

Overcoming scale and privacy issues in industrial software studies and repositories

Judith Bishop

Microsoft Research, Redmond, USA

PROMISE 2010, Timisoara, Romania
September 13, 2010



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2000
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A Timeline of Microsoft Research

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Quick Links

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Spotlight

Making User Interfaces Natural

Worldwide Locations



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Community and Geographic Outreach

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Earth, Energy & Environment



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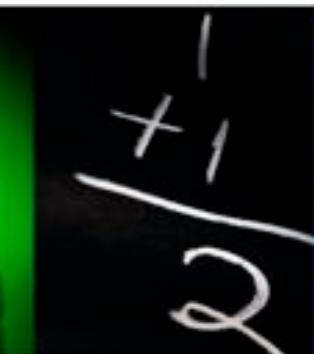
Advanced Research Tools and Services

Agenda

1. The Data Deluge
2. Programs that Already Cope
3. From Data Release to Data Services
4. Changing Software on a Massive Scale using the Data
5. Service-specific Risk Prediction
6. The Future



1. The Data Deluge

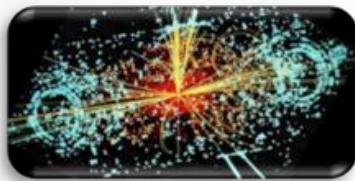


The Present: an Explosion of Data

Experiments



Simulations



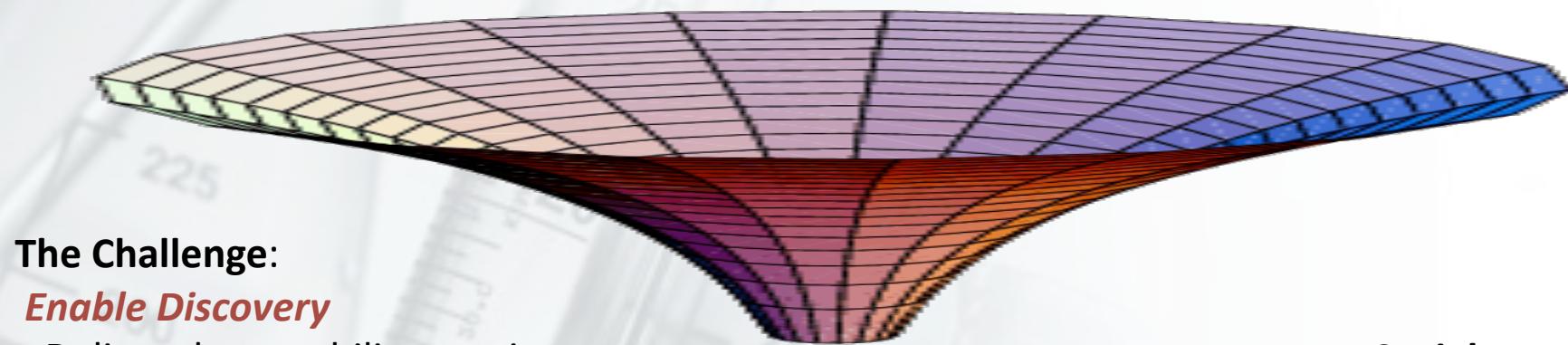
Archives



Literature



Instruments



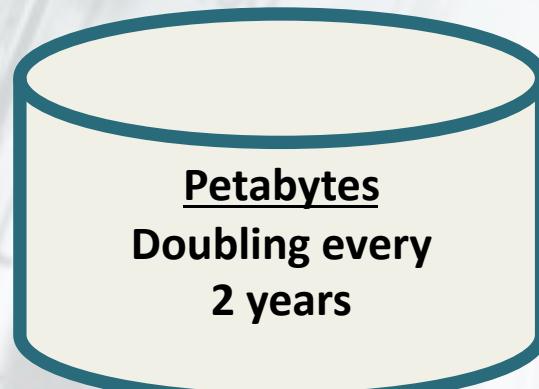
The Challenge:

Enable Discovery

Deliver the capability to mine, search and analyze this data in near real time.

Enhance our Lives

Augment experience with deeper understanding.



Social Networks



Connected Devices and The Cloud



The Current Cloud Challenge

- The current driver: how do you
 - Support email for **375 million users?**
 - Store and index **6.75 trillion photos?**
 - Support **10 billion web search queries/month?**
- And
 - deliver a quality response in **0.15 seconds** to millions of simultaneous users?
 - **But never go down?**

Data-driven software
engineering



Clouds are built on Data Centers

- Range in size from “edge” facilities to megascale.
- Economies of scale
 - Approximate costs for a small size center (1,000 servers) and a larger, 100,000,000 server center.



Technology	Cost in small-sized Data Center	Cost in Large Data Center	Ratio
Network	\$95 per Mbps/month	\$13 per Mbps/month	7.1
Storage	\$2.20 per GB/month	\$0.40 per GB/month	5.7
Administration	~140 servers/Administrator	>1000 Servers/Administrator	7.1



Each data center is
11.5 times
the size of a football field

2. Programs that already cope





WWT: Worldwide telescope

A screenshot of the Worldwide Telescope (WWT) software interface. The main window displays a detailed image of a spiral galaxy with a bright central core and distinct spiral arms. At the top, a navigation bar includes "Explore" (highlighted in blue), "Guided Tours", "Search", "View", "Settings", and "Install Windows Client". Below the bar, a breadcrumb trail shows "Collections > Hubble Studies >". A row of thumbnail images includes "Monocerotis V838", "Supernova 1987A", "Nebulae", "Galaxy Collisions", "Hubble's Largest G", "NGC 3031 Myriad of", and "Full ACSI Field of R". On the right, a status bar indicates "1 of 24". At the bottom, a control panel features "Look At" (set to "Sky"), "Imagery" (set to "Digitized Sky Survey (Color)"), "Info", "Image Crossfade" (set to "1 of 5"), a coordinate display ("RA: +14h03m12s Dec: +54°21'05\"), and a map of the "Ursa Major" constellation.

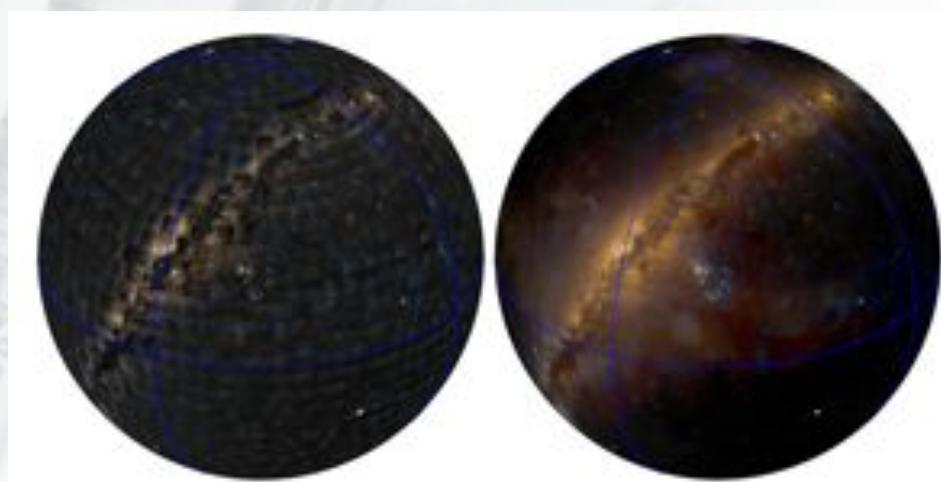


Terapixel => WWT

- Terapixel produced a full color 24 bit RGB terapixel image of the night sky for
 - WorldWide Telescope
 - Bing Maps
- TeraPixel is a showcase for Microsoft technologies
 - in many-core computing,
 - in high performance and data-intensive distributed computing, and
 - in scientific workflow management
- Terapixel demonstrates the use of technologies such as
 - Windows HPC, .NET Parallel extensions, DryadLINQ and Trident
- Terapixel can be used for data-intensive research in
 - astronomy, bioinformatics and environmental science

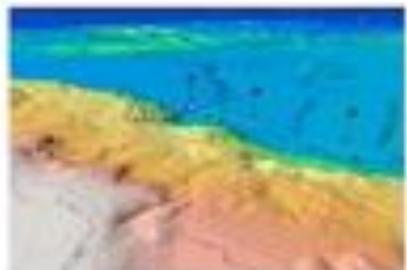
Terapixel by Numbers

- 1791 pairs of red-light and blue-light images acquired from two telescopes, scanned into 23,040x23,040 or 14000x14000 images.
- Input: **417 GB** (compressed, 4TB uncompressed) (Processing time: 5 hours)
- Output: 790 GB (approx. 500MB/plate)
- Stitch images into a spherical image (3 hours)
- Optimize image to remove seams (4 hours 15 mins)
- Move data off the cluster (2.5 hrs on a 1Gbps link)
- Output: 1025 pyramid files; total size: **802 GB**



Trident for Workflows

Project Trident: A Scientific Workflow Workbench



With Project Trident, you can author workflows visually by using a catalog of existing activities and complete workflows. The workflow workbench provides a tiered library that hides the complexity of different workflow activities and services for ease of use.

Version 1.2 Now Available

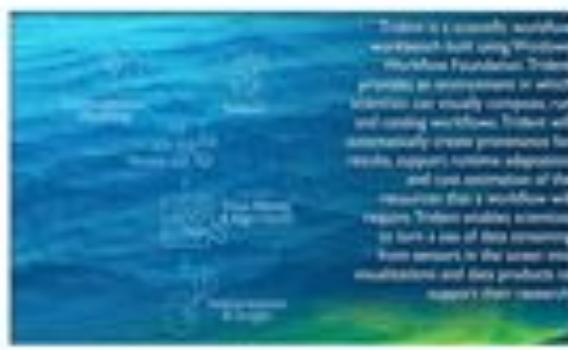
Project Trident is available under the Apache 2.0 open source license.

- [Download Project Trident: A Scientific Workflow Workbench 1.2](#)

About Project Trident

Built on the Windows Workflow Foundation, this scientific workflow workbench allows users to:

- Automate analysis and then visualize and explore data
- Compose, run, and catalog experiments as workflows

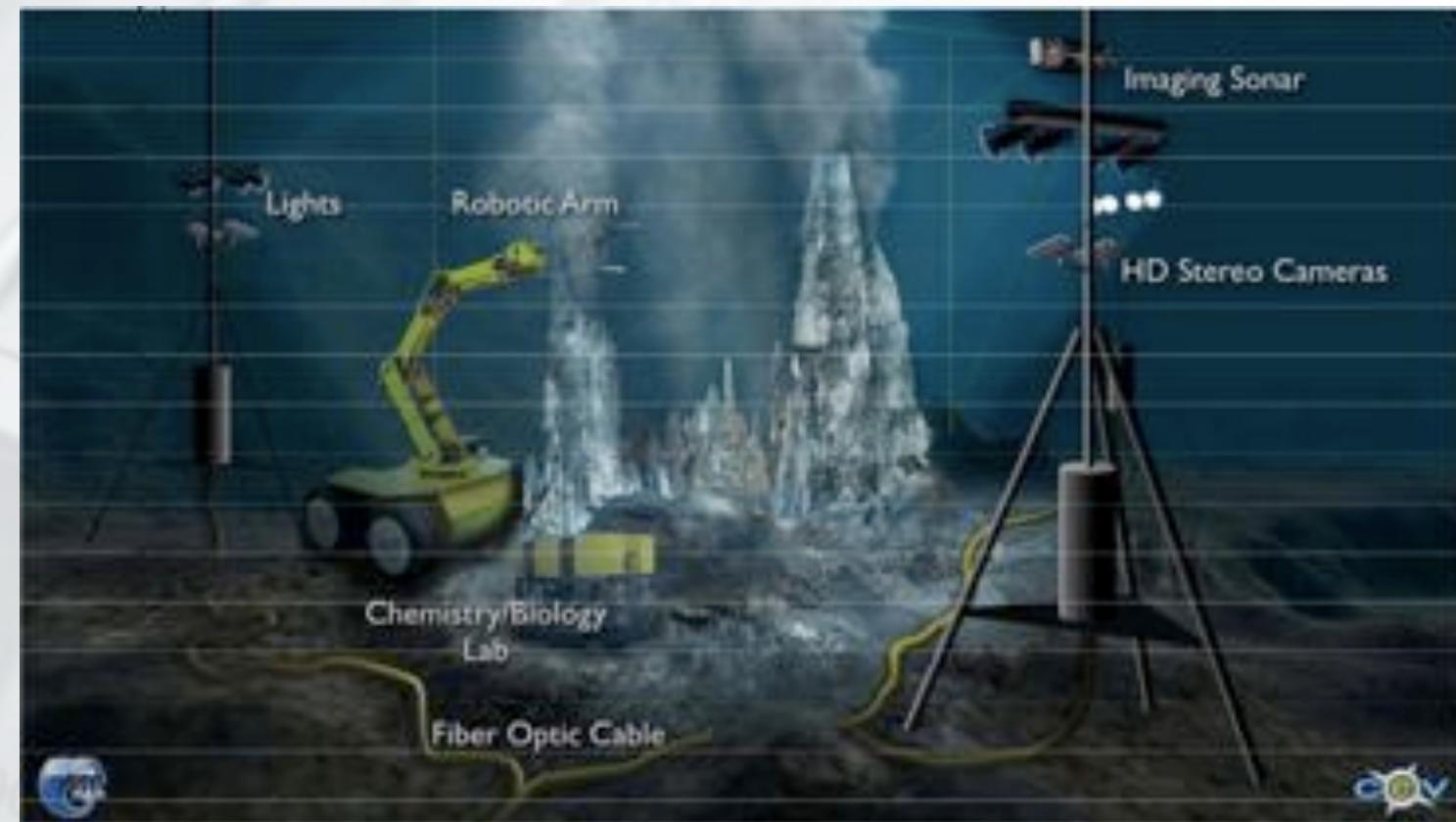


Academic Partners

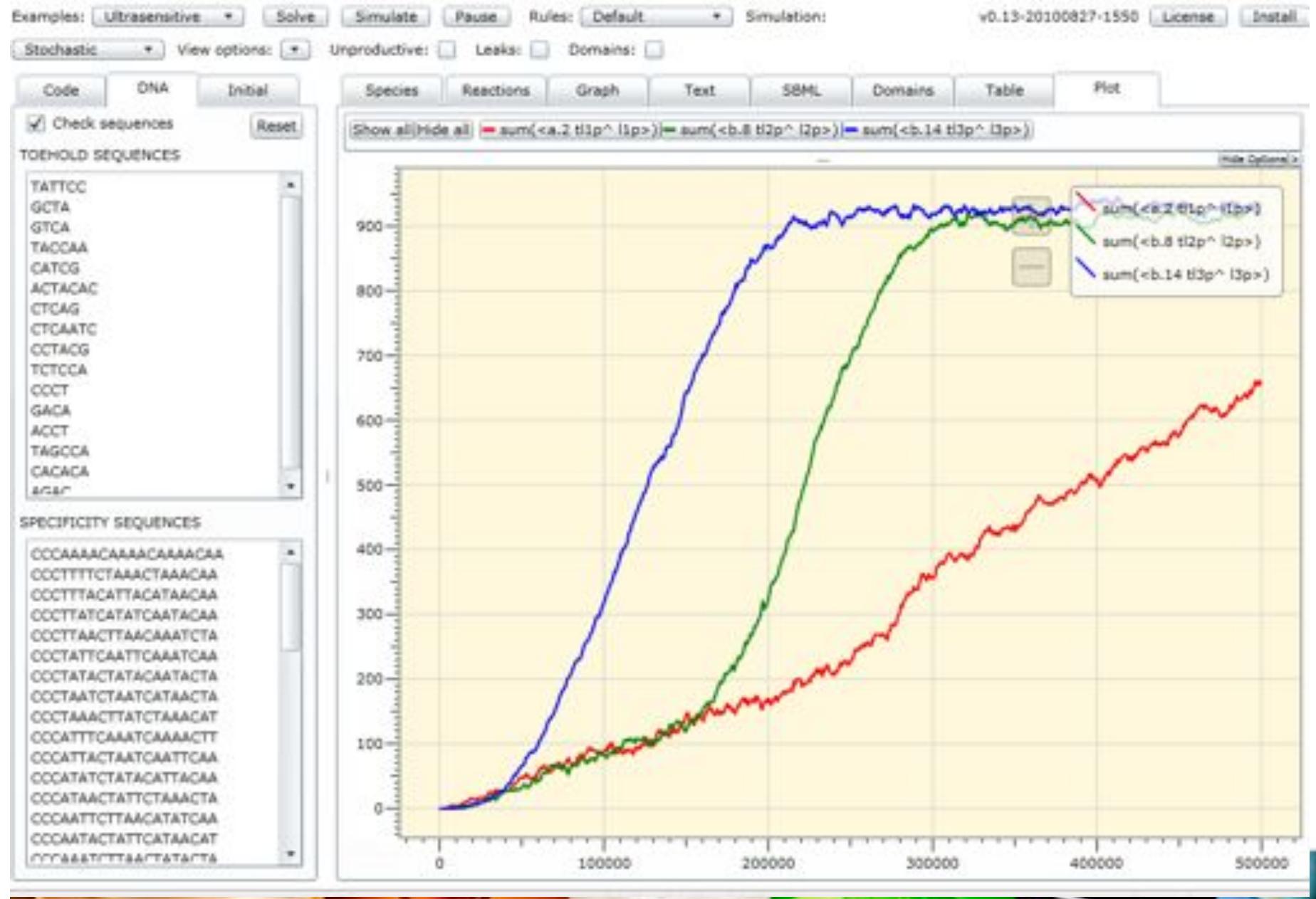
- [myExperiment: University of Manchester and Southampton University](#)
- [Pan-STARRS Consortium](#)
- [University of Washington, Monterey Bay Aquarium and Microsoft Research: 2007 eScience Workbench Research Award](#)
- [IRIS: Incorporated Research Institutions for Seismology](#)
- [COVE: A Visual Environment for Ocean Observatories](#)
- [The LEAD Team: Linked Environments for Atmospheric Discovery](#)
- [Center for Coastal Margin Observation and Prediction, Oregon Health & Science University](#)
- [Department of Electrical and Computer Engineering, Ohio State University](#)

Smart Sensors and Data Fusion

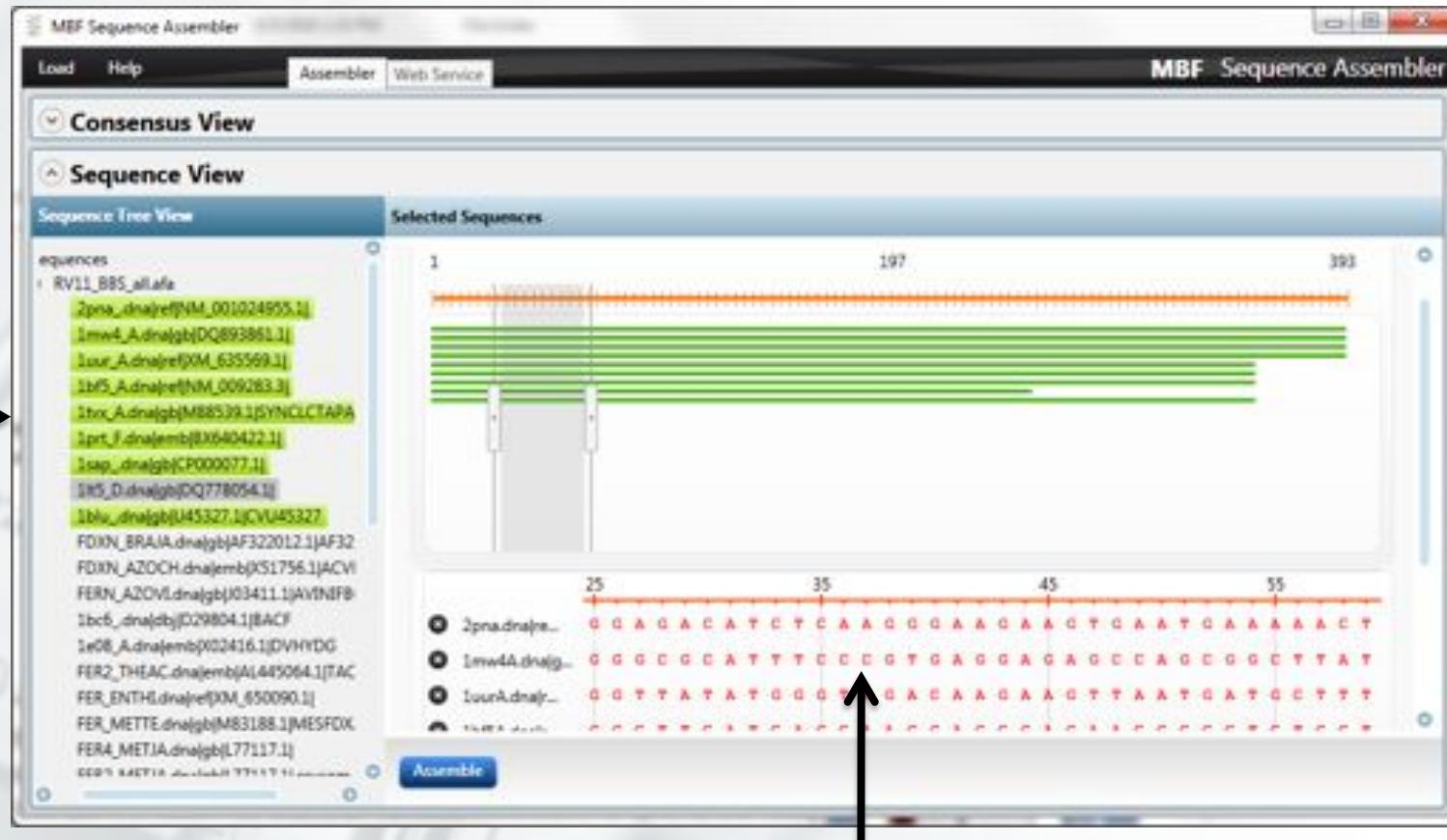
- The NSF Ocean Observing Initiative
 - Hundreds of cabled sensors and robots exploring the sea floor
 - Data to be collected, curated, mined



Microsoft Biology Foundation



MBF: Sequence Assembler



sequence data is loaded from FASTA
file and assembled using MBF

drawn as nucleotide symbols and
graphics using WPF

Last week in Proc. Nat. Academy of Science

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PNAS

Proceedings of the National Academy of Sciences of the United States of America

Correction for hidden confounders in the genetic analysis of gene expression

Jennifer Listgarten^{a,1}, Carl Kadie^b, Eric E. Schadt^c, and David Heckerman^{a,1}

+ Author Affiliations

Edited by David Haussler, University of California, Santa Cruz, CA, and approved July 21, 2010
(received for review February 26, 2010)

Abstract

Understanding the genetic underpinnings of disease is important for screening, treatment, drug development, and basic biological insight. One way of getting at such an understanding is to find out which parts of our DNA, such as single-nucleotide polymorphisms, affect particular intermediary processes such as gene expression. Naively, such associations can be identified using a simple statistical test on all paired combinations of genetic variants and gene transcripts. However, a wide variety of confounders lie hidden in the data, leading to both spurious associations and missed associations if not properly addressed. We present a statistical model that jointly corrects for two particular kinds of hidden structure—population structure (e.g., race, family-relatedness), and microarray expression artifacts (e.g., batch effects), when these confounders are unknown. Applying our method to both real and synthetic, human and mouse data, we demonstrate the need for such a joint correction of confounders, and also the disadvantages of other possible approaches based on those in the current literature. In particular, we show that our class of models has maximum likelihood to

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This Article

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Abstract

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This Week's Issue

August 31, 2010; 107 (35)



From the Cover

- Morphology of an island dinosaur
- Solubilizing starch
- Ice Age savanna in Southeast Asia
- Transcription-coupled DNA repair
- Deficit in the aging brain

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WorldWideScience

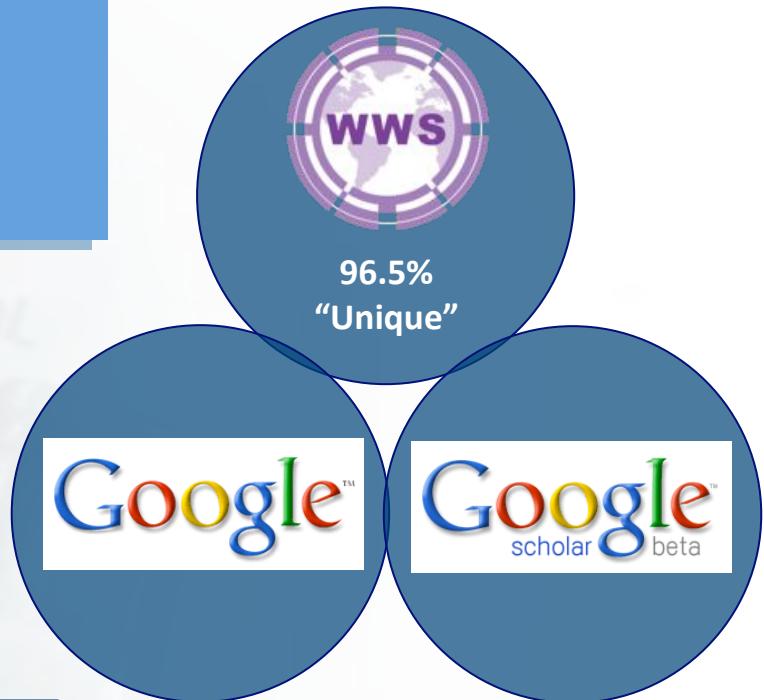
- The Deep Web
 - where science is hundreds of times larger than the “surface web”
 - generally not “googleable,” “bingable” or searchable by major search engines
- Scientists Limitations
 - Not knowing “what’s out there.” (examples: Korean medical journals, Australian Antarctic data, South African scientific research database)
 - Inadequate time to search scientific databases one by one (examples: UK PubMed Central, Ginsparg’s arXiv.org)
 - Inability to sort compiled results by relevance
- Solution: Federated searching
 - A single user query simultaneously sent to multiple deep web databases.
 - Federated search engine sorts and presents results in relevance-ranked order

WorldWideScience – Fills Key Niche in Scientific Discovery

- In comparisons of search results from identical queries on WWS, Google, and Google Scholar, only **3.5%** overlap
- WorldWideScience is 96.5% unique

Now available in multilingual versions

From the DOE, the British Library and Microsoft External Research



Academic.Research.Microsoft

 Microsoft Academic Search

tim menzies  Advanced Search

 Tim Menzies  Edit  Embed  Subscribe

Co-author (188) » This page will show details of an author matched to your query. You may find other results here.

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ASE
ICSE
SEKE

Tim Menzies
West Virginia University
Publications: 231 | Citations: 1286 | G-Index: 24 | H-Index: 18
Interest: Software Engineering & Programming Languages, Artificial Intelligence, Human-Computer Interaction




Year	Cumulative Citations	Annual Citations
1983	0	0
1986	0	0
1989	0	0
1992	0	0
1995	0	0
1998	0	0
2001	~100	~10
2004	~250	~15
2007	~450	~10
2010	~650	~5

Cumulative Annual

Publication (231) »

Regularities in Learning Defect Predictors.  Download

Burak Turhan, Ayse Basar Bener, Tim Menzies

Conference: Product Focused Software Process Improvement - PROFES 2010



Key links

Product	URL
WWT	www.worldwidetelescope.org research.microsoft.com/wwt
Terapixel	research.microsoft.com/terapixel
Trident	http://tridentworkflow.codeplex.com/ Open Source
Microsoft Biology Foundation	http://mbf.codeplex.com/ Open Source
WorldWideScience	http://worldwidescience.org
The Fourth Paradigm	http://research.microsoft.com/fourthparadigm



Lessons learnt

On 21 November 2009, scientists, lawyers, journal editors, and funding representatives gathered for the Yale Law School Roundtable to discuss how data and code might be integrated with tradition research publications (www.stodden.net/RoundtableNov212009). The inspiration for the roundtable came from the example set by members of the genome research community who organized to facilitate the open release of the genome sequence data. That community gathered in Bermuda in 1996 to develop a co-operative strategy both for genome decoding and for managing the resulting data. Their meeting produced the *Bermuda Principles*, which shaped data-sharing practices among researchers in that community, ensuring rapid data release (see www.ornl.gov)

- Permission required to use data can delay research
- Data can be continuously produced
- Federating data produces huge wins
- Visualisation is vital
- Projects themselves are “data” to workflow engines
- Late breaking news:

Reproducible Research," Computing in Science and Engineering, vol. 12, no. 5, pp. 8-13, Sep./Oct. 2010, doi:10.1109/MCSE.2010.113

2. From Data Release to Data Services



It's a data-driven world

Machine Translation (MT)

- From rules to statistics

Spell Checking as MT

- Search queries + click through

Online games

- Skill matching

How Good Are You at Halo?

Xbox Live

- > 12 million players
- > 2 million matches per day
- > 2 billion hours of gameplay

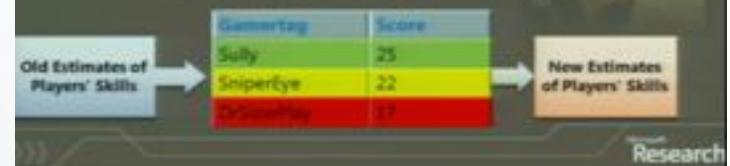


The Challenge

- > Tracking how good each player is to match players of similar skill.

TrueSkill™

- > Months of work, 100s of lines of code



Research

Data logs **behaviours** in more reliable ways than demographic **studies or surveys** to study/predict **trends**

(Banko and Brill, 2001) – effectiveness of statistical NLP techniques is highly susceptible to the **data size** used to develop them

(Norvig, 2008) – it is the **size of data**, not the sophistication of the algorithms that ultimately play the central role in modern Natural Language Processing

Challenge in Data-driven Research

- A lot of the data needed for data-driven research is in industry (vaults)
- It cannot be accessed because of
 - Scale
 - Privacy
 - Business sensitivity



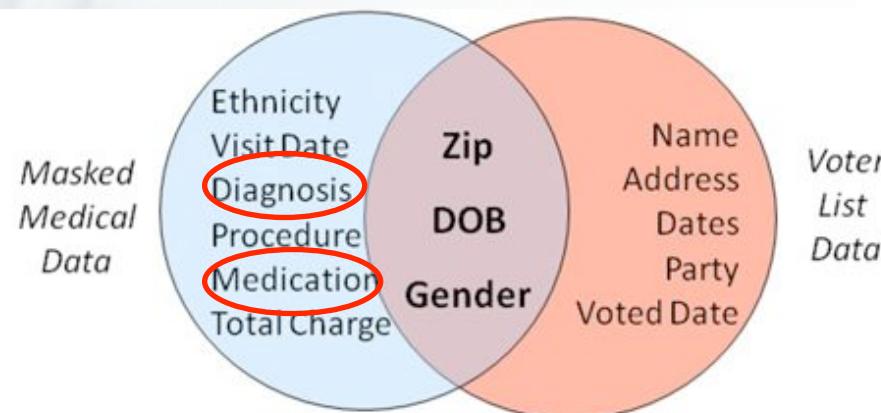
To what extent is industry inhibiting invention and innovation in universities?

How to drive innovative research in the world of cloud-based data services?

Privacy in Public Cross-linked Data Sets



The Massachusetts Governor Case



He was the only male in his zipcode with his Date of Birth

Online Privacy

- We leave our traces online at multiple sites such as social networks, blogs, forums etc.
 - Re-identify users from movie mentions in forums to user ratings of movies [Frankowski'06]

225
200
150
100

BobZ	Some Recommendations	Reply Reply with Quote
Your predictions:	Sep 21, 2005 5:29:45 PM	
Lite Aquatic .. <input type="checkbox"/>	I've enjoyed some great movies from Netflix recently. Last night I watched The Life Aquatic with Steve Zissou , which was quirky and funny. The best comedy I've seen in years.	
★★★★ <input checked="" type="radio"/> 4.5 stars <input type="checkbox"/>		
Finding Never .. <input checked="" type="checkbox"/>	Earlier in the week I saw Finding Neverland . Also a great movie.	
★★★ <input checked="" type="radio"/> Not seen <input type="checkbox"/>		

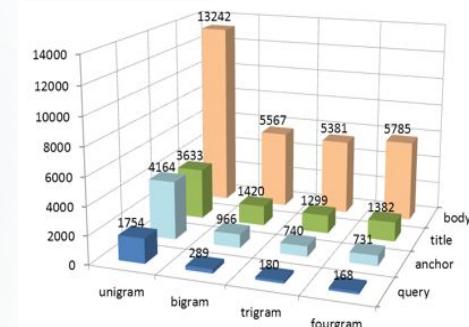
Web N-gram Services



Access to *petabytes* of real world data

<http://research.microsoft.com/web-ngram>

Leading technology in Search, Machine Translation,
Speech, Learning, ...



8/10/2010

Microsoft
Research

Web N-Gram in Public Beta

Web data has structure...

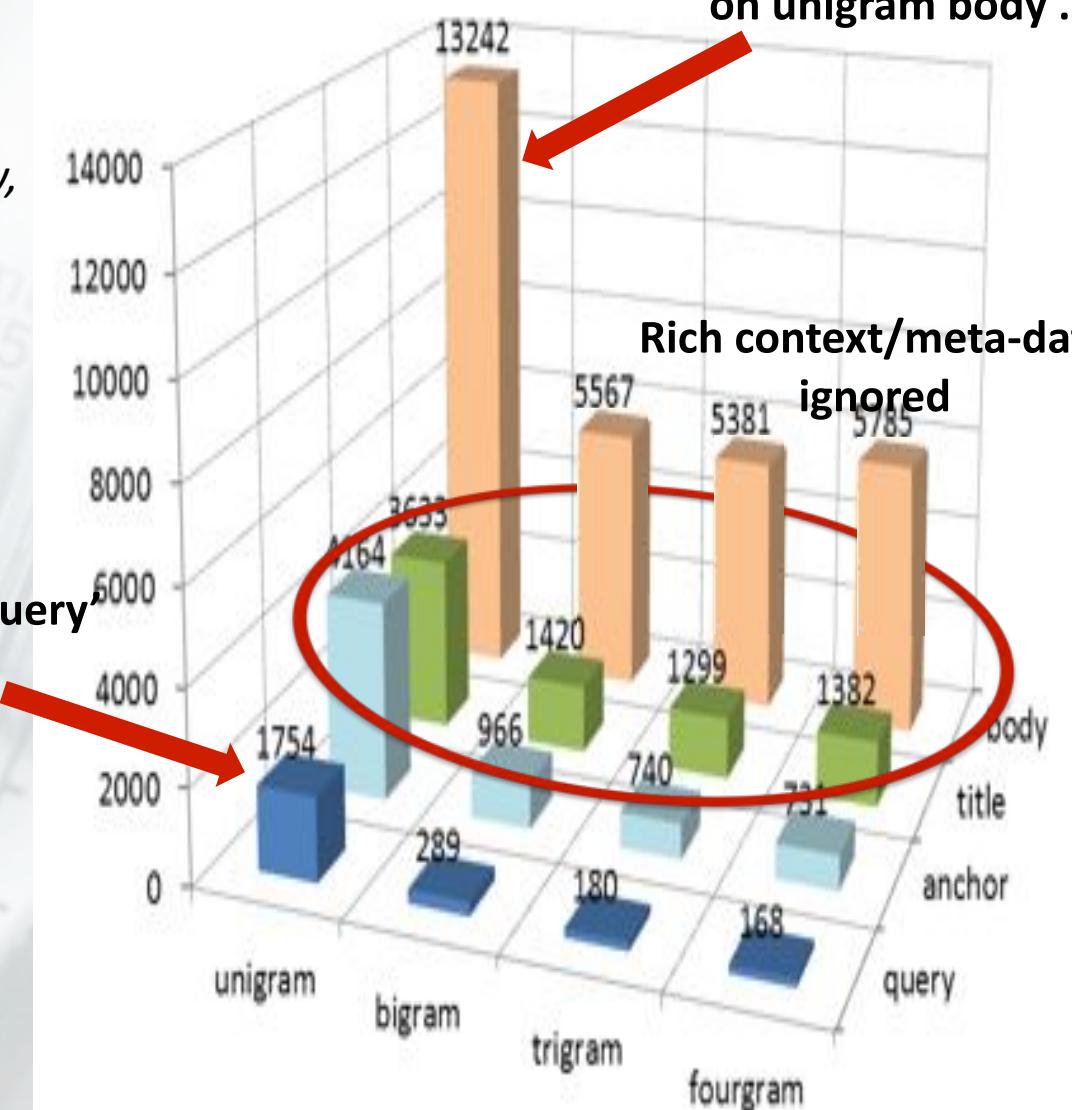
...and that counts (e.g. Body, Title, Anchor)

“Perplexity” decreases effectiveness

Users form ‘query’

Search engines rely on unigram body ...

Rich context/meta-data ignored



Web N-Gram in Public Beta

Single Tag Cloud



Multi Tag Cloud



Ref: Dr. Li Ding, Rensselaer Polytechnic Institute

Going to Webscale (trillion tokens)

- Free for *non* commercial research
- Scaling to TeraBytes and PetaByte
- Features:
 - Content types: Document Body, Document Title, Anchor Texts
 - Model types: Smoothed models
 - N-gram availability: unigram, bigram, trigram, N-gram with N=4, 5
 - Training size (Body): All documents indexed by Bing in the en-us market
 - Access: Hosted Services by Microsoft
 - Updates: Periodical updates **
- Research team to engage with
- Available on Azure for the awardees of the NSF Program
Solicitation Computing in the Cloud



** Distinct from Google

[Exploring Web Scale Language models for Search Query Processing](#), in *WWW'2010*

De-hash examples

Enter a hash-tag phrase, and we will show the likely breakdown of sub-words. For instance, enter #nowplaying. More examples...

#whenifirstmet #nowplaying #wtfyoumean #thissummer #enoughisenough #ifirstmet #riptherunway #complimentgonebad
#SMHyoureghetto #letmefindout #idoit2 #itaingtmyfault #FlavoredCondoms #jayparkaom #ChrisBrownRocks #thingthatihate #nowplaying
#whenifirstmet #hereugo #stpatricksday #thissummer #hiphopaintdead #idoit2 #sexistthebest #Lupequotes #WillYouEver
#flavoredcondoms #whenimeetjustin #hcr #FF #Nowplaying #followfriday #howyouathug #youaintforme #OhJustLikeMe #NotMeThough
#HCR #idoit2 #yeaisaidit #Advice #iloveitwhentrey #MarchMadness #TLS #ihatequotes #slbattle #nowplaying #howyouathug
#uaintforme #youaintforme #Whenifirstmet #whatsworse #WhenTwitterWasDown #howuathug #ChrisBrownonJstream #hereugo #TLS
#justinbiebermyspace #idoit2 #HCR #willyouever #marchmadness #Hereyougo #nowplaying #imthekindofperson #FF #6wordstory
#whitecusswords #whoelsenoticed #yeaisaidit #hcr #idoit2 #ss3forindonesia #Ohjustlikeme #blackcusswords #theboltonnews
#ss2malaysia #FollowFriday #arashi #StopHatingDemi #mucoreSNSD #nowplaying #imthekindofperson #Mlis #whitecusswords
#OhJustLikeMe #idoit2 #thankstwitter4 #YourUnderArrest #hcr #BounceBackTeuk #inschool I #Imliableto #DontBeMadBut
#becauseofbieber #ChrisBrownonJstream #hbu #nowplaying #dearfuturewife #imthekindofperson #musicmonday #Isitjustme
#goseethedoctor #hcr #idoit2 #thankstwitter4 #MM #OhJustLikeMe #TLS #ohmySiWon #thatisall #ihatequotes #afmimoment
#biebermemories #tellmewhyumad

Phrase	LgProbability
yea i said it	-9.345904
yeaisaidit	-10.42589
yeal said it	-11.31242
yea isaid it	-12.04566
ye a i said it	-13.61018

Phrase	LgProbability
when i first met	-6.974892
when ifirstmet	-10.34817
when ifirst met	-10.67689
when i firstmet	-11.09351
wheni first met	-11.1378

Phrase	LgProbability
w8 4 u	-10.0969
w84u	-10.27723
w 84u	-10.69117
w 84 u	-10.7444
w 84 u	-11.06896

Phrase	LgProbability
parlez vous francais	-7.901024
parlezvous francais	-11.01565
parlez vousfrancais	-11.23517
pa rlezvous francais	-11.30055
parlezvousfrancais	-11.41711

Implicit Search

VINOGRAPHY: a wine blog
wine and food adventures in San Francisco and around the world

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Breaking Wine News: Bordeaux's Cos d'Estournel Buys Napa's Chateau Montelena

To those of you in the wine world paying attention to the dollar's stomach churning lows against the Euro, this news may come as little or no surprise. This morning, Chateau Cos d'Estournel announced its purchase of the historic [Chateau Montelena](#) in Napa. While not the first bit of investment from Bordeaux in the [Napa Valley](#) is certainly a significant one, given both the landmark historical status of Chateau Montelena as well as the prestige and success of Cos d'Estournel, whose star has certainly been rising in Bordeaux over the past decade.

Montelena became a world famous winery after its 1973 Chardonnay beat out French competitors in the famous [1976 Judgement of Paris](#).

- 17.07378 Chateau Montelena in Napa
- 17.28525 Chateau Montelena in Napa
- 17.36758 Chateau Montelena in Napa
- 17.49432 Chateau Montelena in Napa
- 22.04413 Chateau Montelena in Napa
- 22.10334 Chateau Montelena in Napa
- 22.25322 Chateau Montelena in Napa
- 22.39656 Chateau Montelena in Napa

'Chateau Montelena in Napa'
segmentation

Chateau Montelena

From Wikipedia, the free encyclopedia

Chateau Montelena is a Napa Valley winery most famous for winning the white wine section of the historic "Judgment of Paris" wine competition. Chateau Montelena's Chardonnay was in competition with more than wines from France and California under blind tasting. \$8.1 million invested their top success to offer the Chardonnay that Chateau Montelena in California, which is another California wine company. Chateau Montelena was featured in the 2004 film *Judgment*.

Contents (10)
1 History
1.1 Judgement
2 Geology
3 References
4 External links

Chateau Montelena

Location: Calistoga, California, USA

Established: 1968

Key people: Jim Bernini (owner), Michael M. Shanks (general manager), Greg Johnson (Managing Director), David Mills (Vice President, Winemaking)

Capacity: 10,000–15,000

Topics: Chardonnay, Pinot noir, Cabernet Sauvignon, Winemaking, Poetry

Wikisource: Chateau Montelena

'Chateau Montelena' as an entity
in Wikipedia

Foreseen Breakthroughs and Impact with Microsoft Web N-gram Service

- Sheer **power of data**
 - Cross lingual documents are a way of life. N-grams work on other languages
- Documents have **structure and styles**
 - A single document is written in many languages, with the document body, title and anchor text being all different languages that should be treated separately
 - Web has other languages such as those used for SMS. The N-gram Service works on this kind of language which opens up a lot of interesting research questions



Are we revisiting the concept of “language identification” as a means of identifying languages of different styles, and not so much on national languages?

4. Changing Software on a Massive Scale



The Challenge

- Microsoft ships software to **1 billion** users around the world
 - How do we find out when things go wrong?
- We want to
 - fix bugs **regardless of source**
 - application or OS
 - software, hardware, or malware
 - prioritize bugs that **affect the most users**
 - **generalize the solution** to be used by any programmer
 - get the **solutions out to users** most efficiently
 - try to **prevent bugs** in the first place



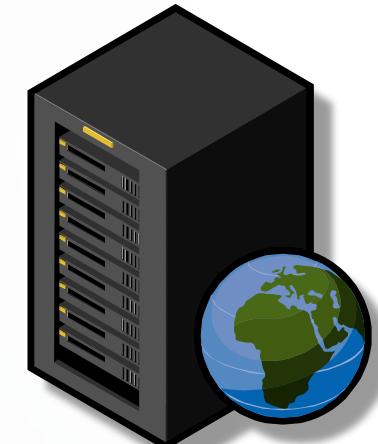
Windows Error Reporting by the Numbers

billions	Error reports collected per year (App,OS,HW)
1 billion	Clients
100 million	Reports /day processing capacity
many 1000s	Bugs fixed
almost all	Microsoft product teams use it
over 700	Companies using WER
200	TB of Storage
60	Servers
10	Years of use
2	Servers to record every error received

Debugging in the Large with WER...



Minidump



!analyze



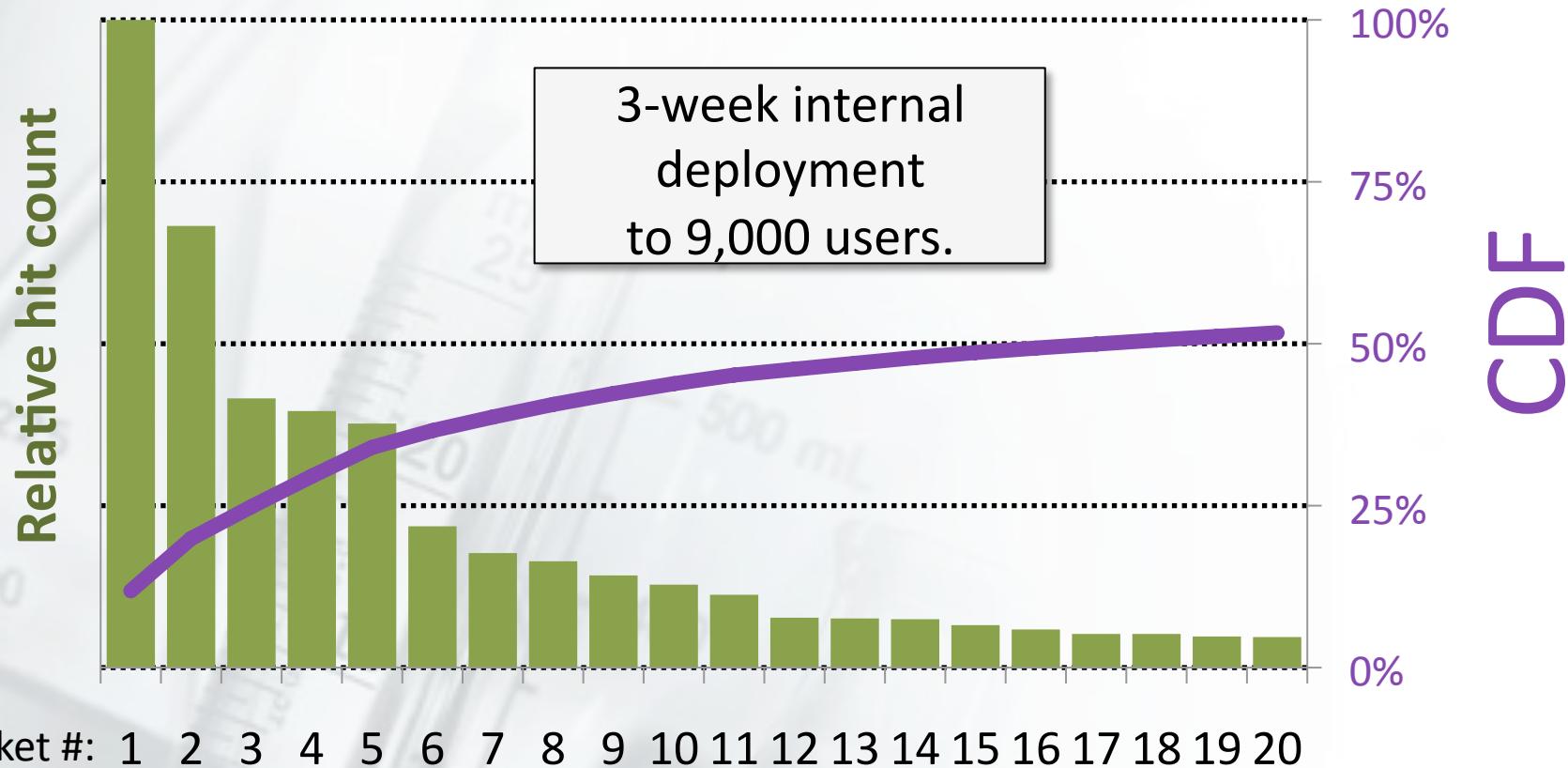
5

17

23,450,649



Top 20 Buckets for MS Word 2010



Bucket #: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

- Just 20 buckets account for **50% of all errors**
- Fixing a small # of bugs will help **many users**

Fixing bugs in software

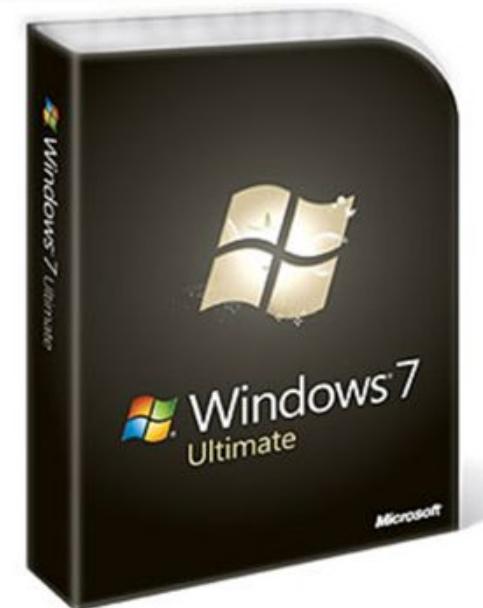
- First use found >=5-year old heisenbugs in Windows
- Windows Vista team **fixed 5,000 bugs** in beta
- Anti-Virus vendor fixed top 20 buckets and
dropped from 7.6% to 3.6% of all kernel crashes
- Office 2010 team fixed 22% of reports **in 3 weeks**
- And you can fix yours...

5. Service specific risk prediction and impact models



Testing Windows

- More than 400 million lines of code
- Development team spread all over the world
- Over 1 billion users
- 400,000 supported devices
- 6,000,000 apps running on Windows
- Cost of development \$xxxxx
- Updates and fixes constantly
- How do we test the Fixes???



Change Risk Analysis and Estimation

- Motivation:
 - Reasoning about risk and test impact of any code change is currently based largely on **human judgment**
 - The supporting data is scarce and largely subjective
- Goals:
 - Expose rich static and **historical information on binaries** being serviced
 - Build servicing-specific **risk prediction and impact models** for Windows binaries and code changes
 - Provide actionable **fix triage and test recommendations** based on collected data

The scale/impact factor of this project has never been done before

CRANE

- At the time of fix triage, we already need to make assessments on risk of the fix and plan for potential mitigations
- CRANE allows users to look at the part of the system that is about to be changed through a report containing the following data:
 - Vital metrics for the executable and the procedure about to be changed
 - History of changes done to this part of code
 - Data on quality of the test process for the area being changed
 - First approximation of the list of system components selected for re-testing
 - First approximation of probability of regressing existing behavior
 - Available test cases executing through changed parts of code.



Vista SP1 QFE [View Details and Notes](#)

Change Summary

Fix Regression Risk: **Very High** (Probability of regression > 50%)

Binary	Arch Layer	Total/Post-LKG changes	Regressions	Changed Block Covered
+ p.dll	48 (range0-64)	1/2	0/0	50/52 (96%)
Source File				Changed Block Covered
+ base\diagnosis\pdata.c				21/32 (65%)
+ base\diagnosis\public.c				2/2 (100%)
Function		Complexity	Blocks Covered	Changed Blocks Covered
Connect		10->12	76/90 (85%)	1/2 (50%)
+ base\diagnosis\query.c				25/38 (66%)
+ u.dll	45 (range0-64)	1/1	0/0	5/9 (55%)
+ v.dll	21 (range0-64)	1/2	0/0	5/5 (100%)

Buddy Components [\(?\)](#) [View Whitelist](#)

Component	Source	Owner
+ base\technologies\diagnostic\framework\diagnostic scenarios	bug history	car
+ base\technologies\performance counters	trace	pmtv
+ base\technologies\file systems\junctions\fsn2	trace	salb
+ tools\client platform\japi	static analysis	dly
+ networking\wireless services\wlan end-to-end	static analysis	ama

Inspected Applications [\(?\)](#)

AppId	Name	Version	Vendor
2048	visual studio 2005 gamma	2005 sp1	microsoft
2049	visual studio 2005 japanese	2005 sp1	microsoft

Minimum Tests [\(?\)](#) [Export All](#)

Pt 1 (Must run) | Pt 2 (Good to run) | Pt 3 (Optional)

Trace	Blocks Covered	Component	Owner
networking\qos\qos-core3619481 [pacxperf]	31	networking\qos	sun
server\technologies\wmi\accounting\remotequery0mx\6363	48	server\technologies\wmi	ama
tools\performance management\performance tool\35002 [ctbregevt typeperf]	45	tools\performance management	pmtv
server\technologies\wsrm\service\common\upppool5103	28	server\technologies\wsrm	ama
multimedia\media foundation_\common\japi\mfconfig071344	11	multimedia\media foundation	var
tools\util\triage\52006344 [code coverage - configuration]	8	tools\util\triage	and

Similar Hotfixes

[Same changed binaries](#) [Same changed source files](#) [Same changed functions](#)

kb9507 d:\base\diagnosis\pdata.c

Branches

WinXP SP2 QFE
WinXP SP2 GDR
WinXP SP3 QFE
WinXP SP3 GDR
Win2003 SP1 QFE
Win2003 SP1 GDR
Win2003 SP2 QFE
Win2003 SP2 GDR
Vista SP1 QFE
Vista SP1 GDR
Vista RTM QFE
Vista RTM GDR

Vista RTM Calculate Fix Regression Risk

Summary		WdCheck	
Binary Regression Risk (1)	Low *	Source File	base\diagnose\gmmon.cpp
View			
Blocks Covered (1)	13/22 (59%)	Complexity (1)	9
View			
Changes in performance.exe (1)			
KB Article	Released On	Downloaded (1)	Risk
K89617	1/17/2009	534,463,067 *	Very High
Bug Id	Branch	Bug Type	Regression Of
2581	VISTASPI	Code Defect	
2582	VISTASPI	Code Defect	
2584	VISTASPI	Code Defect	
K89379	5/9/2007	42 *	Low
View			
Dependent Components (1)			
Component	Risk	Owner	
base technologies\kernel\registry	Low *	pmu	
base technologies\performance counters	Low *	pmu	
base technologies\system utilities	Low *	far	
View			
Available Tests (1)			
<input type="checkbox"/> Show			
Trace	Component	Blocks Covered	Owner
desktop technologies\accessibility\screen magnifier\basic (5196)	desktop technologies\accessibility\screen magnifier	11	jan
deployment\windows installer (msi)\triaged2196	deployment\windows installer (msi)	11	tim
base technologies\reliability\restart manager\cm functional test\managed code512	base technologies\reliability\restart manager	11	paul
networking\tcp\ip v4&v6\ncpp5116	networking\tcp\ip v4&v6\ncpp	11	aj
networking\net\ncbase550	networking\net\ncbase	11	aj
desktop technologies\accessibility\screen magnifier\basic (51923)	desktop technologies\accessibility\screen magnifier	11	jan
desktop technologies\accessibility\screen magnifier\basic (51934)	desktop technologies\accessibility\screen magnifier	11	jan
desktop technologies\accessibility\screen magnifier559	desktop technologies\accessibility\screen magnifier	11	jan



Vista RTM Calculate Fix Regression Risk

Summary

Binary Regression Risk [?]

Win2008/Vista SP1 Hide Calculator

Fix Regression Risk Calculator

Number of source files added, deleted or changed* 4

Names of binaries affected*

Separate names with comma

p.dll

Calculate

High

(Probability of regression around twice the average)

Owner in performance.exe [?]

KB Article

= KB9617

Bug ID

2581+

Windows Performance Counter

Code Defect

2582+

VISTASPI

Code Defect

2584+

VISTASPI

Code Defect

* KB9379

5/9/2007

42 *

Low

Days To Solution

21

10

7

Dependent Components [?]

Component

- base technologies\kernel\registry
- base technologies\performance counters
- base technologies\system utilities

Risk

Owner

Low *

jan

Low *

jan

Low *

far

Available Tests [?]

Show

Trace

desktop technologies\accessibility\screen magnifier\basics (5196)
deployment\windows installer (msi)\triaged2196
base technologies\reliability\restart manager\rm functional tests\managed code512
networking\tcp\ip v4&v6\scipip (516)
networking\net\ndatabase530
desktop technologies\accessibility\screen magnifier\basics (5193)
desktop technologies\accessibility\screen magnifier\basics (5194)
desktop technologies\accessibility\screen magnifier (59)

Component

desktop technologies\accessibility\screen magnifier
deployment\windows installer (msi)
base technologies\reliability\restart manager
networking\tcp\ip v4&v6\scipip
networking\net\ndatabase
desktop technologies\accessibility\screen magnifier
desktop technologies\accessibility\screen magnifier
desktop technologies\accessibility\screen magnifier

Blocks Covered

Owner

11

jan

11

tim

11

paul

11

aj

11

aj

11

jan

11

jan

11

jan



CRANE

- Several hundreds of engineers use CRANE
- CRANE case studies reduced Test Pass (TP) time by 30% by prioritizing tests without missing issues
- For 8 out of 10 fixes with defects, such a defect can be found by testing the components recommended by CRANE

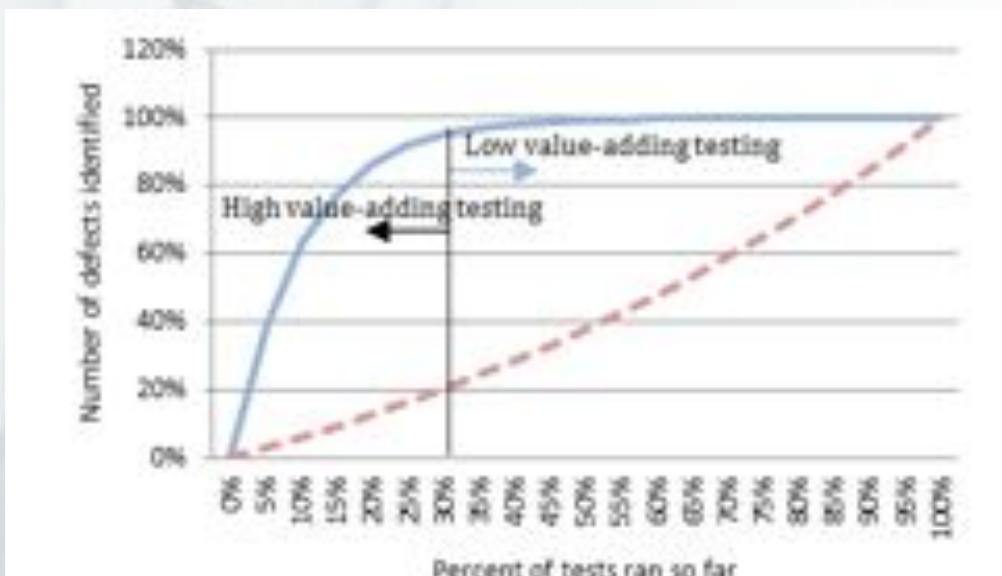


Figure 7. Well-prioritized test execution (solid line) vs. execution of tests not prioritized by effectiveness (dashed)

Conclusions

- More research needed on
 - technical, legal, societal solutions and processes understanding how a service-based approach can be evaluated
- Development process is a constantly evolving social system
 - recalculating models periodically to adjust to these changes in the process
- A more precise definition of test execution cost will be useful in improving efficiency of test selection

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