How to deal with too much success

spilgames

Today's subject

- About Spil Games
- How success became a problem
- How to deal with scalability
  - Throughput scalability
  - Scalability of data
  - Scalability of organization

About me

- Enrique Paz Perez
- Classic-metal-loving, motorcycle-riding, Erlang enthusiast

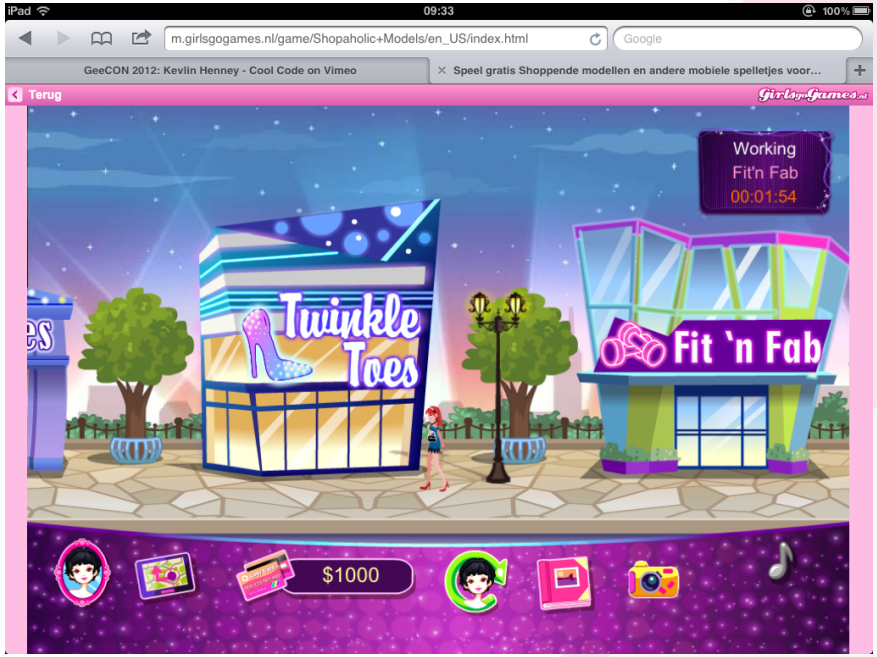
spilgames

spilgames

About Spil Games

Stand-alone games

Single Player: Uphill Rush 4



Mobile: Shopaholic

spilgames

Social Games

Multiplayer: Galaxy Life

Real-time: 7-Sum-Up

spilgames

Free Online Games - Agame

www.agame.com

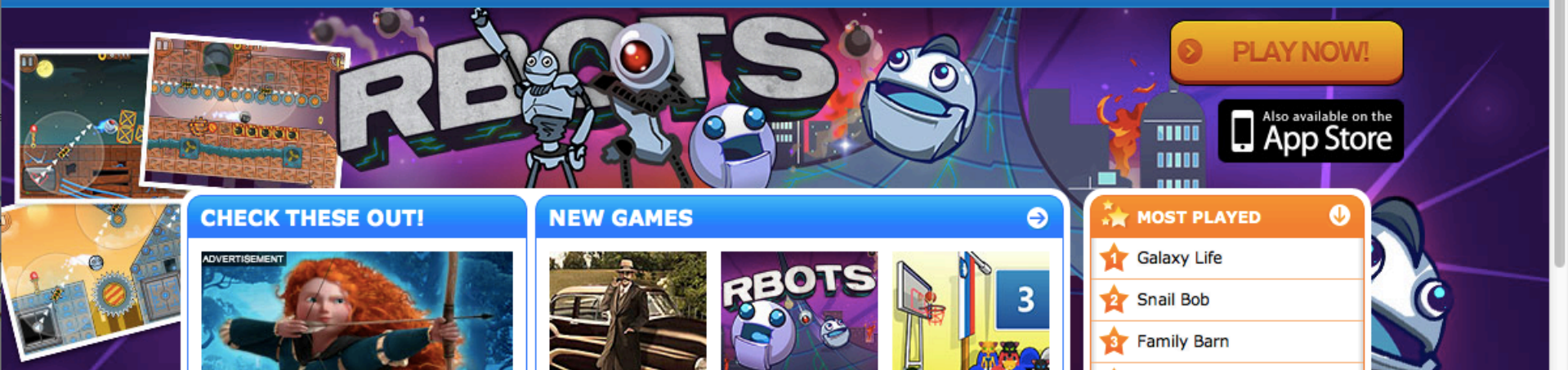
AGAME.COM

Your zone to play free online games

JOIN OR LOG IN

I'm looking for... Search

HOME | BEST GAMES | SOCIAL GAMES | RACING | ACTION | SPORTS | SKILL | ADVENTURE | MULTIPLAYER | MORE →



CHECK THESE OUT!

1 2 3 PLAY IT!

Disney/Pixar's Brave
Grab your bow and arrow and join this fiery heroine for some magical adventures in the Scottish highlands!

NEW: Play Anywhere
Now Agame.com's on your cell!

NEW GAMES

Vintage Car Parking

Rbots

World Basketball Champi...


Goalkeeper Premier


Cookieland


Offroad Rage


Death Racers 2


ivivva Style Quiz


Blackwood & Bell Myster...

See All New Games

MOST PLAYED

1. Galaxy Life
2. Snail Bob
3. Family Barn
4. Offroad Rage
5. Sara's Cooking Class:...
6. Lose the Heat 3: High...
7. Uphill Rush 4
8. Slotomania
9. Uphill Rush 2
10. Death Racers 2

More

BEST RATED →

PLAY SOCIAL GAMES

MORE SOCIAL GAMES

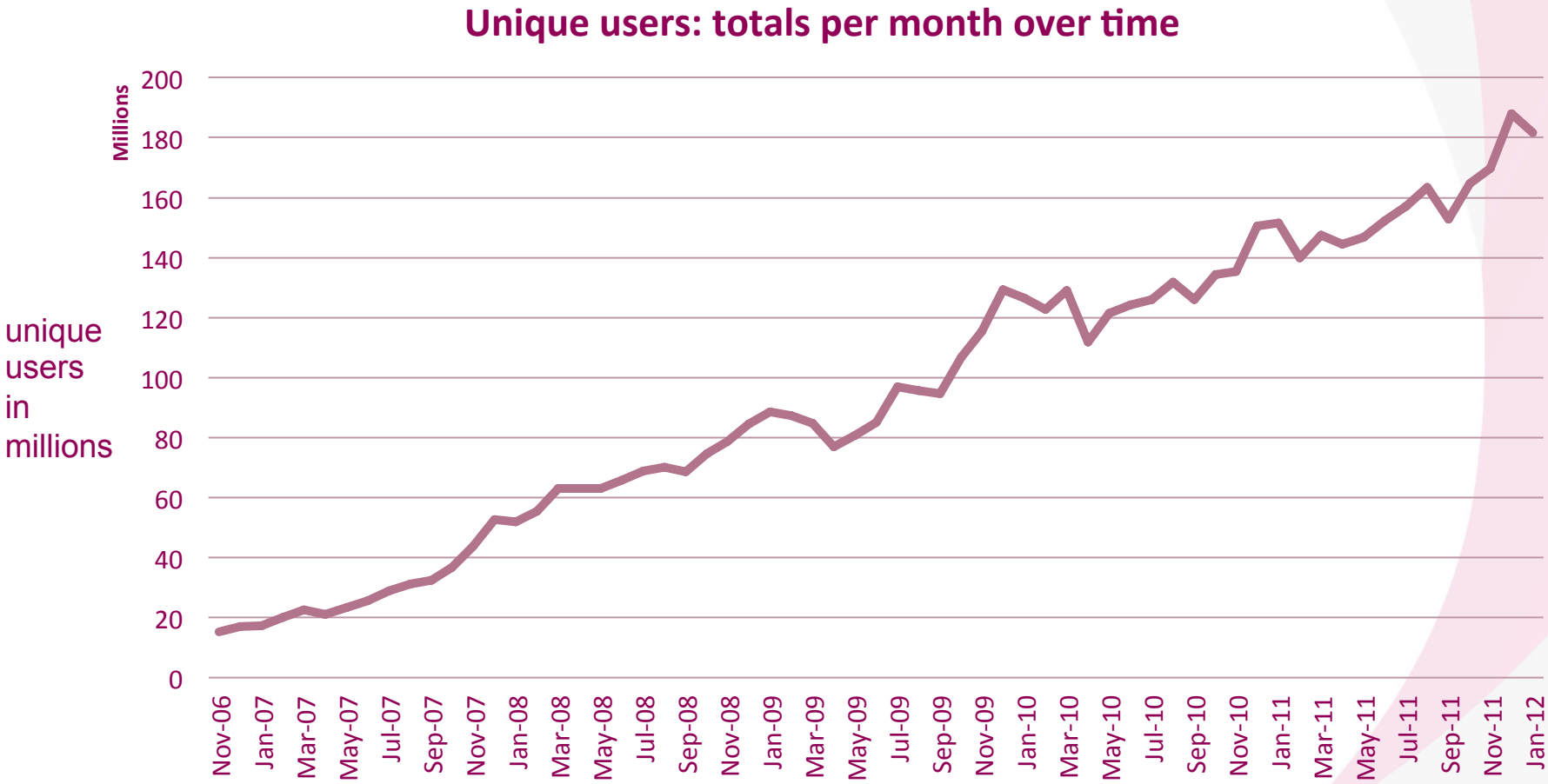
Family Barn | Goodgame Empire | Slotomania | Galaxy Life

About Spil Games

- Social casual gaming platform
- Serving data to 190+ countries world-wide
- 180+ million unique users per month!
- Multiple platforms: desktop, mobile, iOS
- 300+ employees
- Offices in The Netherlands & China
- Revenue: advertising & EUM

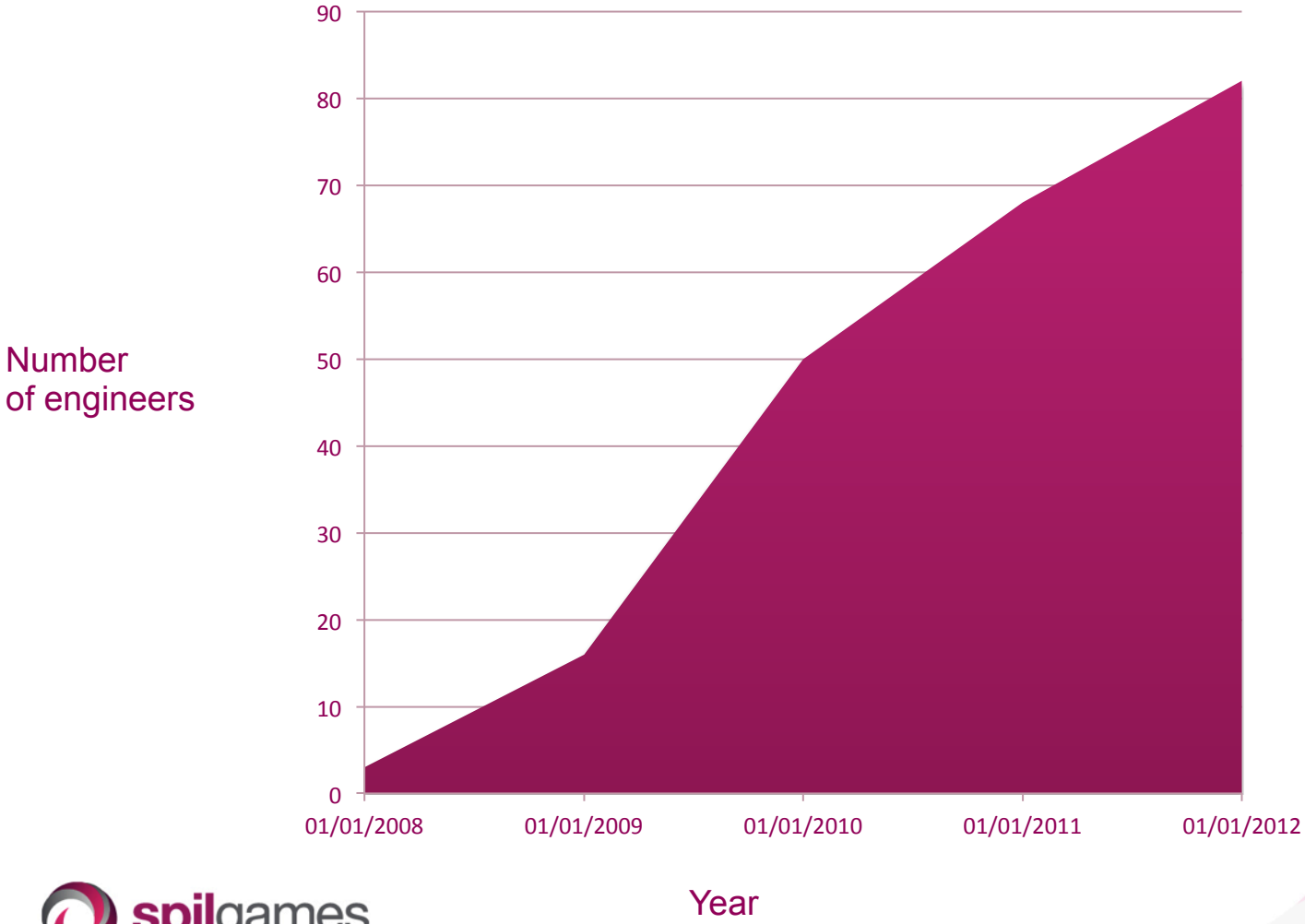
spilgames

Traffic growth over 1600%



spilgames

Tech department growth over 2000%!



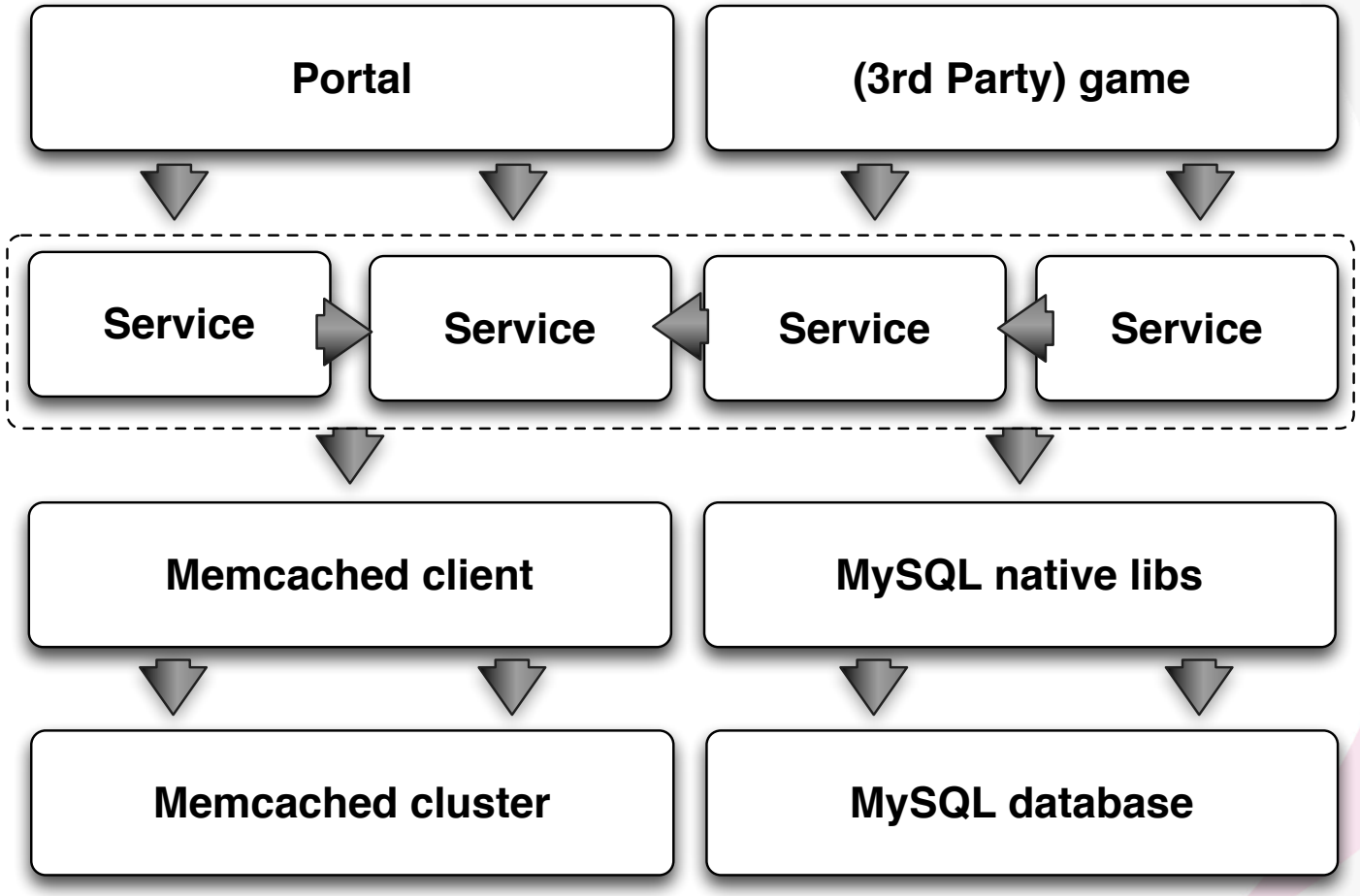
spilgames

Did we have control?

Core technologies

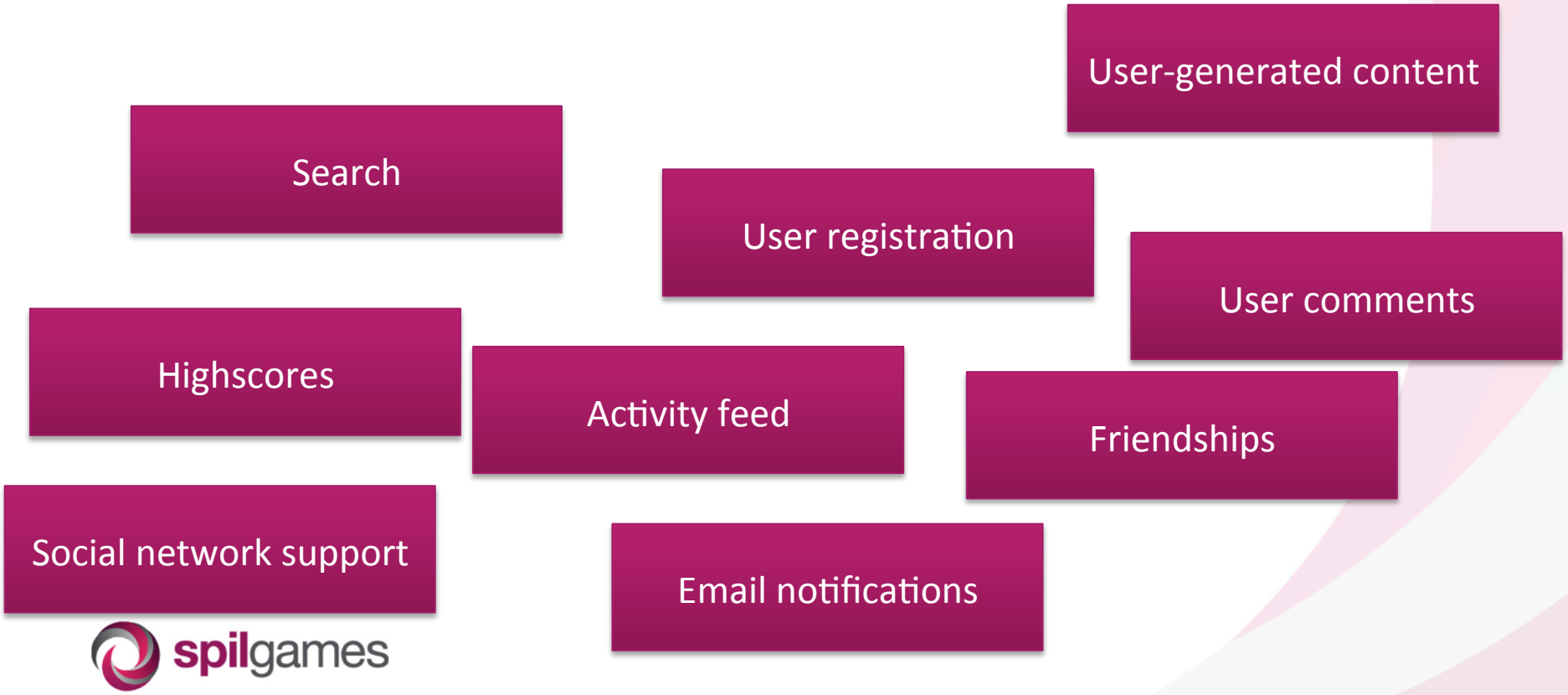
spilgames

Spil, old architecture



The road to success

- From a single-player static site (2006) ...
- ... to a multiplayer social gaming platform (2011)



Luxury problems!

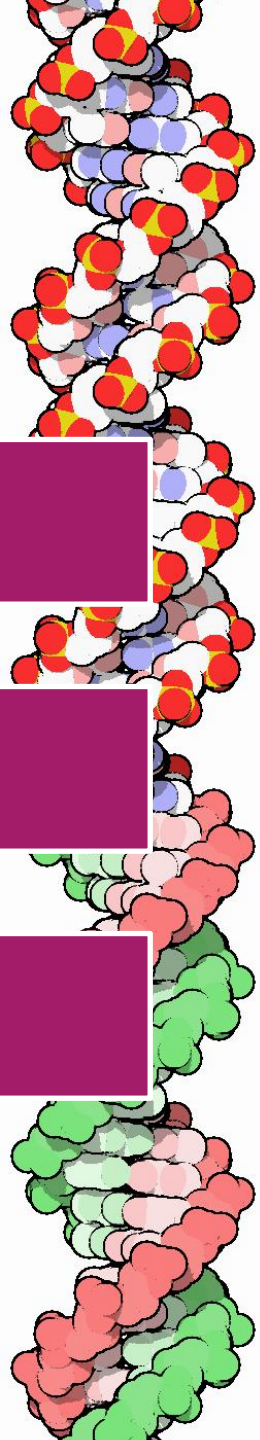
- Putting more people on a project makes it go slower (Brooks)
- No possibilities for sharding (native libs)
- Scaling by adding servers is not linear
- No clear architectural vision:
  - Too many horizontal dependencies
  - Lack of maintainability
  - Independent teams developing the same features
  - Very hard to predict effects of changes

spilgames

A new approach

Architecture is like DNA…

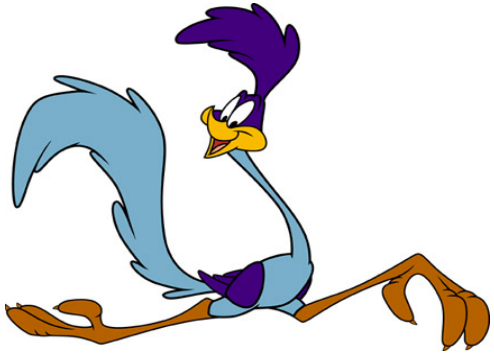
- a **blueprint** for the
- **design** and **evolution**
- of **systems** and **processes**



spilgames

New architecture expectations

- Scale the throughput of the traffic
- Scale the data storage using sharding
- Grow the company and people in a sustainable way



spilgames

New architecture, new technology

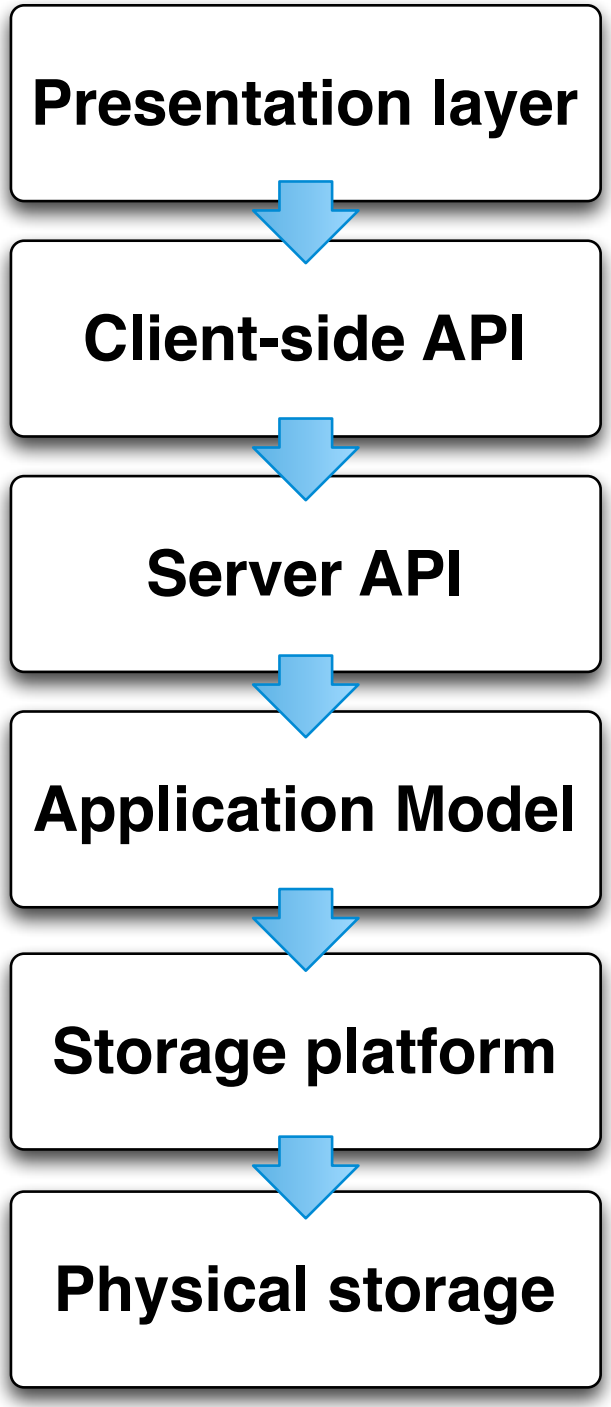
- Like Apache, but better!

- Not Only MySQL but MySQL

- Fault-tolerant distributed applications

Why Erlang?

- Functional language
- High availability: designed for telecom solutions
- Excels at concurrency, distribution, fault tolerance
- Do more with less!
- Other companies using Erlang:


Presentation layer
Client-side API
Server API
Application Model
Storage platform
Physical storage

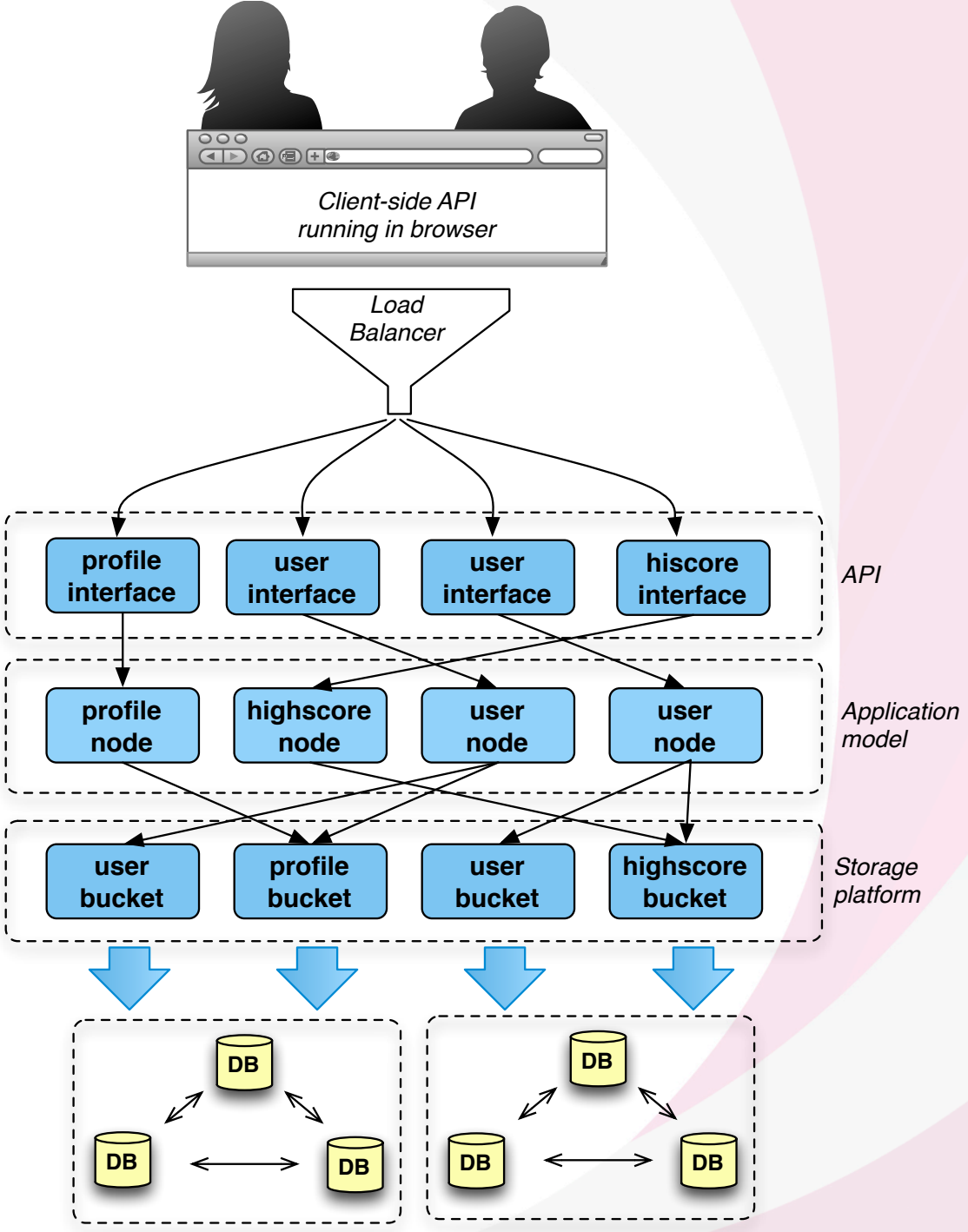
spilgames

Throughput Scalability

Throughput Scalability

- Scale horizontally in every layer
- More efficient
- Inter-layer communication is redundant & fault-tolerant
- Avoiding overhead
- Concurrency & isolation by default

- Well-defined interface
- Scalable layers
- Efficient communication



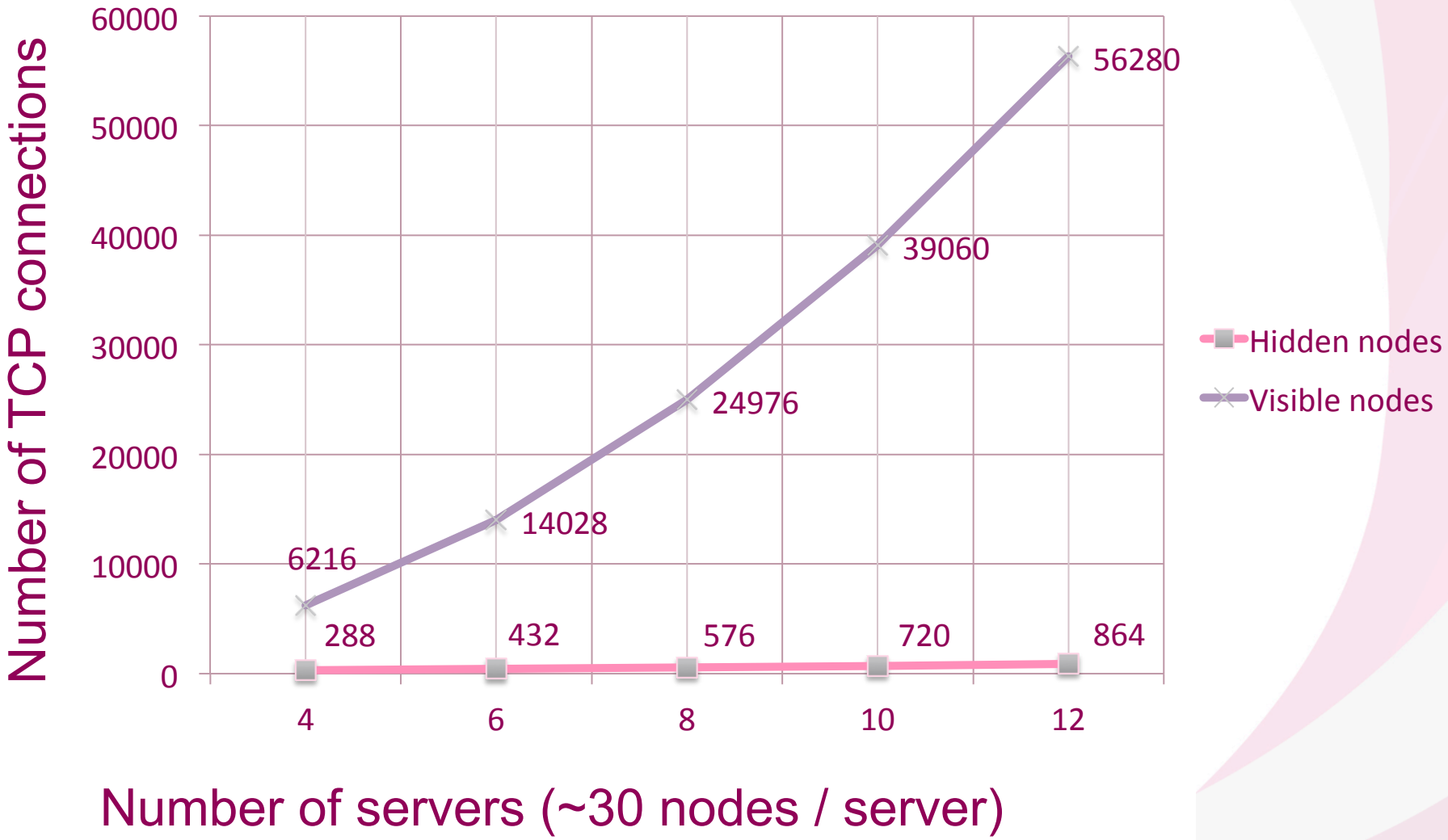
spilgames

Keeping the Erlang cluster connected

- Scale individual subsystems
- Vertical network connections
- Connecting all nodes is a bad idea:
  - Not needed
  - Number of open connections

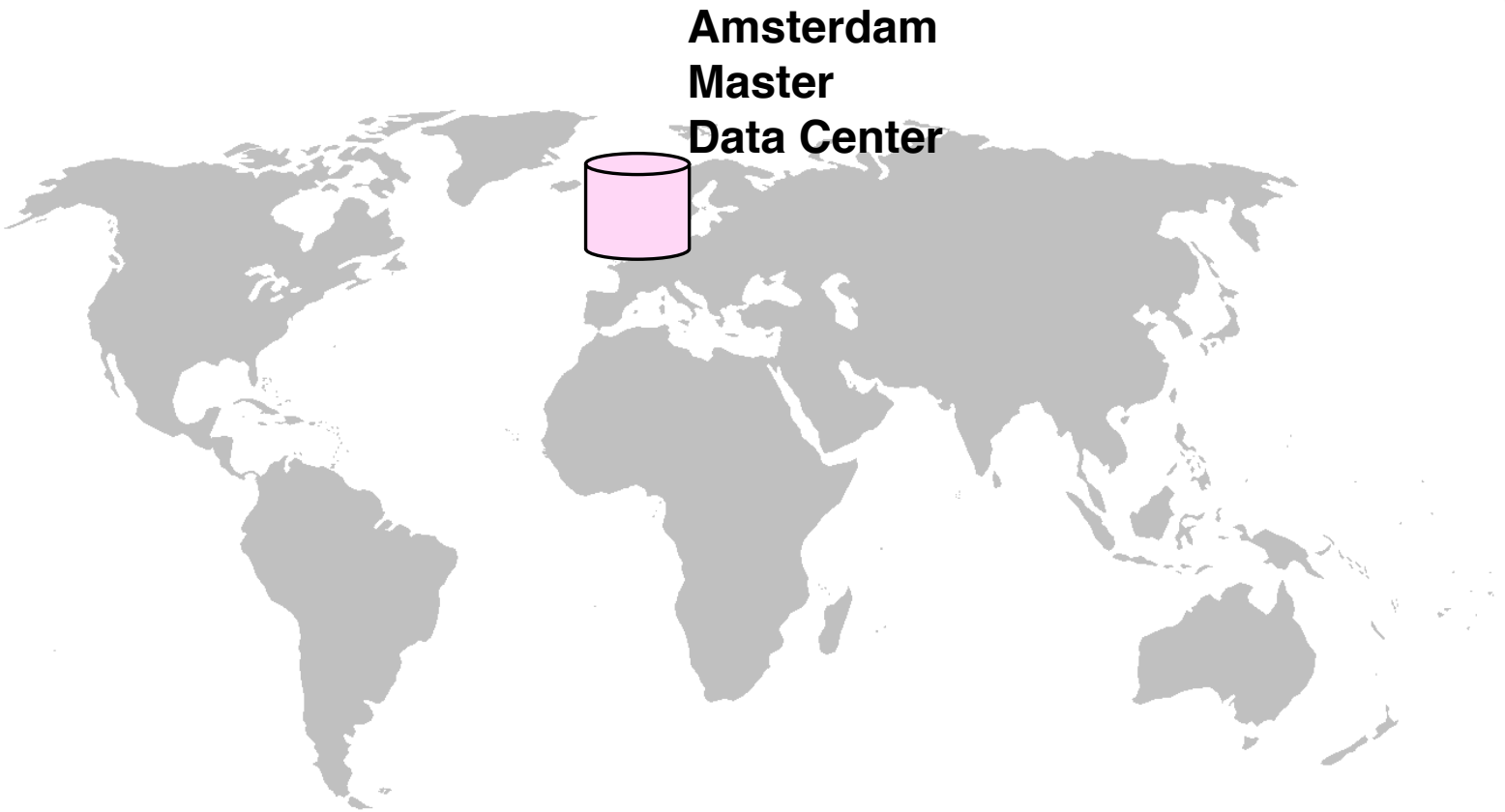
- Solution: use hidden nodes!
  - Each node specifies the nodes it needs
  - How does it scale?

Hidden nodes vs. visible nodes

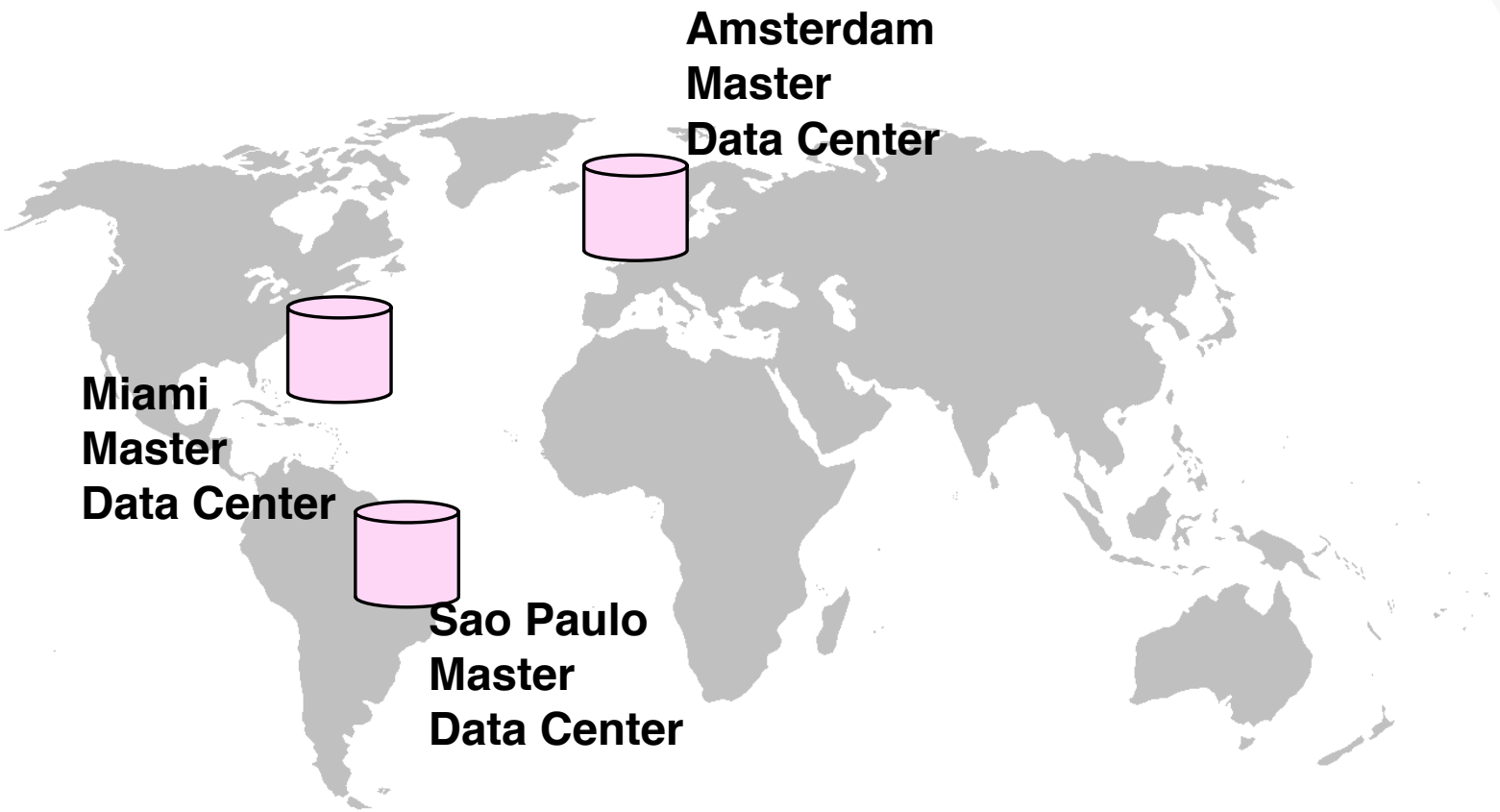


Data Scalability

From one data center…

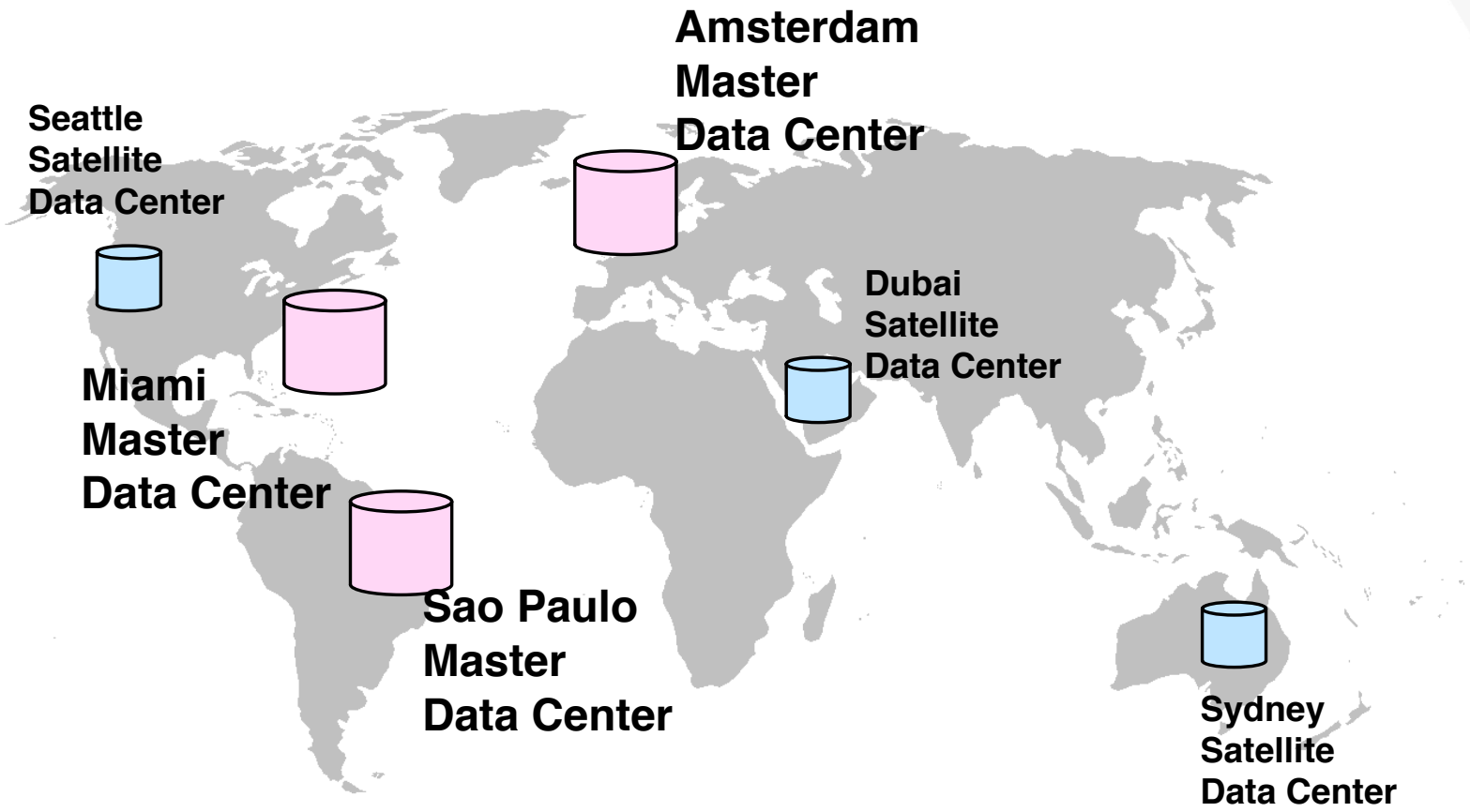


… to many more.



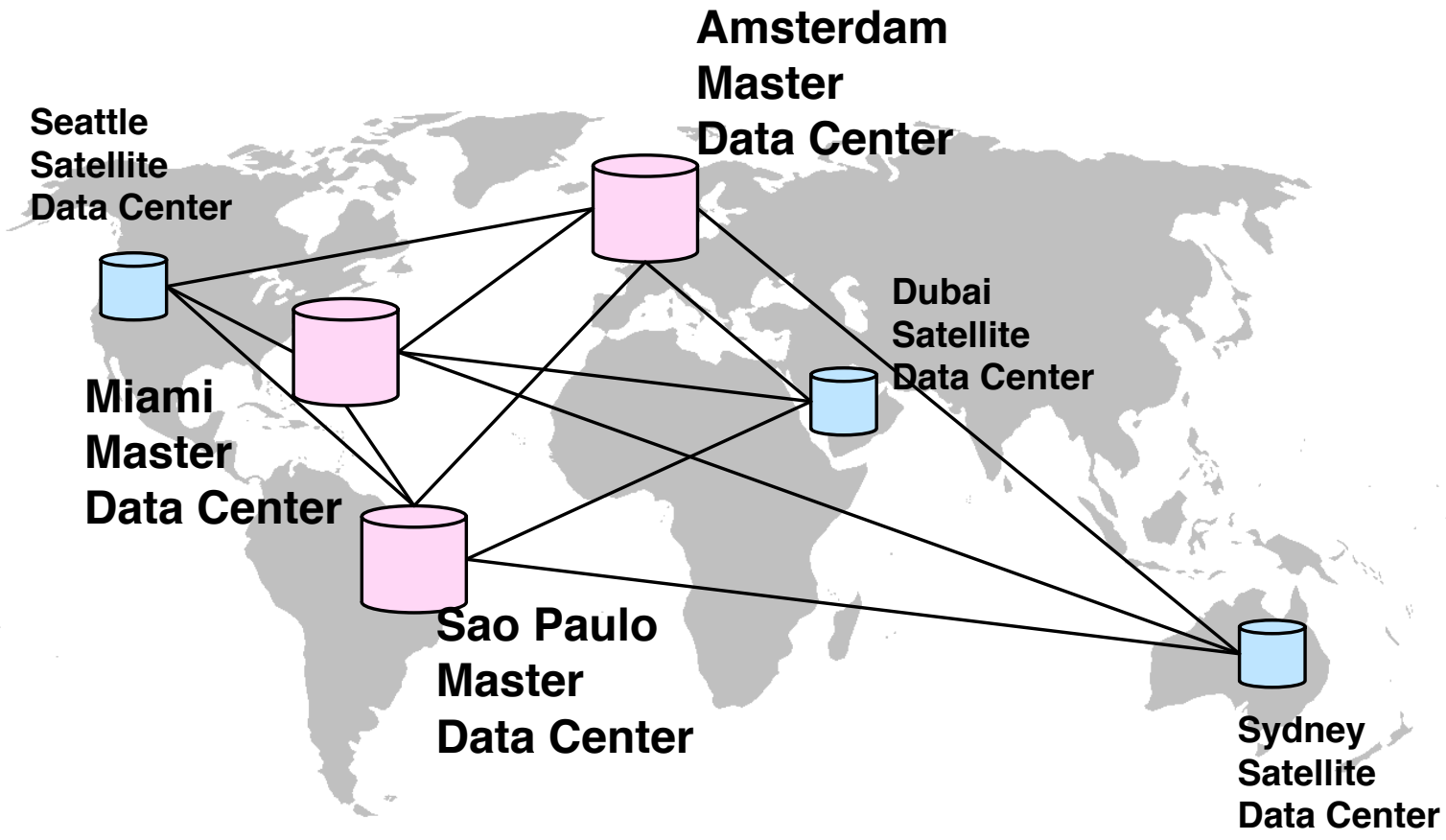
spilgames

Adding *memory-only* data centers…



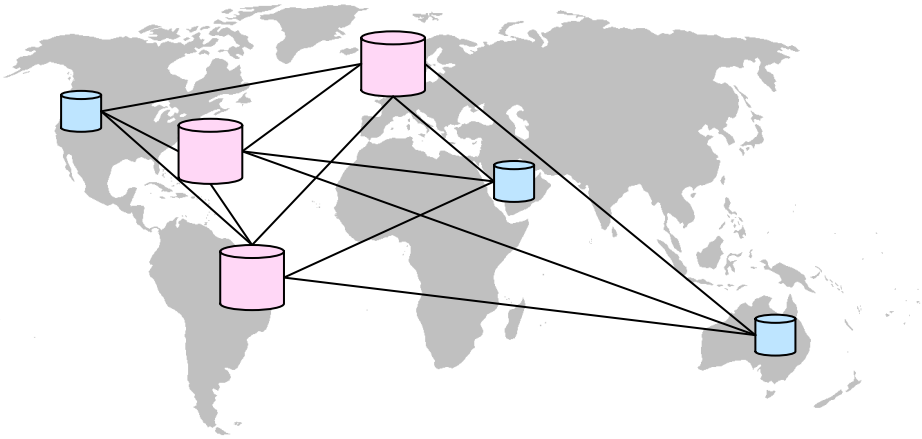
spilgames

… which are all interconnected.



Data Scalability

- Local sharding of data is user-based
- Data migrates automatically
- Data migrates on-demand
- Geographically distributed data centers

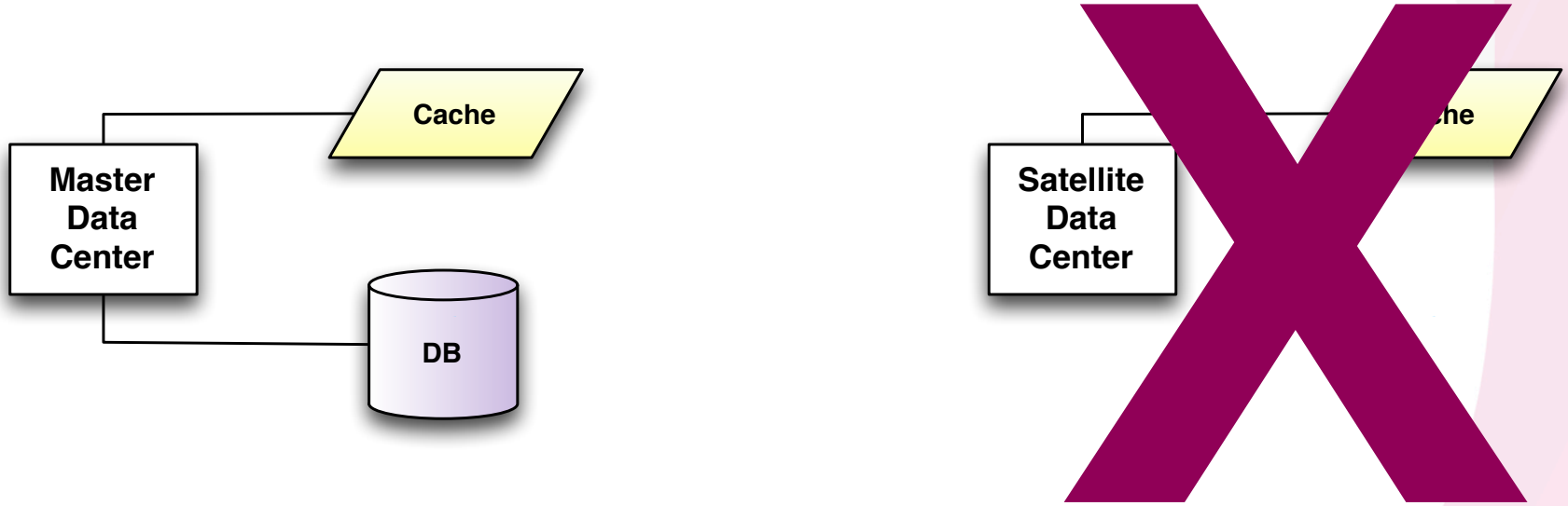


spilgames

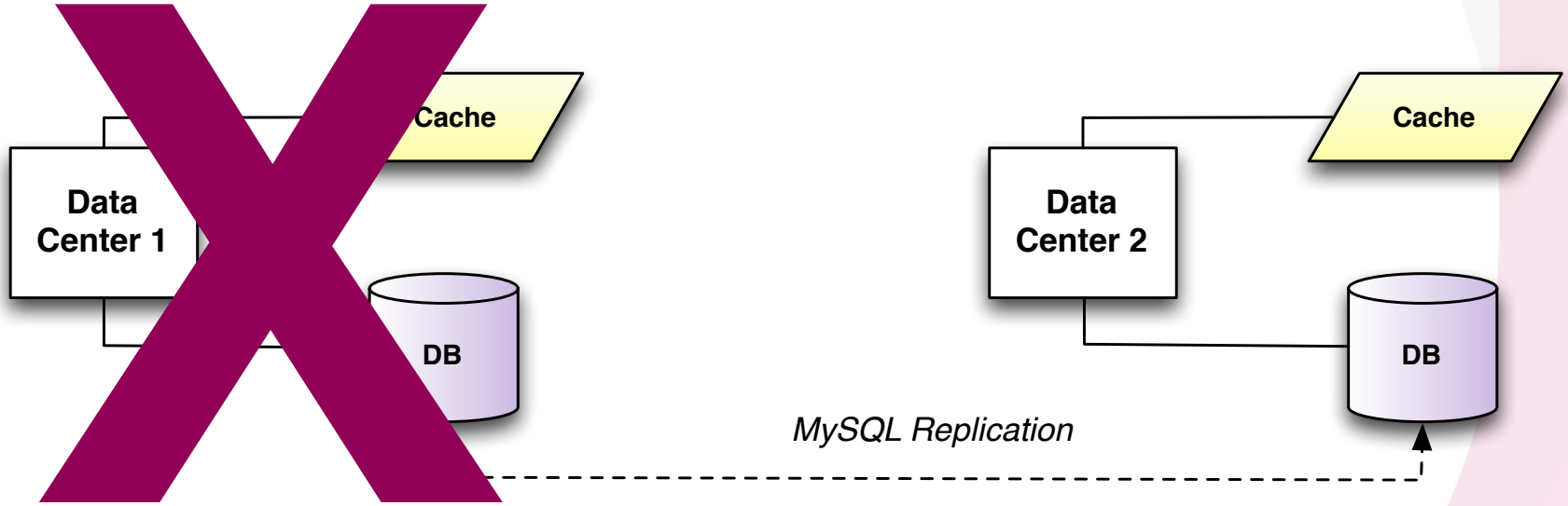
Properties of an operation

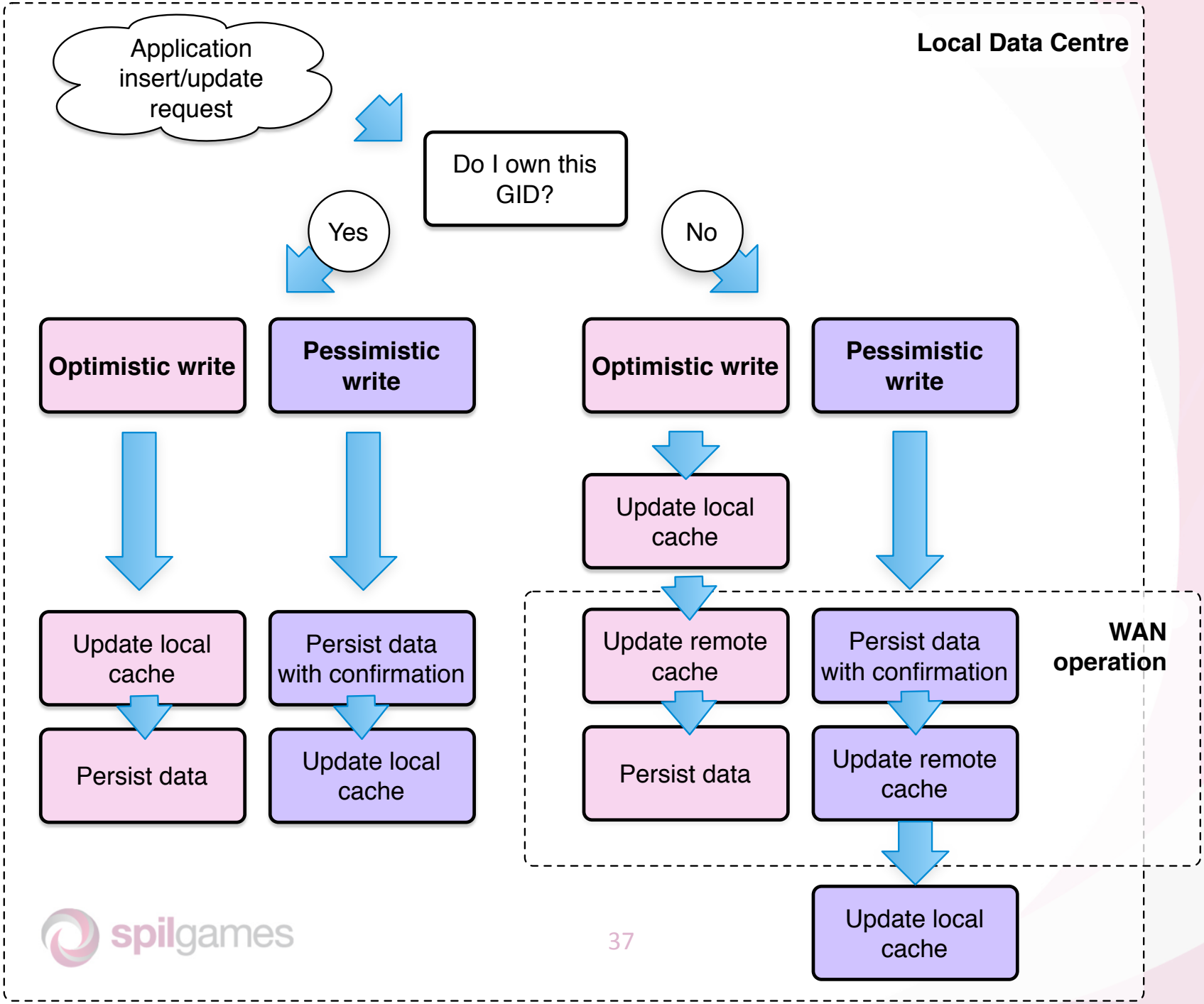
- Global identifiers: GIDs
- Every Bucket/GID operation is atomic
- Two types of storage:
  - Cache
  - Persisted
- Two types of operations:
  - Optimistic
  - Pessimistic

Disposable Data Centers



Dealing with catastrophies




Local Data Centre
Application insert/update request
Do I own this GID?
Yes
No
Optimistic write
Pessimistic write
Optimistic write
Pessimistic write
Update local cache
Update local cache
Persist data with confirmation
Update remote cache
Persist data with confirmation
WAN operation
Persist data
Update local cache
Persist data
Update remote cache
Update local cache

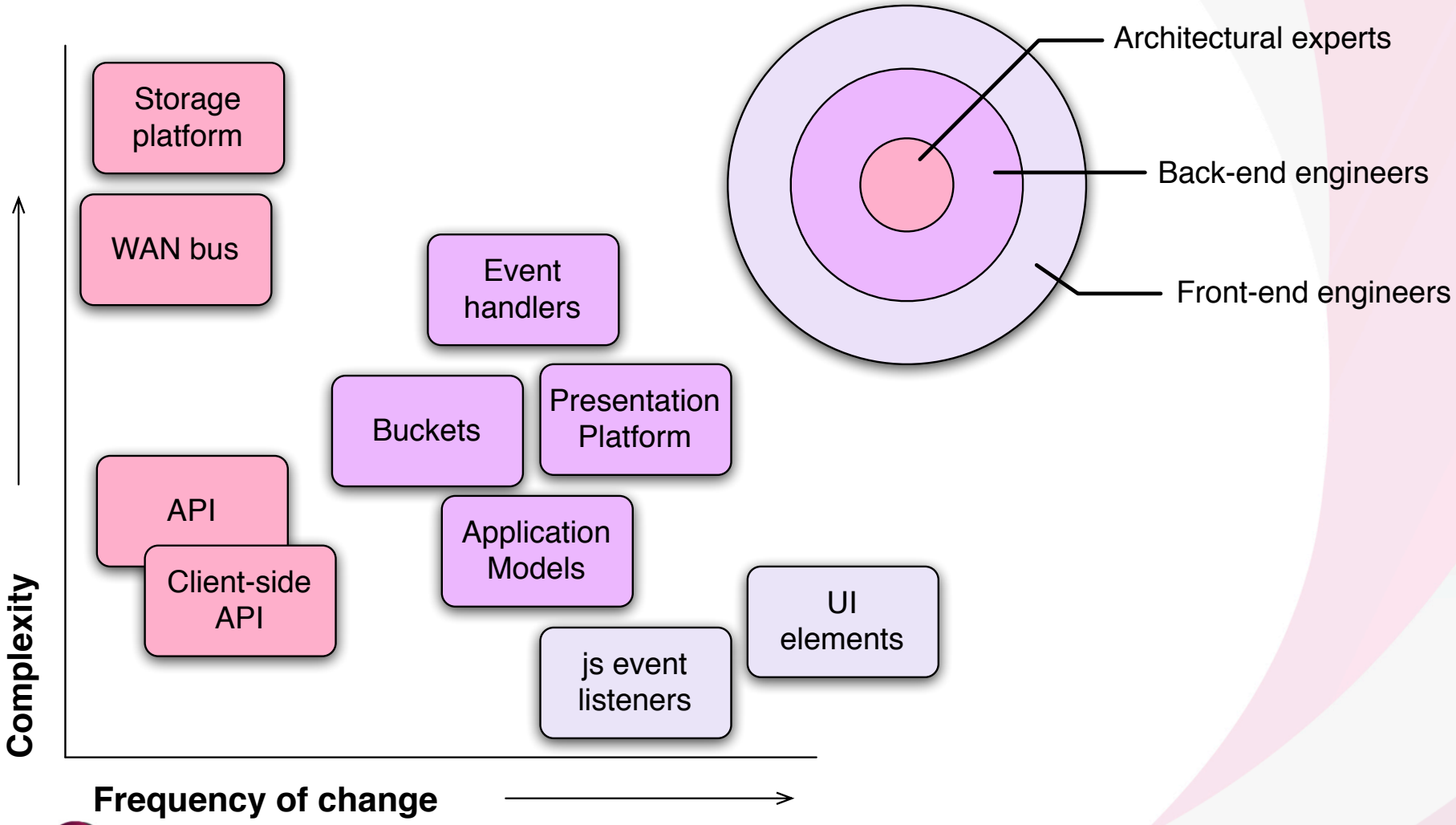
Organizational Scalability

What we want

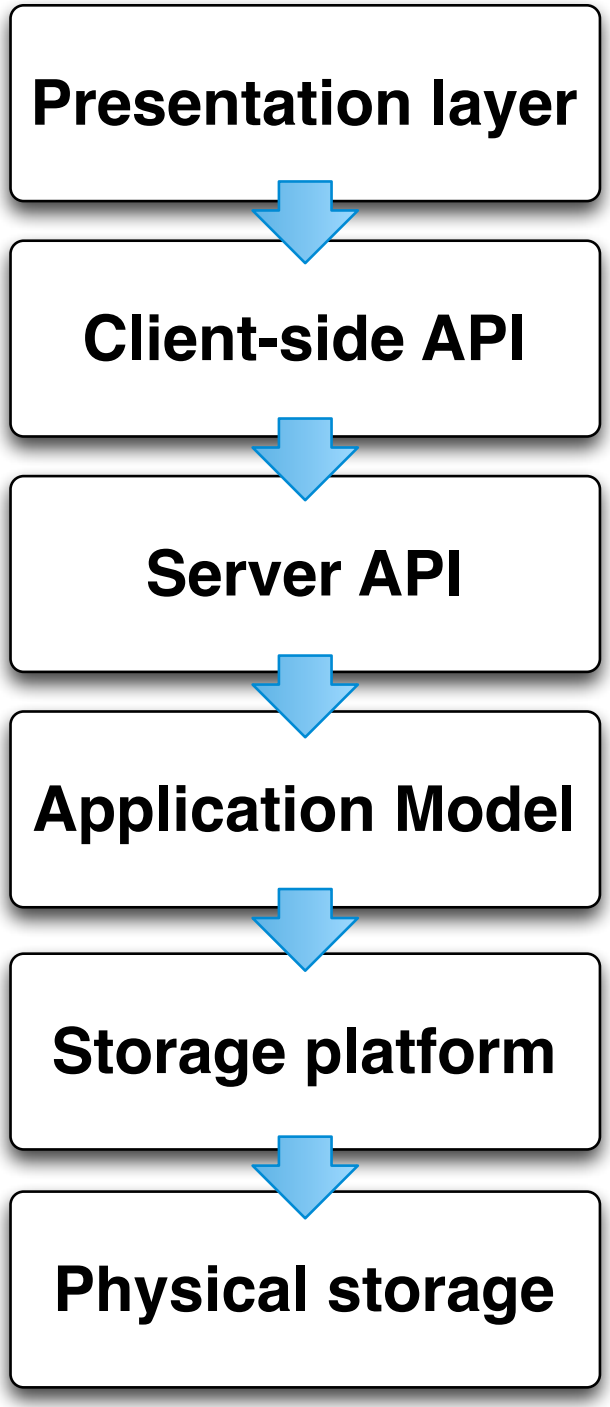
- Teams need to *adapt* to a fast-changing market
- Every team needs to be able to *deliver*
- No need to learn *everything*

spilgames

A flexible development workforce



spilgames



Front-end engineers
Javascript/HTML/CSS

75%

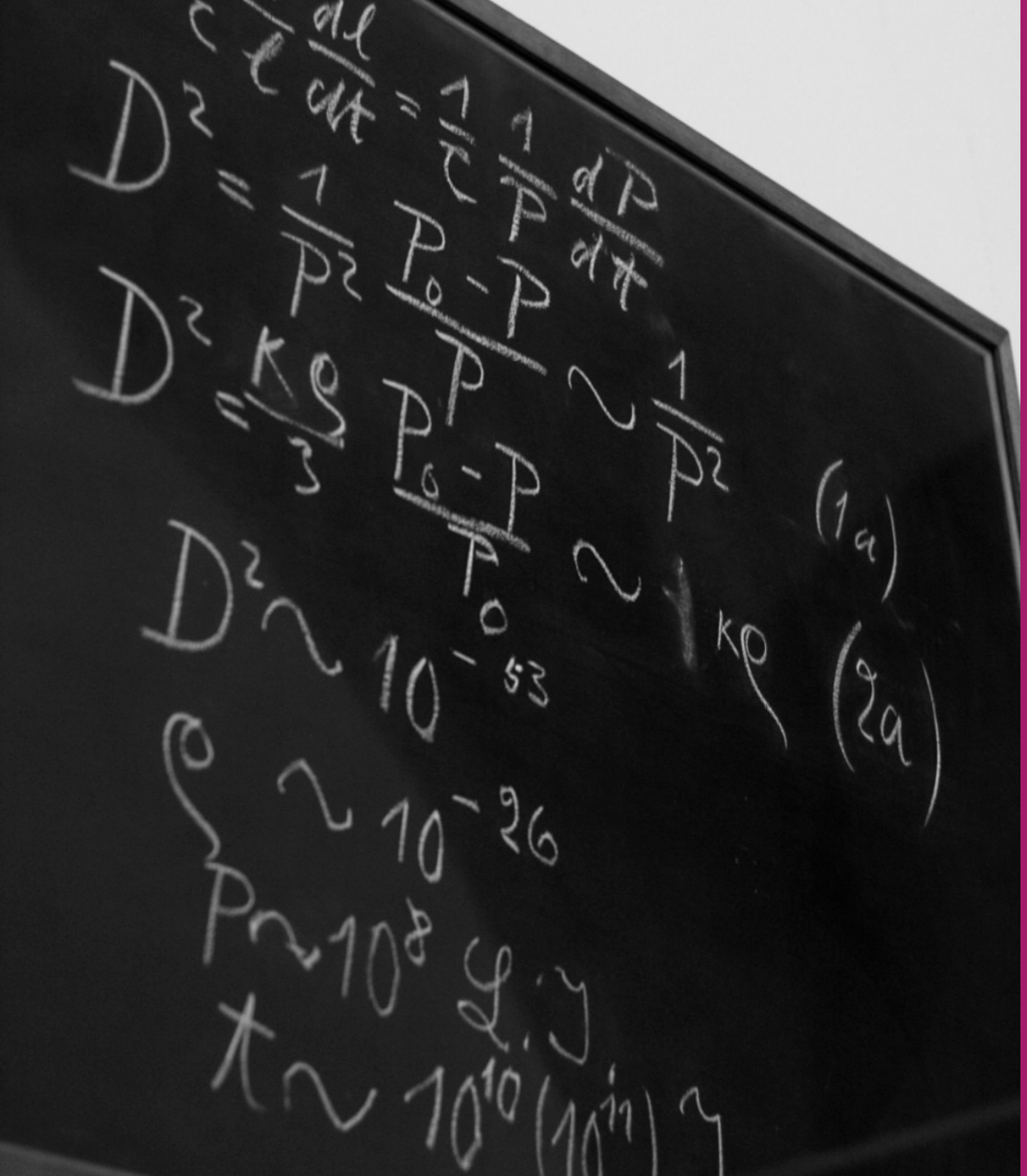
Organizational Scalability

Back-end engineers & Architectural experts
Erlang

20%

Database specialists
MySQL

5%



Lessons Learned

What we've done…

- Set up tooling for development
- Moved functions behind one, solid API
- Tested inter-layer communication with live traffic
- Set up development and deployment processes
- Deployed full vertical slices to live

... And what we're doing

- Organizational challenge:
  - Development & hosting landscape is changing
  - Independent teams
  - Training current workforce
- Adding geographical storage capabilities
- Back-end and front-end are being released now
- Next data center in early 2013

Lessons Learned

- An architectural vision is crucial:
  - Provide focus for developers
  - Less risk of chaos
  - Control the information flow
- Use the right tools for the right task:
  - Don't be afraid to switch to a different (proven) technology…
  - … Also don't be afraid to stick with proven technology
- Hide implementation in a layer …
- … expose through a strict API …
- … with efficient communication

Questions

Useful Links

PIQI & **PIQI-RPC**:
https://github.com/alavrik/piqi
https://github.com/alavrik/piqi-rpc

Erlang productivity by Jan Henry Nystrom
http://www.slideshare.net/JanHenryNystrom/productivity-gains-in-erlang by Jan Henry Nystrom

Architectural principles by Randy Shoup:
http://singztechmusings.wordpress.com/2011/09/05/performance-engineering-slides-on-ebay-architecture-principles-and-high-performance-computing/

Joe Armstrong replying to Steve Vinoski regarding **Erlang-RPC**:
http://armstrongonsoftware.blogspot.nl/2008/05/road-we-didnt-go-down.html

spilgames