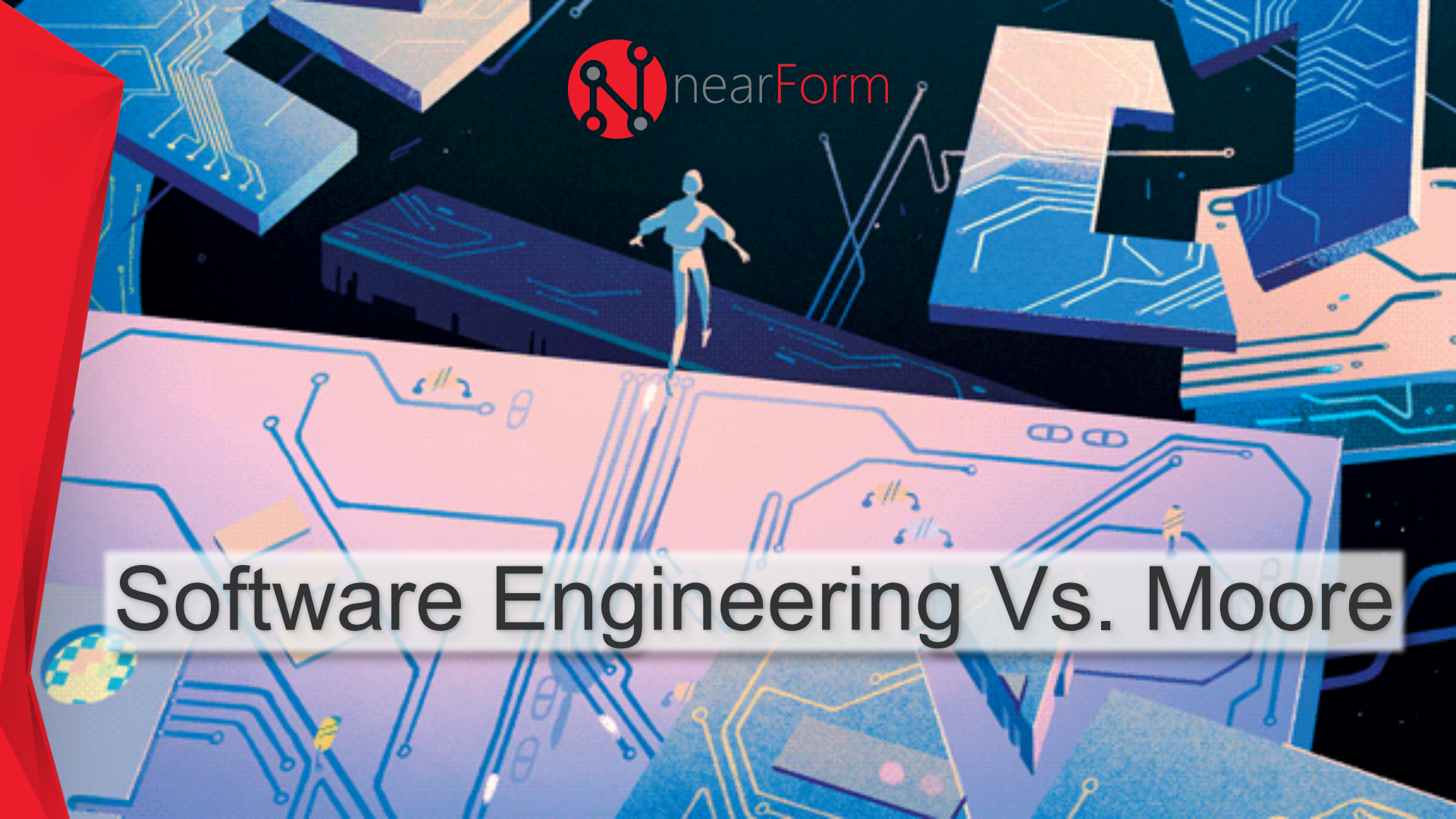
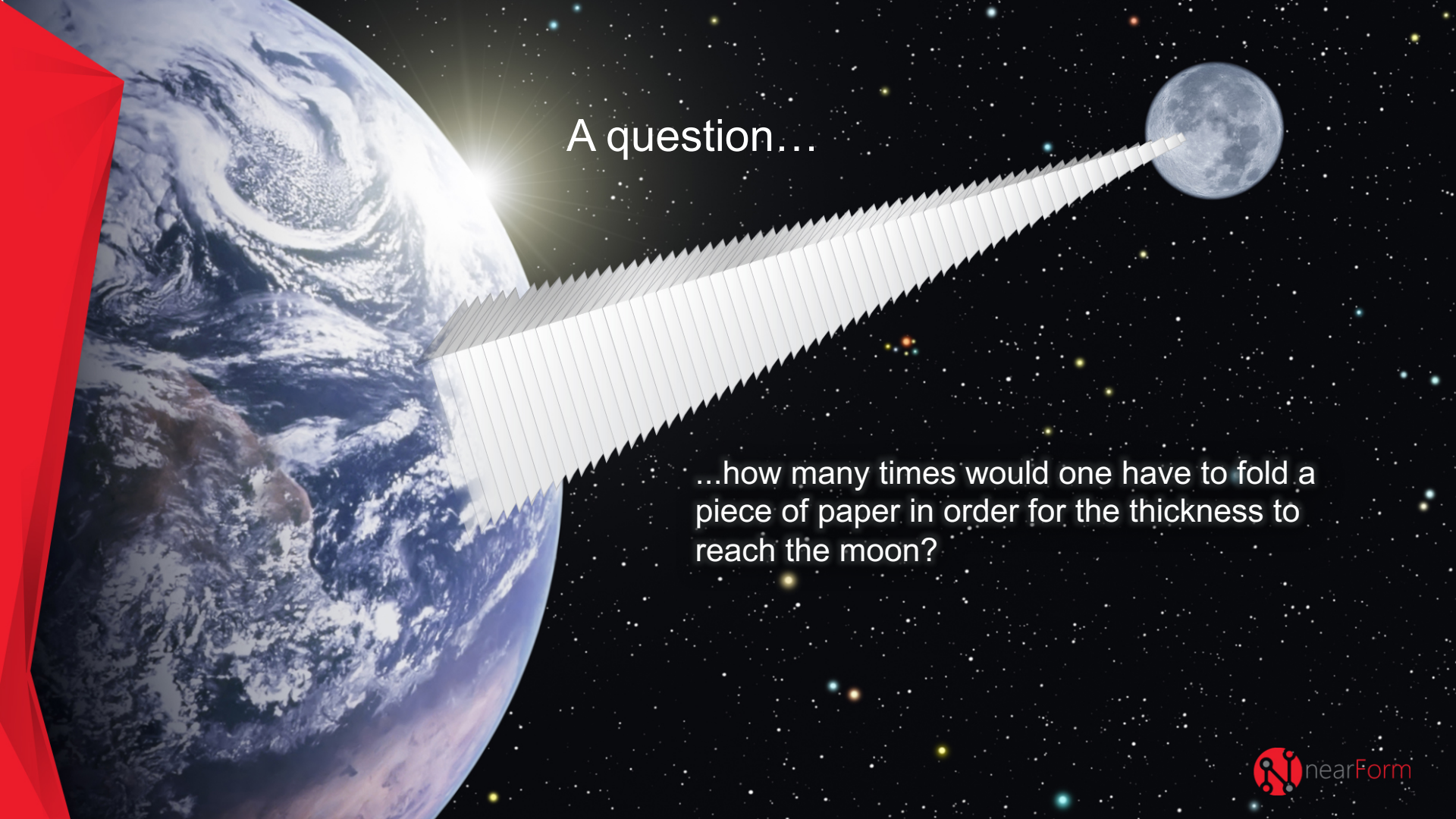

nearForm
Software Engineering Vs. Moore


A question…
...how many times would one have to fold a piece of paper in order for the thickness to reach the moon?
nearForm

Answer

Just **42** folds

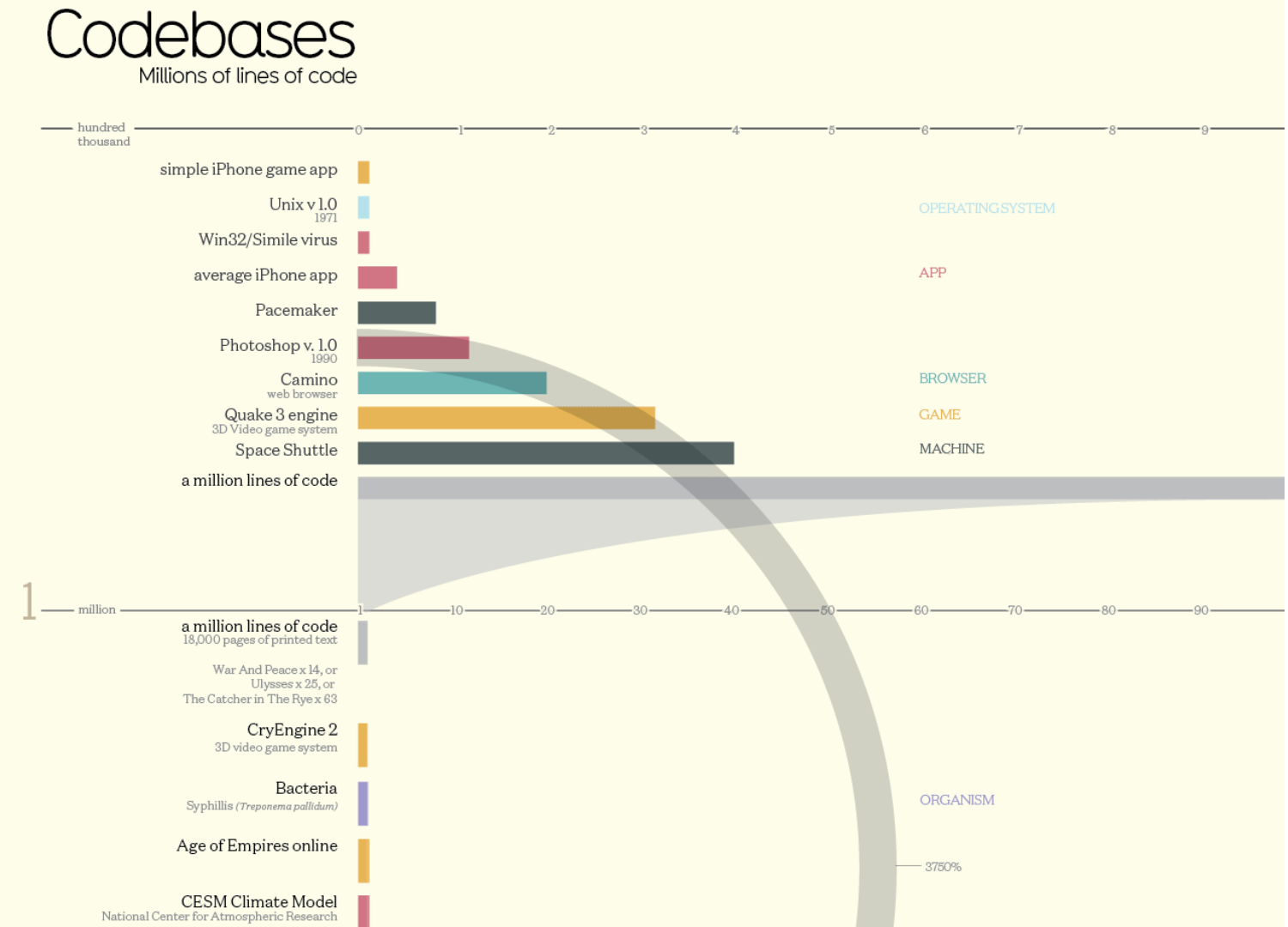
103 folds - as thick as the width of the known universe

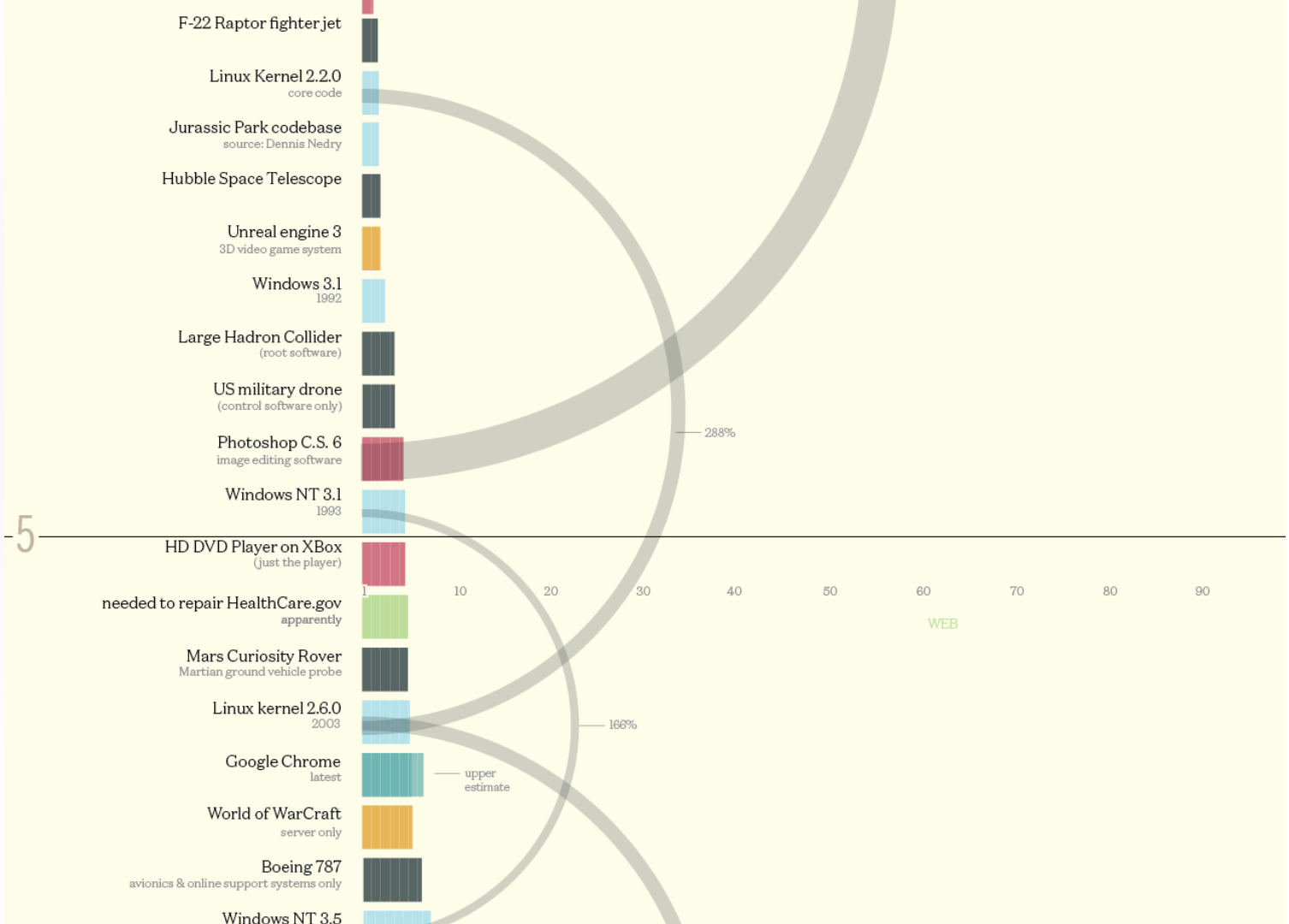
Exponential growth - human brains think linearly…

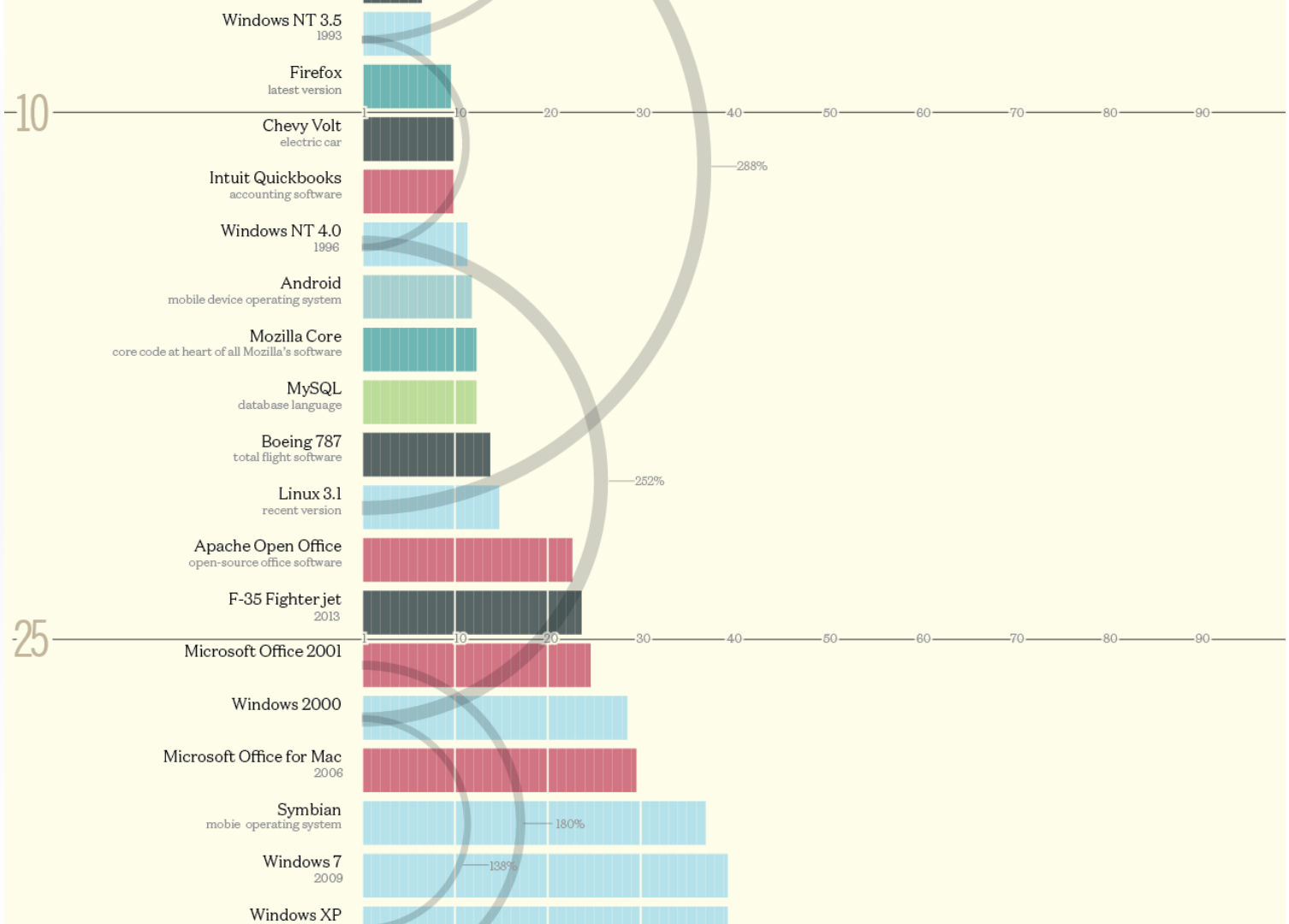
There is a well known exponential law in our industry

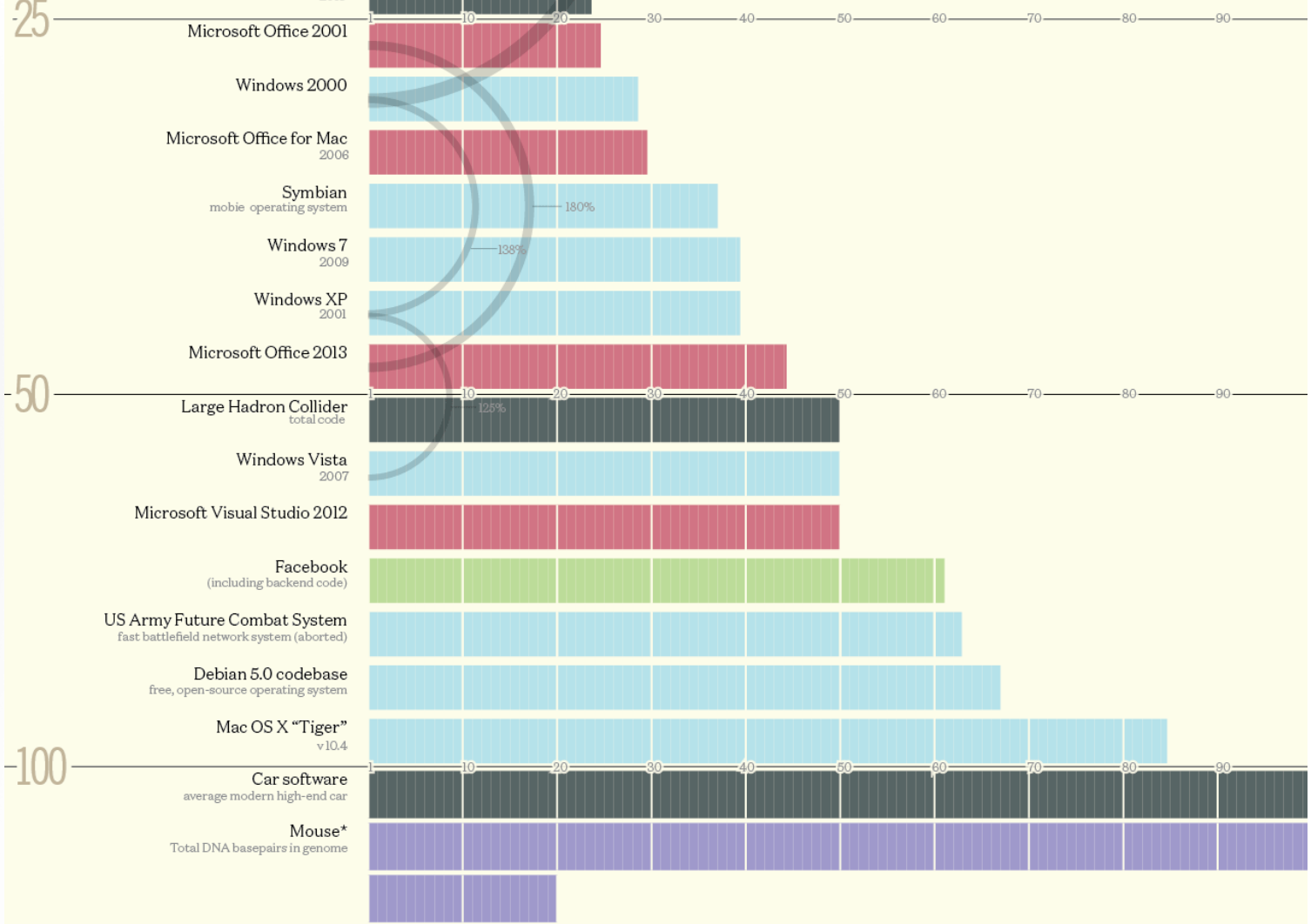
Moore's law

The exponential growth in compute power allows
us to build today what was impossible yesterday


Codebases
Millions of lines of code
hundred thousand
0
1
2
3
4
5
6
7
8
9
simple iPhone game app
Unix v 1.0
1971
Win32/Simile virus
average iPhone app
Pacemaker
Photoshop v. 1.0
1990
Camino
web browser
Quake 3 engine
3D Video game system
Space Shuttle
a million lines of code
OPERATING SYSTEM
APP
BROWSER
GAME
MACHINE
1
million
1
10
20
30
40
50
60
70
80
90
a million lines of code
18,000 pages of printed text
War And Peace x 14, or
Ulysses x 25, or
The Catcher in The Rye x 63
CryEngine 2
3D video game system
Bacteria
Syphillis (Treponema pallidum)
Age of Empires online
CESM Climate Model
National Center for Atmospheric Research
ORGANISM
3750%

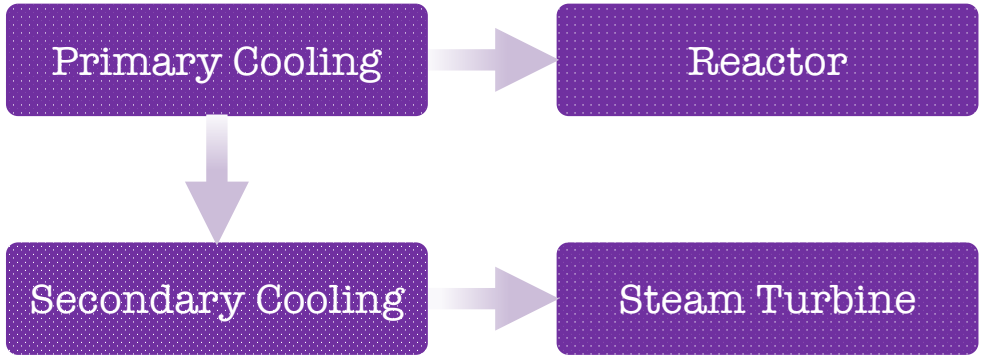

F-22 Raptor fighter jet
Linux Kernel 2.2.0
core code
Jurassic Park codebase
source: Dennis Nedry
Hubble Space Telescope
Unreal engine 3
3D video game system
Windows 3.1
1992
Large Hadron Collider
(root software)
US military drone
(control software only)
Photoshop C.S. 6
image editing software
Windows NT 3.1
1993
288%
5
HD DVD Player on XBox
(just the player)
1
10
20
30
40
50
60
70
80
90
WEB
needed to repair HealthCare.gov
apparently
Mars Curiosity Rover
Martian ground vehicle probe
Linux kernel 2.6.0
2003
166%
Google Chrome
latest
upper
estimate
World of WarCraft
server only
Boeing 787
avionics & online support systems only
Windows NT 3.5


Windows NT 3.5
1993
Firefox
latest version
10
1
10
20
30
40
50
60
70
80
90
Chevy Volt
electric car
288%
Intuit Quickbooks
accounting software
Windows NT 4.0
1996
Android
mobile device operating system
Mozilla Core
core code at heart of all Mozilla's software
MySQL
database language
Boeing 787
total flight software
252%
Linux 3.1
recent version
Apache Open Office
open-source office software
F-35 Fighter jet
2013
25
1
10
20
30
40
50
60
70
80
90
Microsoft Office 2001
Windows 2000
Microsoft Office for Mac
2006
Symbian
mobie operating system
180%
Windows 7
2009
138%
Windows XP


25
1
10
20
30
40
50
60
70
80
90
Microsoft Office 2001
Windows 2000
Microsoft Office for Mac
2006
Symbian
mobie operating system
180%
Windows 7
2009
138%
Windows XP
2001
Microsoft Office 2013
50
Large Hadron Collider
total code
125%
Windows Vista
2007
Microsoft Visual Studio 2012
Facebook
(including backend code)
US Army Future Combat System
fast battlefield network system (aborted)
Debian 5.0 codebase
free, open-source operating system
Mac OS X "Tiger"
v10.4
100
Car software
average modern high-end car
Mouse*
Total DNA basepairs in genome

Three Mile Island

What was the root cause?



Pressurised water reactors

A simple architecture does not imply a simple implementation.

- Condensate polisher leaks water into pneumatic system
- Air pressure falls
- Main water pumps to secondary cooling close
- Loss of water from secondary cooling
- Backup water pumps start, but...
- No water as backup valves closed!
- Heat exchange with primary coolant stops
- Reactor "SCRAMs" - control rods dropped
- Primary coolant water overheats as fuel rods still hot
- Pressure relief valve opens, but fails to close
- Pressure relief valve indicator seems to show closed!
- 13 seconds into accident, already in LOCA
- Emergency water is injected, but then shut off
- Primary coolant drains away
- Reactor core partially exposed
- Partial meltdown with hydrogen bubbles

Some Historical Trends – What's been happening

CODE VOLUME

1980s ~ 1M LOC monoliths

1990s ~ 1M LOC monoliths

2000s ~ 50K LOC SOA

2010s ~ < 500 LOC micro-services

ITERATION TIMES

1980s (Waterfall) ~ 1year

1990s (Early agile scrum) ~ 3 months

2000s (Agile XP et al) ~ 2 weeks

2010s (Extreme agile) ~ 1 day

RELEASE CYCLES

1980s ~ 2/3 years

1990s ~ < 1 year

2000s ~ 3 month

2010s ~ 1 week and in some cases < 1 day

Technology Enablers – What the disruptors do

CLOUD

- ~~Capex, h/w lead times, capacity planning~~
- Compute power commoditized.
- All infrastructure is code, all costs are operational, capacity scales elastically

CONTAINERS

- ~~Operations team~~
- The ‘Runs on my machine’ Problem– solved
- DevOps, continuous delivery pipelines, immutable deployments

ARCHITECTURE

- ~~Monolith -> SOA -> micro-services~~
- Enabled by rapid deployment pipeline and elastic infrastructure
- Reduce the gap between development and production

LANGUAGES

- ~~High ceremony, object oriented, closed source, specialist developers~~
- Low ceremony, dynamic languages, full stack polyglot developers
- Incremental application development
- Open Source

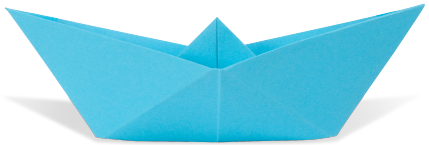
nearForm

Inhibitors – What's stopping you?

1. **Organizational and development inertia**
   - Use technology as a catalyst for organizational change
   - 'Reverse Conway's'
2. **Politics**
   - 'I don't see any role for our ops group going forward'
3. **Language / platform religion**
   - Php / Cobol / Whatever is the best platform ever
4. **Closed thinking – reluctance to adopt open source**
   - Re-inventing the wheel
5. **Fear of failure**
   - Failure is OK – fail fast and learn fast

nearForm – What we do

Professional services company - specialize in helping large enterprises leverage disruptive technologies

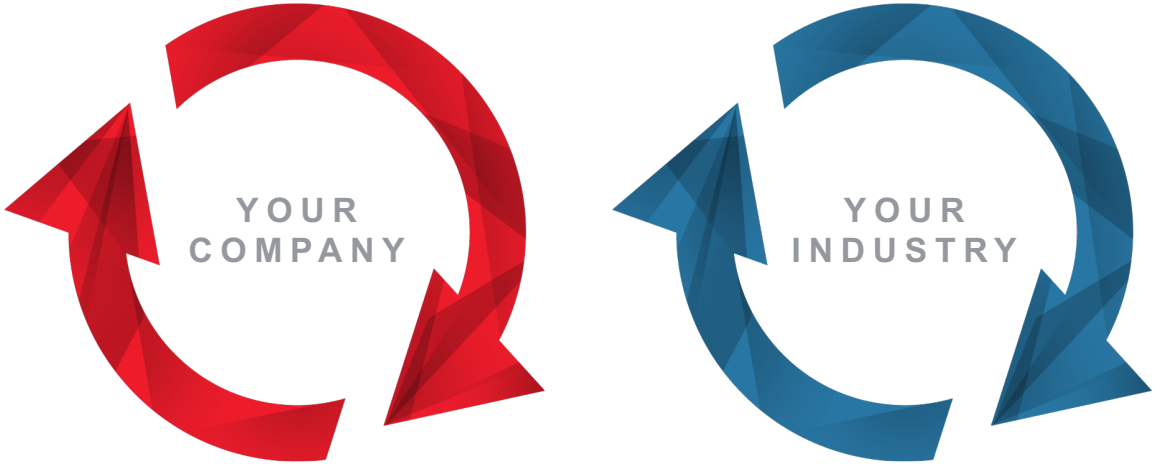


Doubled / Tripled revenues year on year since inception, now over 100 staff.
100+ projects shipped.

Digital transformation- Consultancy, Training, and Co-Development

nearForm

Innovation and Delivery



nearForm

Innovation and Delivery

airbnb

UBER

NETFLIX

Innovation Delivery

airbnb

UBER

NETFLIX

nearForm

Summary

EXPONENTIAL COMPUTE GROWTH

Enables creation of disruptive technology

EARLY ADOPTERS WIN BIG

TECHNOLOGY CAN DRIVE ORGANIZATIONAL CHANGE

nearForm