Standing on the Shoulders of Giants:

New strategies to involve more of the world with data mining and intelligence extraction.

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* Apple’s iPad was first released in April 2010.
70% of World’s Population Uses Mobile Devices

Over half a billion mobile devices and connections were added in 2013

Growing World Demand for Connectivity

Exabytes per Month

61% CAGR 2013-2018

- Middle East and Africa (9.4%)
- North America (18.6%)
- Asia Pacific (42.4%)
- Central and Eastern Europe (10.3%)
- Western Europe (12.0%)
- Latin America (7.3%)

Figures in parentheses refer to regional share in 2018.
Source: Cisco VNI Mobile, 2014
Spoiler Alert: Wearables

52% CAGR 2013-2018

Source: Cisco VNI Mobile, 2014
Mobile Social Networking

Explosion of Mobile Data Services and Social Media

The advent of the smartphone, combined with the widespread deployment of mobile broadband networks, has led to an explosion of mobile data services.

- **Facebook**: 680m active monthly mobile users
- **Twitter**: 120m active monthly mobile users
- **Foursquare**: 30m active monthly mobile users
- **LinkedIn**: 46m active monthly mobile users

*March 2014: Facebook reported 1 Billion Active Mobile Users*
Less Than Four Degrees of Separation

Four degrees of separation.

Facebook

United States

Anatomy of Facebook

By Lars Backstrom on Monday, November 21, 2011 at 5:04pm ☺
Tweet: “Poor little crumb’s got fever and red spots. I feel so sorry.”

Tweet: “Coughed the whole night. I got it bad. Flu.”

> 95% correlation with Health Protection Agency Data
Social and News Media Enable Estimation of Epidemiological Patterns Early in the 2010 Haitian Cholera Outbreak

- Cholera-related HealthMap news media reports, Twitter postings, and government cholera cases reported strongly correlated with official case data.

- Data from Informal sources were available up to 2 weeks earlier!

HealthMap alerts for the first one hundred days of the Haiti cholera outbreak.
Cloud Computing - A Revolution…
Quick Poll

• How Many of You Leverage “the Cloud?”

• Gmail Users?

• Dropbox?

• Use an iPhone or iPad?
The Power of the Cloud
Eidogen Cloud Migration

• 2003-2005: 3 different server rooms: 120+ servers

• 2005-2010: 1 colocation center: 5 caged racks

• 2010-2012: 1 colocation center: 3 racks + EC2/RDS cloud instances (mobile apps and migration)

• 2012-2013: EC2/RDS cloud instances (primary) + 2 legacy racks (“fallback”)
The Cloud: Amazon AWS Growth

In January 2008, Amazon announced that the Amazon Web Services consume more bandwidth than its entire global network of Amazon.com retail sites.

Amazon S3 grew 192% year-over-year.

AWS Free Usage Tier now includes Amazon MS-Windows Server EC2 instances.

February 23, 2012
Jobs Generated by Cloud Computing

U.S. number of unemployed persons (10.5 million) - i.e. unemployment rate (6.7 percent)

April 4, 2014: http://www.bls.gov/news.release/empsit.nr0.htm
Mobile and Cloud

Cloud Applications Will Account for 90 Percent of Mobile Data Traffic by 2018

Source: Cisco VNI Mobile, 2014
Many Apps, Huge Download Numbers

- Total Apps Approved for iTunes App Store: 1,542,115
- Total Active Apps (currently available for download): 1,157,279
- Total Inactive Apps (no longer available for download): 384,836
- Number of Active Publishers in the iTunes App Store: 300,572


> 100 Billion Downloads!

| Mobile App Store Downloads, Worldwide, 2010-2016 (Millions of Downloads) |
|-----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                             | 2012            | 2013            | 2014            | 2015            | 2016            | 2017            |
| Free Downloads              | 57,331          | 92,876          | 127,704         | 167,054         | 211,313         | 253,914         |
| Paid-for Downloads          | 6,654           | 9,186           | 11,105          | 12,574          | 13,488          | 14,778          |
| Total Downloads             | 63,985          | 102,062         | 138,809         | 179,628         | 224,801         | 268,692         |
| Free Downloads %            | 89.6            | 91.0            | 92.0            | 93.0            | 94.0            | 94.5            |

Source: Gartner (September 2013)
However, Market Awareness Is Challenging…

Eidogen’s Apps: More than 50K Downloads

In partnership with Molecular Materials Informatics,

In partnership with Accelrys

In partnership with Intel

In partnership with Accelrys
Science-Cloud Tasks (Eidogen/Accelrys)

- What is it?
  - An iOS application for iPod/iPhone/iPad (Android planned)
  - A new Pipeline Pilot component collection

- What does it do?
  - Allow any Pipeline Pilot PDF and HTML report to be easily deployed to mobile devices
  - Allow authoring of new Pipeline Pilot protocols to deploy dashboards and mobile-centered tasks and actions on mobile devices

- Free App from Apple AppStore (search ‘Accelrys’)
New Mobile Possibilities...

Build protocols and enable for mobile using Mobile Collection

Deploy protocols using Mobile App

Deploy

Dashboards
‘Real-Time Project Status’

Tasks
‘Query Corporate Compound Collection’

Mobile Actions
‘Capture and Analyze Image’

Share protocol or report with other mobile users

ScienceCloud Tasks / Mobile Collection
Pipeline Pilot Protocols are Easily ‘Mobilized’
Protocol Folders Appear in the Tasks App

Enable science on your mobile device with Tasks powered by the industry-standard Pipeline Pilot™ scientific platform. Use it in lab, use it on the train, use it at Starbucks! Your science is no longer limited to your office.

The Tasks home lists a number of task categories. Press on a category to view that categories’ related set of tasks. Press on a task title to execute and see results.
Enable science on your mobile device with Tasks powered by the industry-standard Pipeline Pilot™ scientific platform. Use it in lab, use it on the train, use it at Starbucks! Your science is no longer limited to your office.

The Tasks home lists a number of task categories. Press on a category to view that categories’ related set of tasks. Press on a task tile to execute and see results.

Some Tasks require you to provide input before submitting and will display a Task Settings dialog. Press “Submit” when you are satisfied with your input. Task results can be viewed, printed, or shared with your co-workers and friends, anytime, anywhere!

Create and publish your own tasks by getting a personal ScienceCloud account. Send email to ScienceCloud Support to get started.

Using the Mobile App

**Home**
Show a list of task categories, each containing tasks to run.

**History**
See a list of tasks you have previously submitted. View the results again or rerun with different settings.
Observation Capture (Demo)

Leverage Mobile Device Capabilities

- Camera, Audio, GPS, etc.
Embed and Deploy

Embed full applications within Pipeline. Pilot protocols and deploy to mobile users.
Enable science on your mobile device with Tasks powered by the industry-standard Pipeline Pilot™ scientific platform. Use it in lab, use it on the train, use it at Starbucks! Your science is no longer limited to your office.

The Tasks home lists a number of task categories. Press on a category to view that categories’ related set of tasks. Press on a task tile to execute and see results.

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R&D Productivity Has Been On The Decline

Note: R&D costs are estimated from PhRMA annual survey 2009; NMEs are the total number of small molecule and biologic approvals by the FDA Source: Bernstein Research “The Long View – R&D Productivity” (September 30, 2010)

Life sciences R&D: Changing the innovation equation in India  THE BOSTON CONSULTING GROUP
7 Billion people depend on fewer than 500,000 people to discover and develop new medicines.

Let’s find a way to shift the numbers...
Summary

- Billions of people routinely use and connect with mobile devices.

- Massive worldwide connectivity is unprecedented.

- Well deployed social media frameworks are in-place and easy to access.
  - e.g. Facebook, Twitter, and their APIs.

- Science apps have been largely insular, vertical, and point solutions. We need to recruit more of the world!

- Cloud-based pipelining-tools, social media frameworks, and mobile devices together open many new possibilities.
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About Eidogen-Sertanty, Inc.

- Knowledge-Driven Solutions Provider
  - Sertanty established in 2003, acquired Libraria assets
  - Sertanty acquired Eidogen/Bionomix in 2005 → Eidogen-Sertanty
  - $20M invested: Libraria ($6M), Eidogen/Bionomix ($12M), Sertanty/ES ($2M)
  - 15 distributed FTE’s (5 US and 10 India)
  - Worldwide (bio)pharmaceutical customer base
  - Cash-positive since 2006

- Databases & Software – Annual Subscriptions
  - TIP™ - Protein Structural Informatics Platform
  - KKB™ - Kinase SAR and Chemistry Knowledgebase
  - CHIP™ - Chemical Intelligence Platform

- DirectDesign™ Fee-For-Service
  - In Silico Target Screening (“Target Fishing” and Repurposing)
  - Target and compound prioritization services
  - Fast Follower Design: Novel, Patenable Leads