190 → 45` ways · `145` lost ≈ ¾ · half the users ≠ half the value
- Chain: users leave → fewer to talk to → staying worth less → more leave → app empties

2 × users ⇒ ≈ 4 × ways

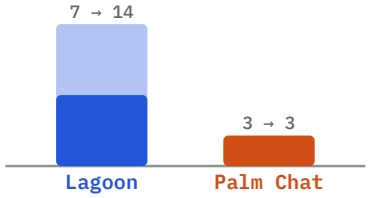


3 Tipping

the big one grows

- Noa's class · **Lagoon** 7 (ads) vs **Palm Chat** 3 (no ads, better) · 7 newcomers join where more are → `14 vs 3` · a chat app = **the people on it**
- **Tipping** = a market with a network effect goes quickly to **one winner** · each new user joins the biggest network, even when a smaller one is better
- **Indirect** network effect (2 sides, Lesson 1) · sellers go where buyers are, and back · used-clothes app · Kai's bakery

tipping · the big one grows



7 new students join the bigger one

4 The chat game

two equilibria

- **Best reply** = the choice that pays a player most, given what the other picks · **equilibrium** = cell where neither gains by switching alone
- **Coordination game** = players do best by choosing the same thing ⇒ often **2 equilibria** · the one everyone **expects** usually wins
- Lesson: both Lagoon `3 / 3` · both Palm Chat `4 / 4` · apart `0 / 0` → both matches stable
- Practice: Lagoon `2 / 2` · Coral Call `5 / 5` · apart (texts) `1 / 1` → expect the other to stay ⇒ moving alone `1 < 2` ⇒ stuck on the worse app

Noa ↓ · Mira →	Lagoon	Palm Chat
Lagoon	3 / 3 ★	0 / 0
Palm Chat	0 / 0	4 / 4 ★

5 Lock-in, real world

won and lost

- **Switching costs** (photos, history, groups, habits) → **lock-in** = users kept on a product they would otherwise leave · **chicken-and-egg**: no users ⇐ no friends ⇐ no users → newcomers go **free**, start in **one school or city**, or **pay** the first users
- **WhatsApp** · passed **2 bn** users, up from 1.5 bn two years before (WhatsApp, 12 Feb 2020)
- **MySpace** · bought by News Corp (media company) ≈ **$580 m** (July 2005) → sold for a reported **$35 m** (June 2011) · **Google+** closed for consumers 2 Apr 2019, low usage → network effect in reverse (why users left: debated)
- **QWERTY** keyboard (named after its top-row letters) · Paul David (American economist, 1985): kept by lock-in ⟷ Stan Liebowitz & Stephen Margolis (1990): little evidence others were better → **still debated**
- Sort: `NETWORK EFFECT` chat app · payment card · online game · video calls · used-clothes app · a language like English `NONE` bread · bicycle · headphones · umbrella · calculator · running shoes

6 So what?

question 2 of 10

- **Ten questions to ask about any app** · 1 · Who pays, if not you? 2 · How many others are on it? → the more of your people on it, the harder to leave, the harder for a newcomer to start
- Noa → stays where her friends are · Kai → sells where the buyers are · same force: Behavioral 8 (herd) · Games 2 (two carts) · Lesson 6 (are big platforms monopolies?)

Watch out: 2 × users ≠ 2 × ways (≈ 4 ×) · ways = n × (n − 1) ÷ **2** (each pair once) · the better app does not always win · not laziness: staying is the best reply · a network can empty as fast as it grew