

O'REILLY

Velocity

Web Performance and
Operations Conference



Velocity 2010 Highlights

淘宝 - 核心系统研发 - 叔度

2010-07-09

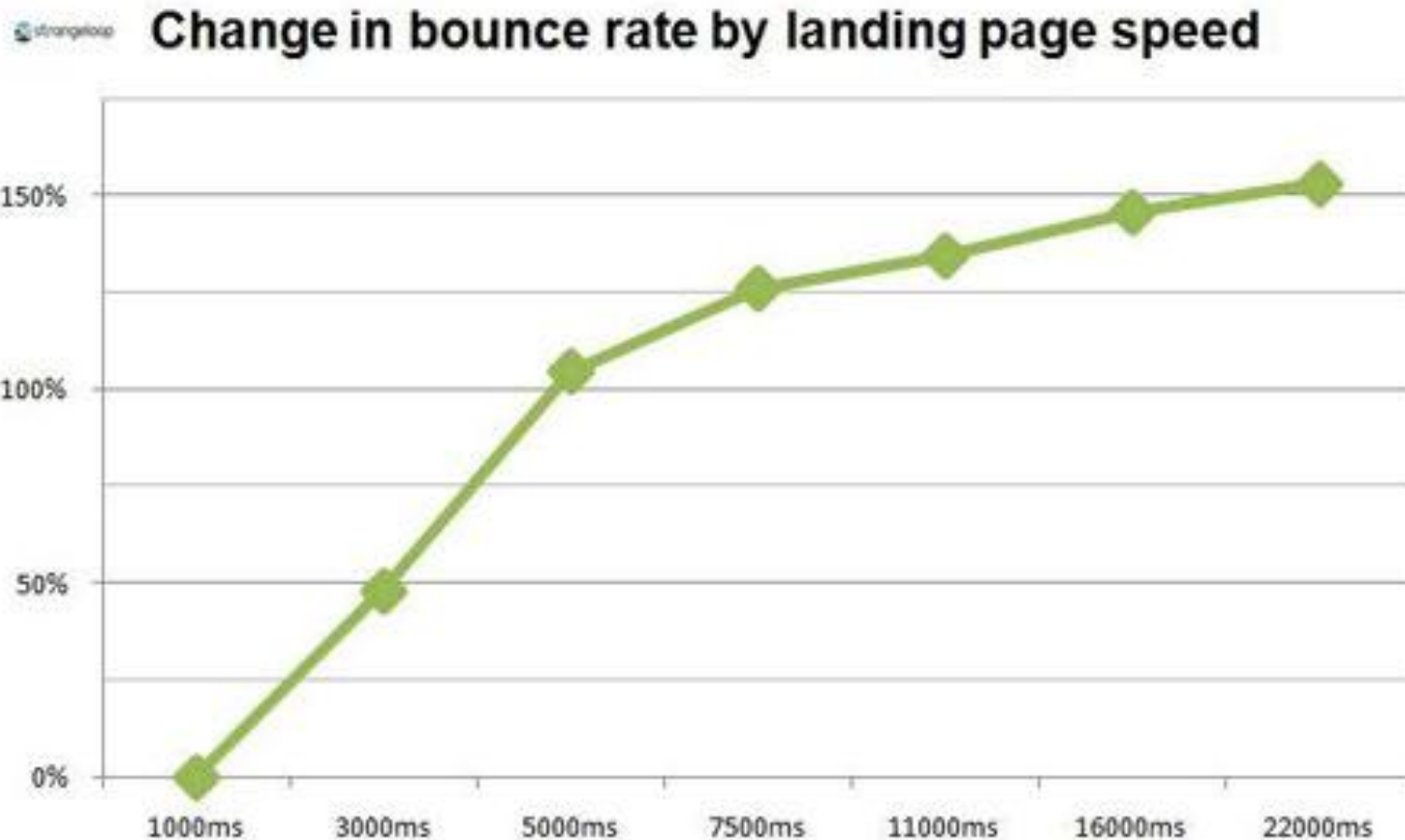
Velocity大会介绍

- 由O'Reilly举办
 - 今年举办第三届
- 顶级web公司参与
 - Google
 - Facebook
 - Yahoo
 - Twitter
 - ...
- 大牛云集

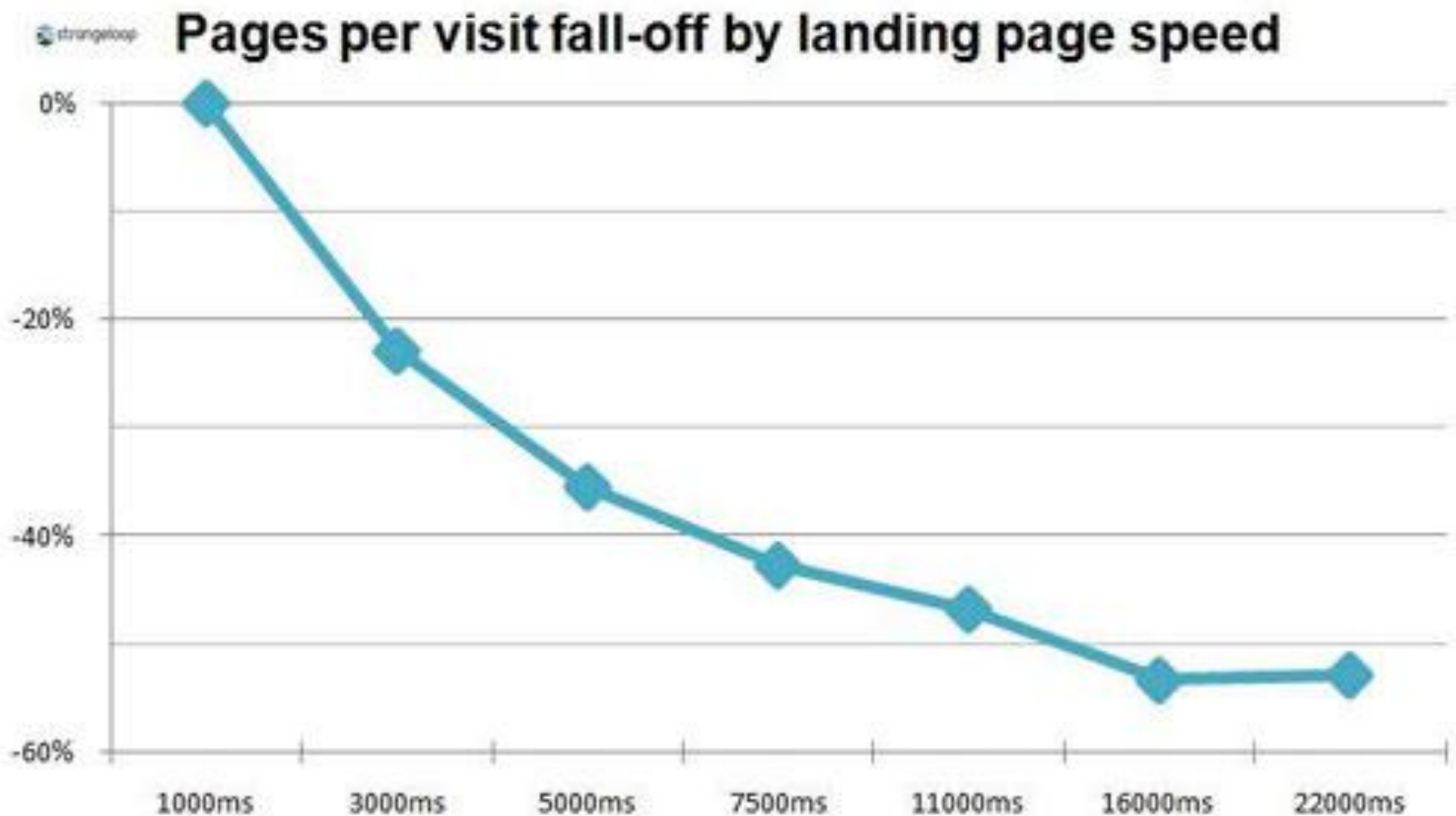
性能是网站的第一要素

——Larry Page, Google创始人

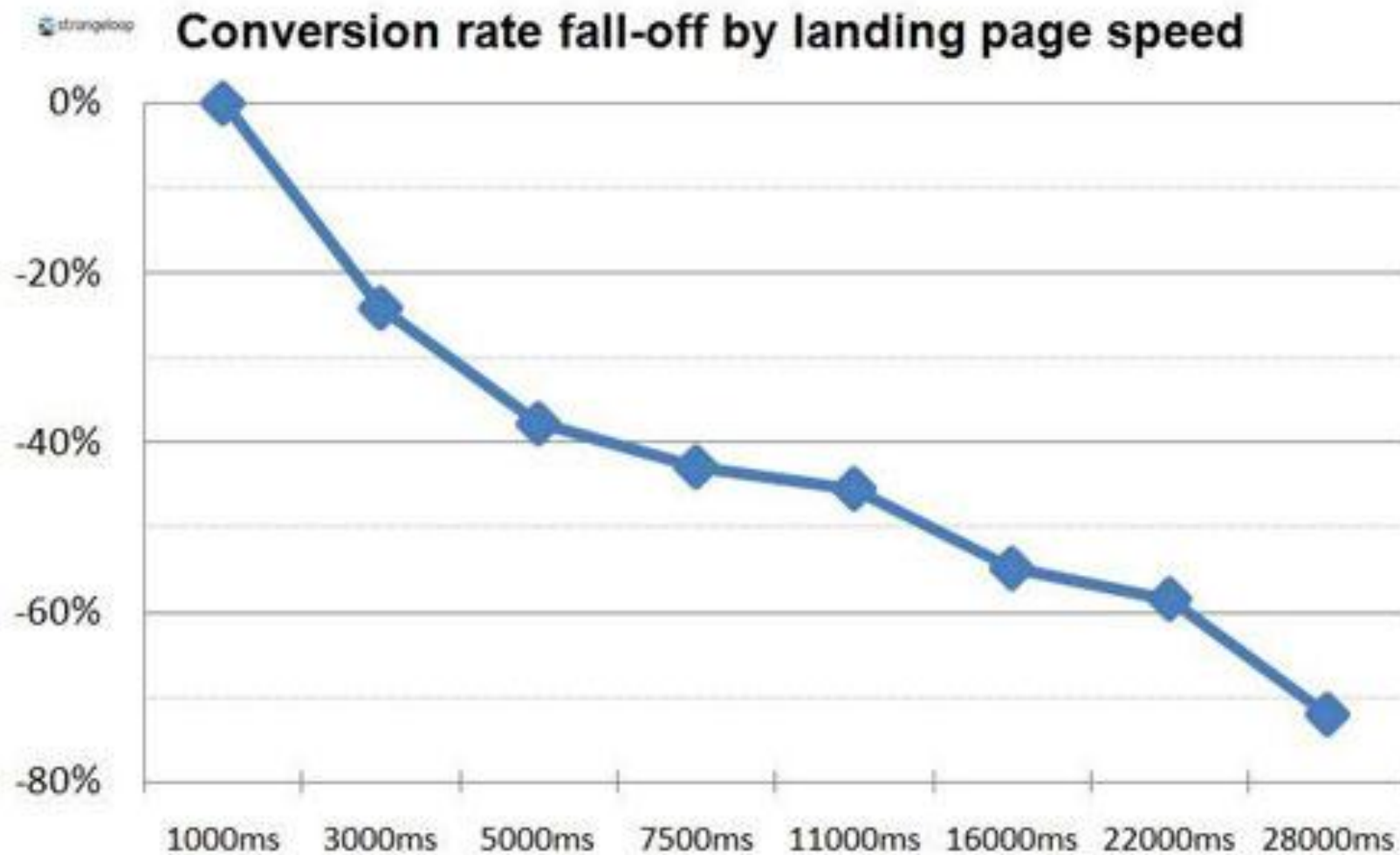
速度变慢，弹出率上升



速度变慢，访问的页面变少



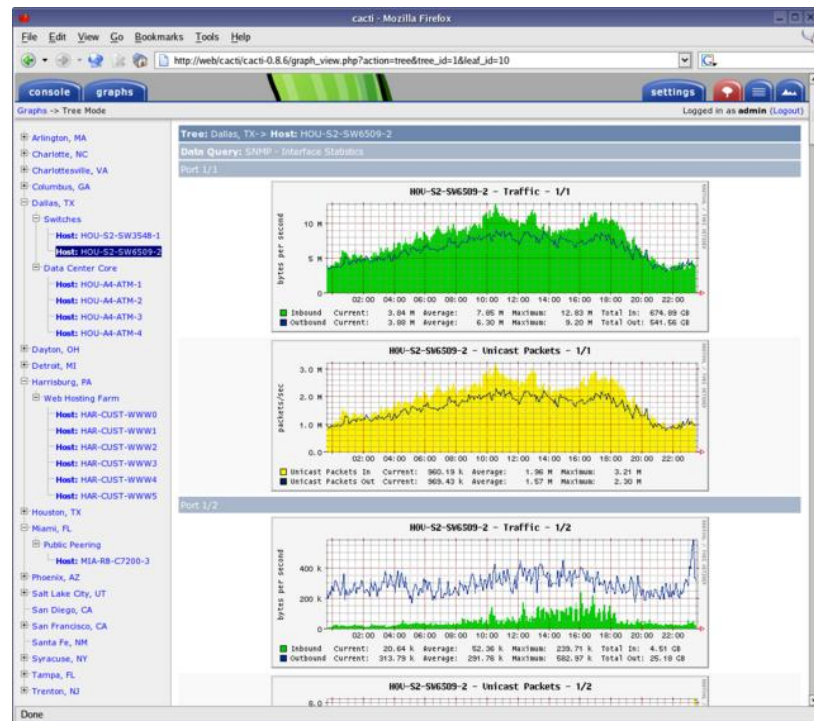
速度变慢，转化率下降



source: <http://www.webperformancetoday.com/2010/07/01/the-best-graphs-of-velocity/>

首先，你要了解你的系统

- 网站类型
 - 不同类型不同的需求
 - 盈利/目的
- 监控什么？
 - 服务时间
 - 网络时间
 - 客户/绘制时间
 - 应用关键步骤



一些你需要知道的数字

- Google统计的平均数据
 - 平均网页大小320K
 - 平均带宽1.8M bps
 - 理论上1.4s，实际上5s
 - 页面组成
 - 使用44个资源
 - 7次DNS查询
 - 三分之一的内容没有压缩

性能优化的大方向

- 前端页面
- 应用与架构
 - 服务器
 - 负载均衡
 - 数据库
 - ...
- 系统与底层
 - 硬件
 - 协议



针对人优化——性能优化心理学

- 实际时间 \neq 感知的时间
- 情绪的影响
- 避免空等待
- 感觉变快
 - 成功的任务
 - 有回应
 - 进度
 - 有意义的信息提示



如何管理变更

- 所有的东西都应该在版本控制之下
 - 交换机的配置文件
 - 路由器的配置文件
 - 防火墙的配置文件
 - 系统的配置文件
 - 应用的配置文件
 - 监视程序的配置文件
 - 文档
 - 程序代码
 - 数据库表结构
 - 所有一切
- 变更要有记录（Facebook）
 - 每天/周更新

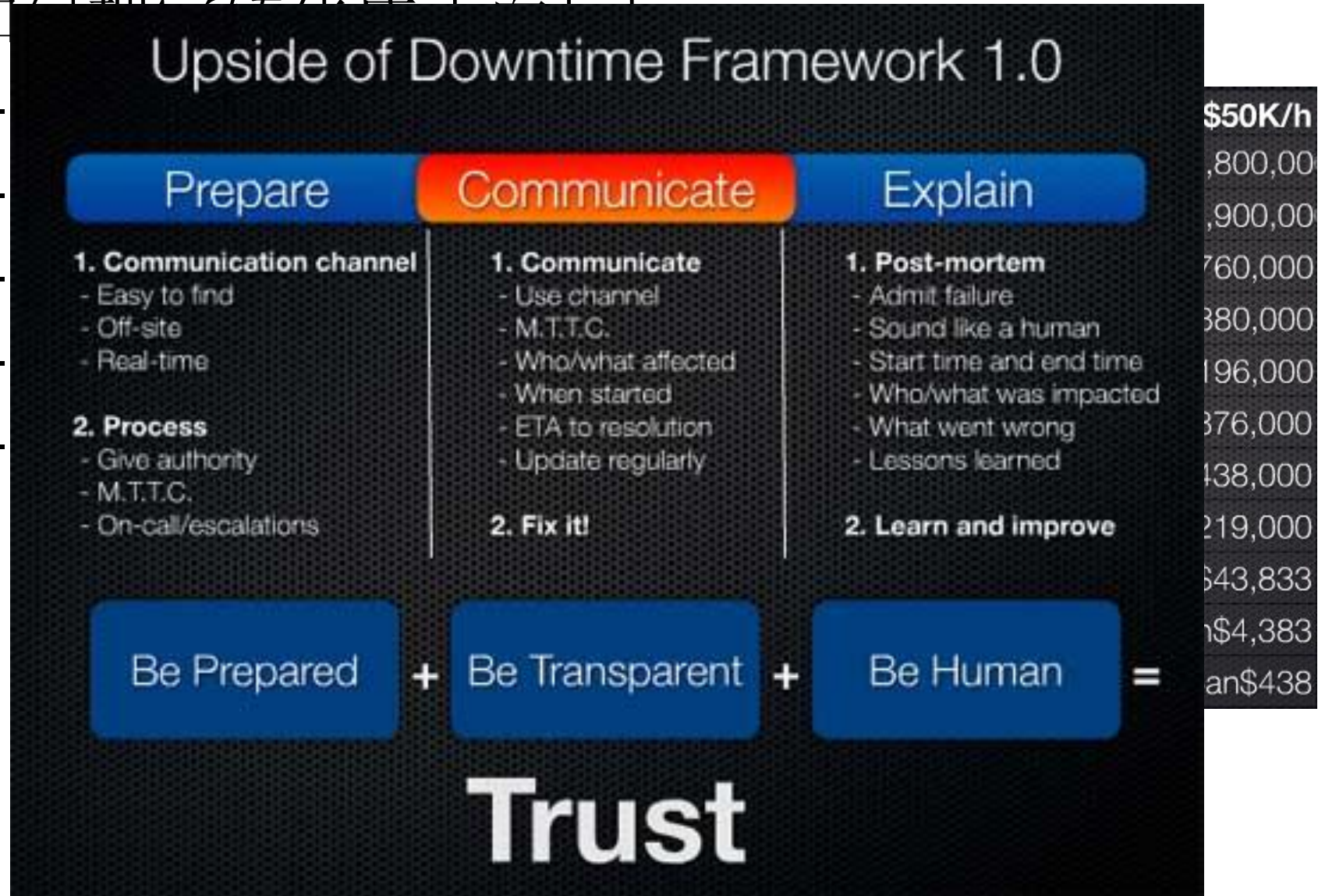


The screenshot displays a deployment log for May 23, 2010. The log is organized into columns: Type, Time, Start/End, Details, Target, and Owner. It records various operations such as 'push' (updates to production and test environments), 'fdeploy' (deployment to staging and production), and 'start' (starting services like cron-maintenance and update-usrdb). The log shows a sequence of updates and deployments throughout the day, with specific times and details for each action.

Type	Time	Start/End	Details	Target	Owner
push	01:18:50	end	Push: push (staging, test, production) of sys... to 12 hosts with 20 cron-maintenance tasks	sys.staging, test, production of sys...	Chuck Reason
	01:12:58	N/A	Deployment: cron-maintenance was changed (Changed Description)	sys.web	Ronald Chung
push	01:12:31	end	Push: push (staging, test, production) of sys... to 12 hosts with 20 cron-maintenance tasks	sys.staging, test, production of sys...	Chuck Reason
	01:10:40	N/A	Deployment: cron-maintenance was changed (Changed Description)	sys.web	Ronald Chung
	01:09:30	N/A	Deployment: cron-maintenance was changed (Changed Description)	sys.web	Ronald Chung
	01:09:30	N/A	Deployment: cron-maintenance was changed (Changed Description)	sys.web	Ronald Chung
push	01:05:05	start	Push: push (staging, test, production) of sys... to 12 hosts with 20 cron-maintenance tasks	sys.staging, test, production of sys...	Chuck Reason
push	00:57:30	start	Push: push (staging, test, production) of sys... to 12 hosts with 20 cron-maintenance tasks	sys.staging, test, production of sys...	Chuck Reason
fdeploy	00:57:29	end	fdeploy: start cron-maintenance	cron-maintenance	Lars Bakken
fdeploy	00:57:25	end	fdeploy: deploy (staging, test, production) to cron-maintenance	cron-maintenance	Lars Bakken
fdeploy	00:57:25	start	fdeploy: start cron-maintenance	cron-maintenance	Lars Bakken
fdeploy	00:57:19	start	fdeploy: deploy (staging, test, production) to cron-maintenance	cron-maintenance	Lars Bakken
fdeploy	00:56:37	end	fdeploy: start update-usrdb	update-usrdb	Gary Wu
fdeploy	00:56:17	start	fdeploy: start update-usrdb	update-usrdb	Gary Wu

如果故障无法避免

- 如何减少故障对业务的影响



大网站如何运维？

- 部署
 - Facebook和Twitter都使用BitTorrent
 - Facebook: 1分钟完成全球的部署（几百兆的文件、上万台服务器）
 - Twitter : 30~60秒更新超过1千台服务器（Python + libtorrent）
- 监控 & 工具
 - CFengine
 - Puppet
 - Chef
 - Ganglia
 - Nagios
 - 编写适用于自己的
- 自动化，自动化，自动化
- 准备好应付故障
- 支持而不是阻止工程师的创新

运维角色的转变

- 不要仅仅是“系统管理员”（Twitter）
 - 通过统计分析产生有意义的结果
 - 以数据而不是直觉来做决策
 - 使网站更快
 - 改进现有架构并为将来做计划
 - 规划好容量而不是做消防员

Javascript

- 确保DOMContentLoaded之前的交互性
- 并不是每个动作都需要Javascript
 - 这是加快性能与用户体验的一个机会
 - 在底端加载Javascript吗？
 - 动态加载的脚本不会阻塞页面加载
- 预测性加载
- 工具
 - Firebug
 - JSMeter

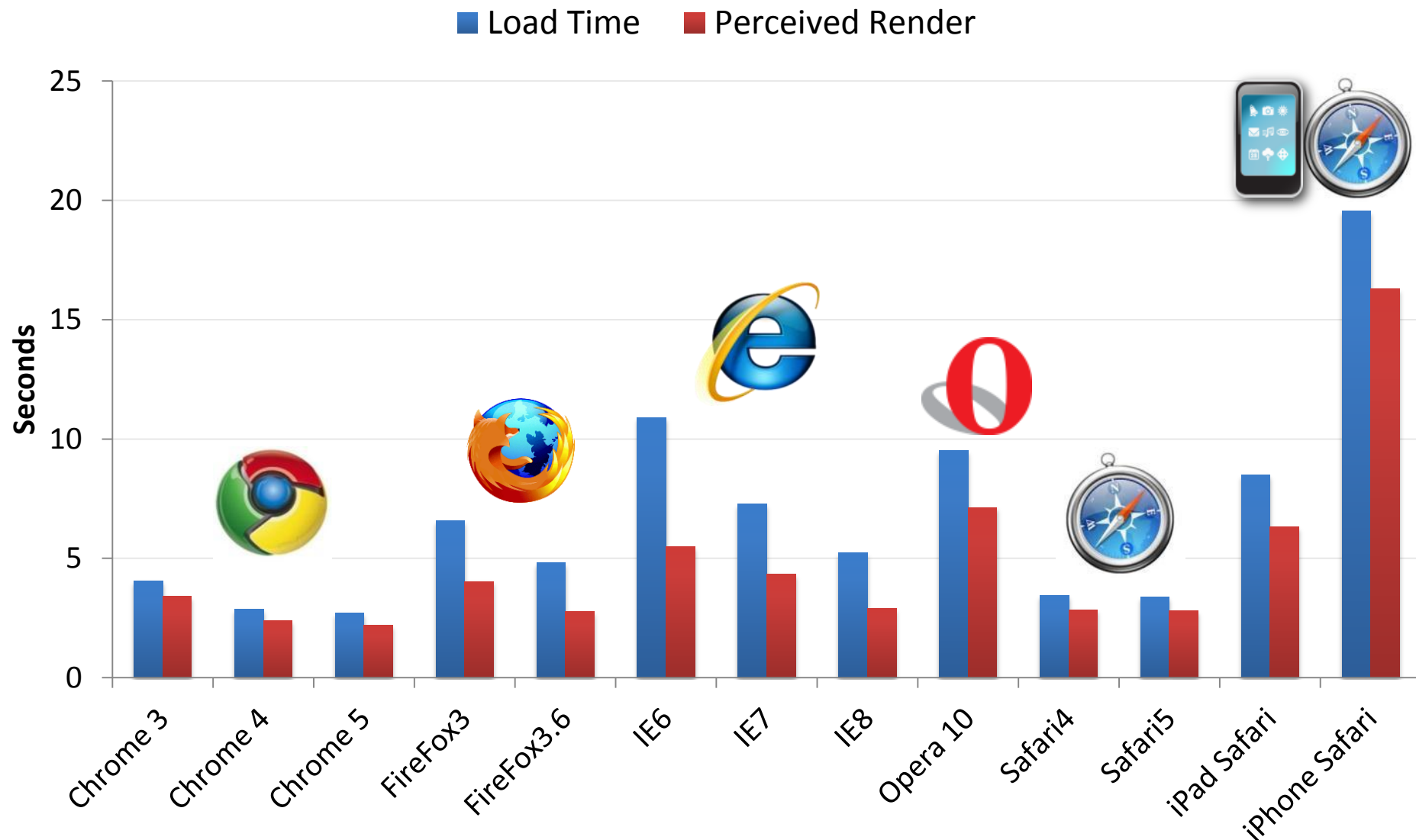
CSS五大错误

- 没有gzip压缩（42%）
- 有2个以上的外部CSS文件（44%）
- CSS文件带有cookie（56%）
- 没有最小化（62%）
 - 使用YUI Compressor
- CSS文件超过100K（21%）

百花齐放的前端诊断工具

- YSlow
- Page Speed
- Closure Compiler
- Show Slow
- dynaTrace
- HttpWatch
- AOL Pagetest
- Speed Tracer
- Fiddler

不同的浏览器性能差别很大



Source: Gomez Real-User Monitoring

- Real users around the world
- 466 million page measurements
- Broadband connections only
- 200+ sites

Web Server优化：关于gzip压缩

- 15%的客户端没有开启gzip压缩
 - Proxy
 - 安全软件
 - 爬虫
- 强制gzip压缩
 - 如果没有Accept-Encoding头
 - 判断User-Agent是否是一个modern的浏览器
 - 如果没有一个特殊的cookie
 - 测试看其能否解压缩gzip内容
 - 如果成功，则发送gzip的内容

尽可能早的刷出页面内容

Flush →

Flush →

YAHOO!
Web Images Video Local Shopping More
Web Search
Sign In New here? Sign Up Have something to share? Page Options

YAHOO! SITES
Yahoo! Mail
Autos
Finance
Flickr
Games
Horoscopes
HotJobs
Messenger
Movies
Music
eMule
Personals
Shopping
Sports
Travel
Updates
Video
Weather

MY FAVORITES
eBay
Facebook
Twitter
Add Favorites

FEATURED PARTNERS
Gmail
Univ. of Phoenix

TODAY - June 06, 2010
Twist in the LeBron James sweepstakes
One team jumps ahead in the race to land the NBA's biggest free agent, a columnist says. → "Down payment"
2010 NBA free agents
Carmelo Anthony's pitch for LeBron
MVC going all out, too

NEWS: WORLD LOCAL FINANCE
Report: Many Gulf federal judges have links to oil industry
Economic recovery means lower expectations for many in U.S.
Drop in juvenile arrests pushes states to close prisons
Vatican says plight of Christians in Mideast being ignored
Sungungu food costs driving developing world into poverty
Cereanensis mark 66th anniversary of D-Day: A tribute
San Jose: Can marijuana collectives be... 10th Anniversary
Family of man shot dead by Oakland cop... 10th Anniversary
City of Sunnyvale cutting library, Public... 10th Anniversary

Markets: Dow: 9,932.90 -3.19% Nasdaq: 2,219.20 -3.64%
Data stock symbols Get Quotes Sponsored by Scottrade

TRENDING NOW
1. British Airways
2. Robin Soderling
3. Belmont Stakes
4. Spice Movie
5. GPS Devices
6. Jason Bateman
7. iPhone
8. Jupiter Impact
9. Pizza Delivery
10. Jake Knotts

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Regular price for equipment and shipping. Call 1-800-445-5111
dishHD GET HD FREE FOR LIFE

NOW ON YAHOO!
R25 Music on Yahoo!
Jackie rules America: Michael Jackson is to dominate the latest American music charts
SNAP, CRACKLE AND POP: Today's tabloid little-tattle in one healthy crunch
Michael's Lost Music: Additional copy goes here

DAILY OFFERS
Netflix - Try for free. Billions of movies delivered so far. Cancel anytime. No late fees - ever.
Want to Build Muscle? Try Force Factor Today to See Results. Limit 1 per Household.

YAHOO! SITES
Answers
Autos
Finance
Games
Gmail
Health
Local
Maps
Movies
Music
News
eMule
Real Estate
Shine
Shopping
Sports
Travel
TV
International
Page Tour
Developer Network
More Services

YAHOO! FOR YOUR BUSINESS
Advertise with Us
Yahoo! Developer Network

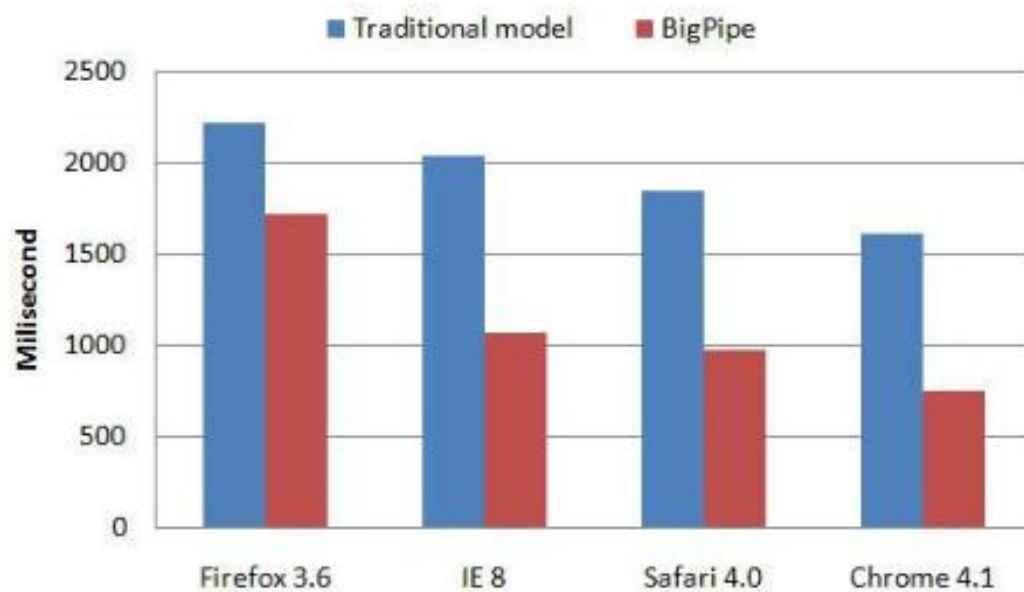
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HTTP并行化，性能提升2倍

- Facebook的BigPipe

- 页片（pagelet）
- 流水线（pipeline）
- 模板
- JSON返回内容
- 刷新方式
 - singleflush
 - pipeline
 - parallel
 - prepare
- 效果对比



Time to interact latency on Facebook's home page

- http://www.facebook.com/home.php?big_pipe=pipeline
- http://www.facebook.com/home.php?big_pipe=singleflush

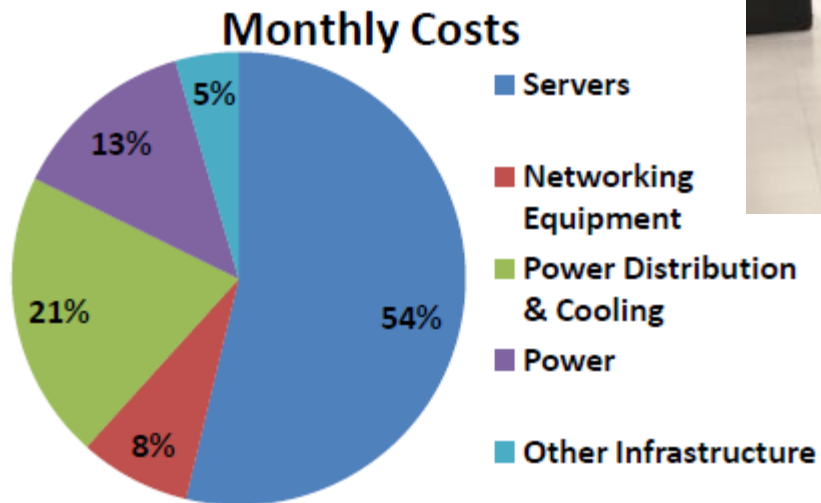
别让第三方内容拖累网站速度

- 不要阻塞住绘制或者加载
 - Iframe
 - Script tag
- 不要影响用户体验

第三方内容	发布网站	% 影响
Digg	services.newsweek.com	14
Digg	realtalkny.uproxx.com	9
FriendConnect	www.artinstructionblog.com	10
FriendConnect	friendconnectdirectory.com/Food	30
FacebookConnect	truveo.com	17
FacebookConnect	www.huffingtonpost.com	12
TribalFusion	www.xe.com	53
TribalFusion	www.wareseeker.com	31

数据中心

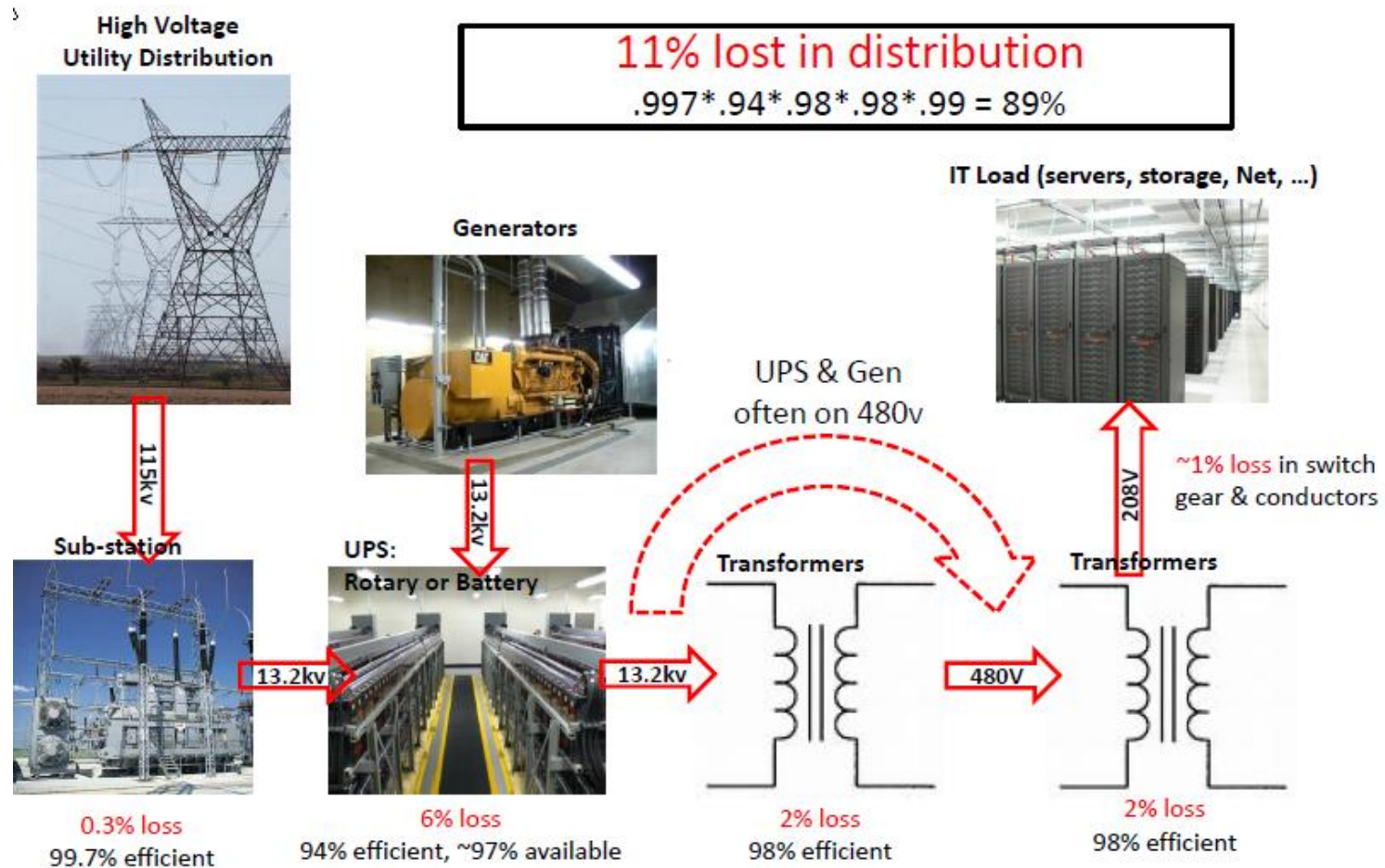
- 钱去哪里了？
 - 34%电力
 - 8%网络



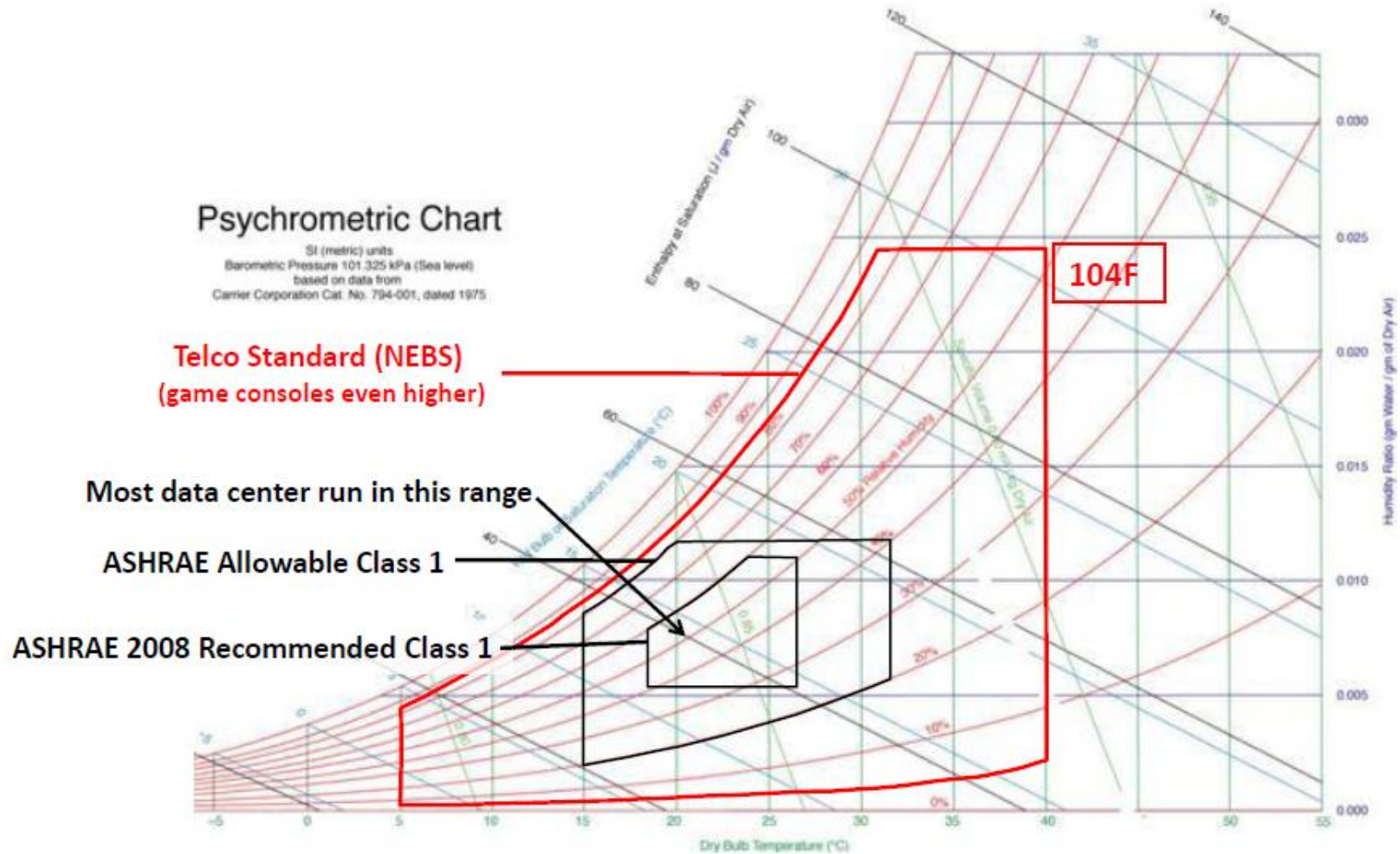
3yr server, 4yr net gear, & 10 yr infrastructure amortization



电力传输中的损耗



机房的温度到底多少合适？



廉价的存储方案

- Openstoragepod.org
 - backblaze



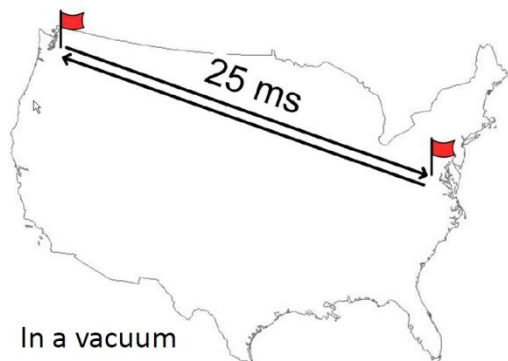
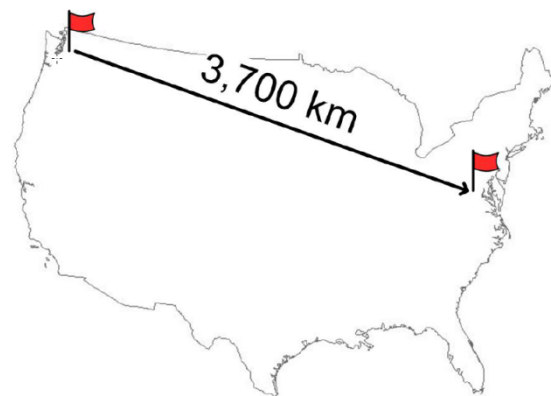
何时搭建自己的数据中心？

- 当买服务的钱大于建数据中心的钱的时候
 - Facebook
 - 6万-10万服务器
 - 第一个自建的数据中心
 - Oregon

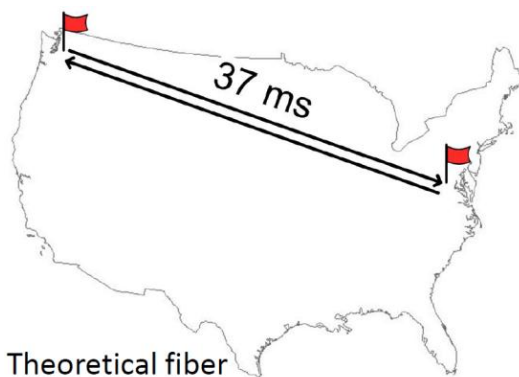


注意网络延时的影响

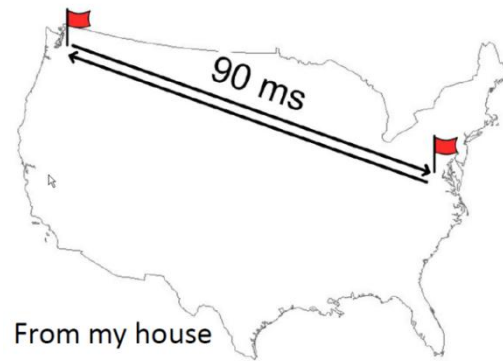
- 光速与距离
 - 传播不是没有代价的
- 前面的几个包
 - 保持Cookie小
 - 让小的assets先下载



In a vacuum



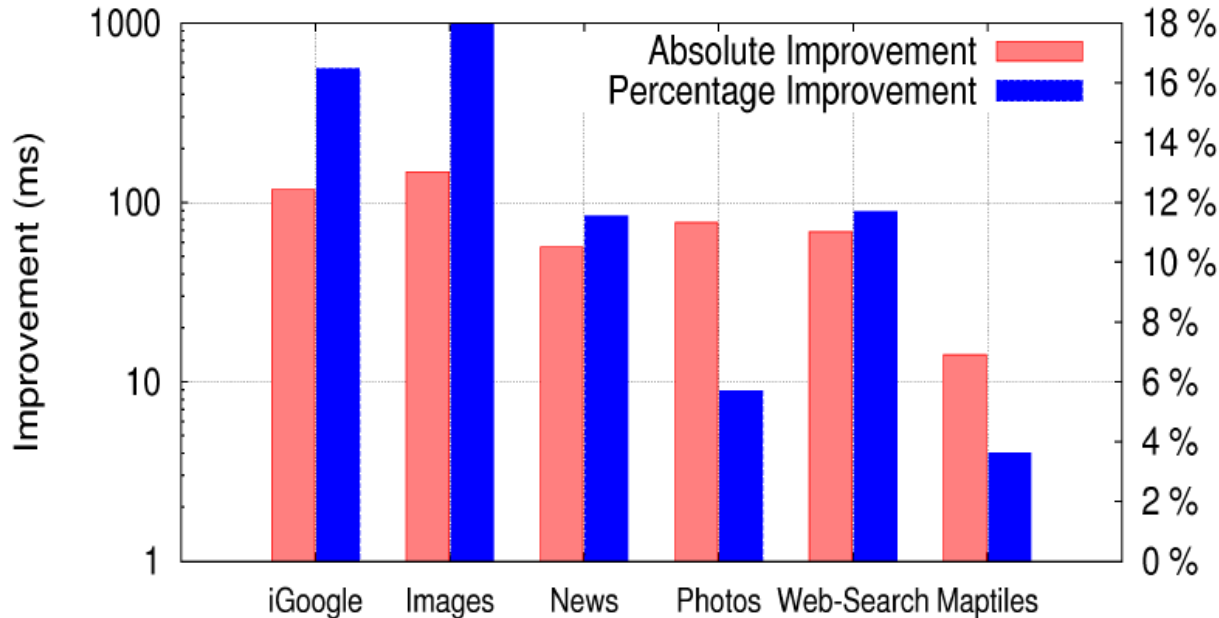
Theoretical fiber



From my house

TCP协议优化

- 对TCP的优化
 - TCP快速开始（加大初始拥塞窗口大小）
 - Google提高了12%的性能



source: <http://en.oreilly.com/velocity2010/public/schedule/detail/14371>

- False Start
 - 减少握手中的一个来回
 - Google的SSL应用快了10%

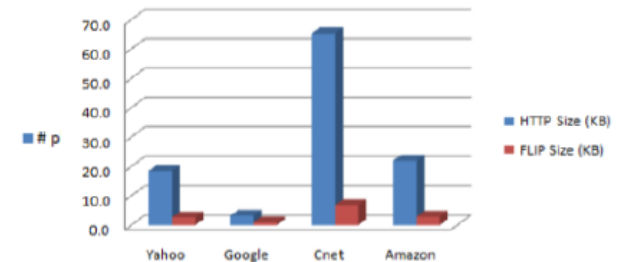
使用SPDY来优化HTTP

- 头部压缩
- 流多路复用
- 快了25%

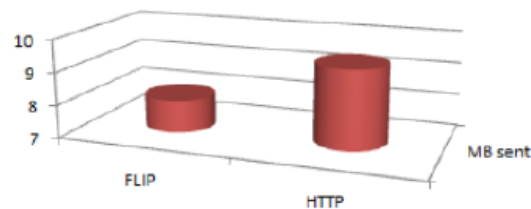
Total TCP Packets Sent
FLIP Sends 40% Fewer Packets



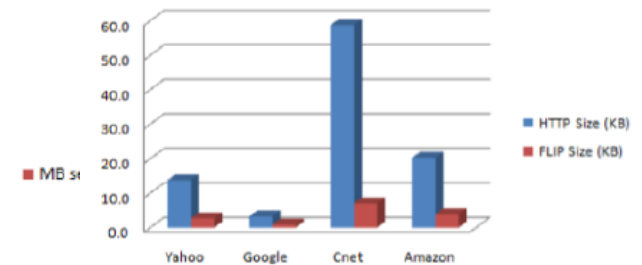
Request Header Compression
~88%



TCP Bytes In & Out
FLIP transmits 15% fewer bytes

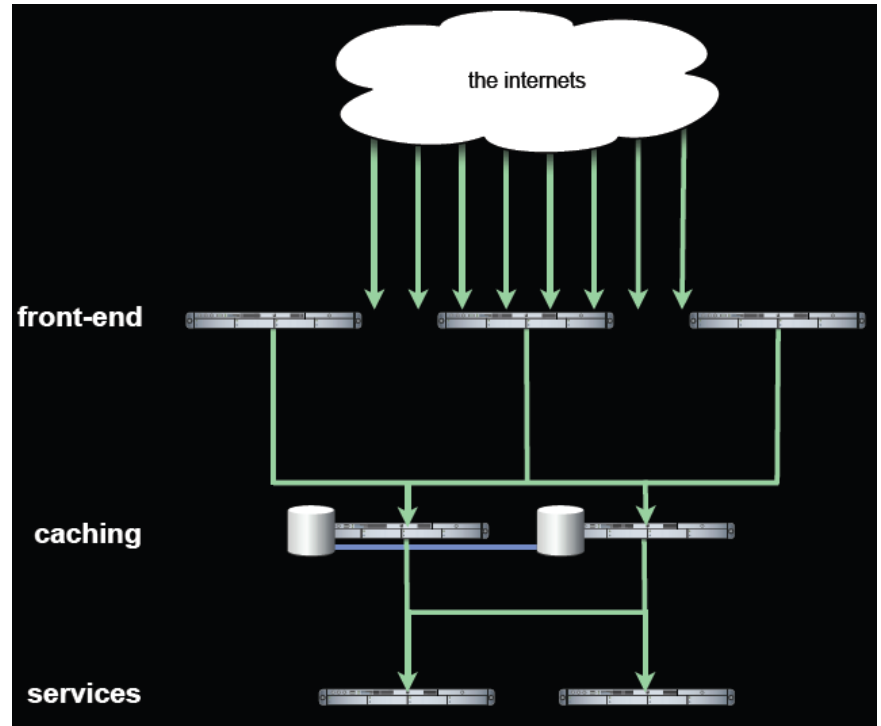


Response Header Compression
~85%



CDN缓存技术

- 软件
 - Squid
 - Traffic Server
- 技术
 - Cache Peering
 - RFC 2186/2756
 - Cache-Control
 - stale-while-revalidate
 - Cache-Control: stale-if-error
 - RFC 5861



数据存储方式的转变

- MySQL
 - Drizzle, 云时代的MySQL替换品
 - FlockDB
- NoSQL
 - Memcached
 - Cassandra
 - Hadoop

未来趋势：移动Web

Mob

- 18
- 46
- 这

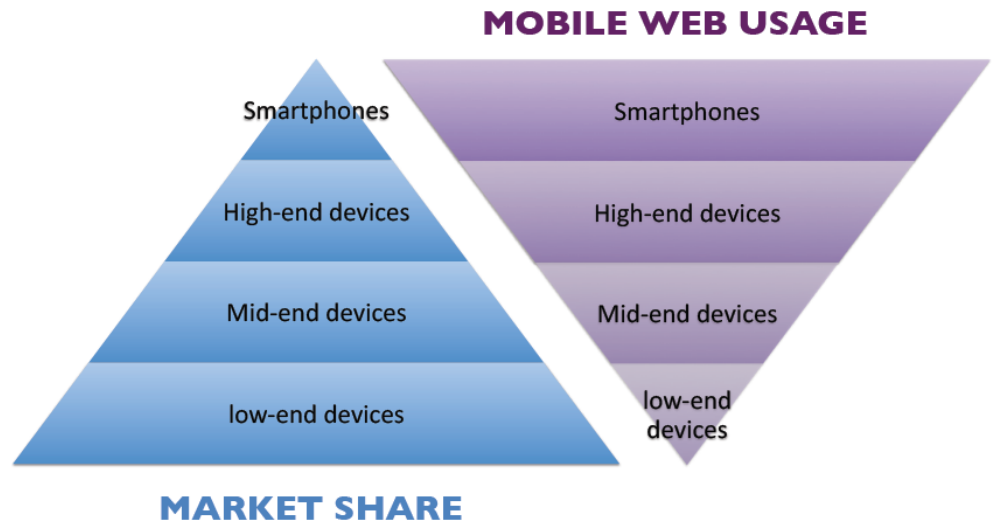


移动设备上的特殊之处

- 浏览器与通常的不一样
- 并不是一个文档适合所有设备
 - 尽可能的标准化



Mobile Browsers



Q & A