Architecting the Internet of Things

Concept -> beer -> wine -> shipping products;
A story of GEOTiQ
• **George Schnurle** is CEO at GEOTiQ. He has worked on storage platforms at Data Domain, optical networking at Alidian, Ethernet switching at Alantec, picture-in-picture at MultiVision and long ago designed the Massbus-Ethernet Interface System (MEIS) to connect Stanford's DEC-20 systems to a new thing called Ethernet. He has a Bachelors in Electrical Engineering from Stanford.

• **Michael Weseloh's** 17 years of sales, marketing, new product development and product launch experience. He has helped numerous companies with product development and feature enhancements in the consumer, medical, industrial, wireless and networking products space. Mike's skills were further honed at Mitsubishi Electronics, Renesas Semiconductor and Oki Semiconductor. He has held committee and board positions with HomeAPI, UPnP and ZigBee, and has been a voting member in IEEE 802.
Genesis of GEOTiQ

• After a year of looking for a job, we started looking for the next big thing

• Discovered Arrayent at the Embedded Systems Conference in May 2010
Catching the Next Wave

<table>
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<tr>
<th>Historical Market Evolution</th>
<th>Innovation Phase</th>
<th>Adoption Phase</th>
<th>Pervasive-Immersion Phase</th>
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<tr>
<td>Evolution of Computers:</td>
<td>Mainframe</td>
<td>Mini-Computers</td>
<td>Micro-Computers</td>
</tr>
<tr>
<td>1950's to 1970's</td>
<td>Computers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evolution of Networks:</td>
<td>Wide Area Networks</td>
<td>Local Area Networks</td>
<td>Internet World Wide Web</td>
</tr>
<tr>
<td>1970's to 1990's</td>
<td>(WAN)</td>
<td>(LAN)</td>
<td></td>
</tr>
<tr>
<td>Evolution of Internet Devices:</td>
<td>Universities, Companies, Military</td>
<td>Personal Computers</td>
<td>Internet-Of-Things</td>
</tr>
<tr>
<td>1990's to Now</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Named the company **Adaline West**
Defining the Market

LUCY Market Population

Seniors with internet access who live alone
- 40M Seniors 65+
- 30% (12M) have home internet access
- 20% (8M) live alone
- 2.4M Seniors with internet access who live alone (40M x 30% x 20%)
- Assume 2% sell-through: 48K units
- Sales potential of $2M to $7M

Market appeared reasonable for a monitor named LUCY
The Vision

• Market research for Arrayent technology
• Seniors with internet access who live alone
• The LUCY Motion/Activity Sensor
Change of Direction

- In researching LUCY it was determined that the capital necessary to bring the product to market exceeded our abilities.

- One of our advisors recommended that we market the Arrayent technology direct to the developers community and build up organically from there!

- The company took off from this point and we started building a team
There are lots of sensors available, and there are lots of things that would benefit from control over the internet.

GEOTiQ
Get Everything On The Internet – Quickly!
From Two to Many, finding talent

- Funny thing, when looking for talented people; spirit lifting hobbies turned out well!

Wine Making

Home Brew
From Two to Many, finding talent

Met Mel While Making beer....

Software Development and Web Platform
From Two to Many, finding talent

- Pressed two more into service ... while making wine!

Operations
Marketing
From Two to Many, finding talent

• Beyond finding new company team members at spirit lifting hobbies

• Think about everyone you know and then everyone they know to build the best team possible:
  – Former Co-Workers
  – Friends of Friends

• We added: Quality, Tech Pub, Engineering
The Name Game

• Adaline West
• GEOTI – unfortunately geoti.com was taken
• GEOTiQ – “GEE-OH-TEAK” (does NOT rhyme with erotic)

• When looking for a company name .. A few things to think about:
  – Is the domain available?
  – Is it unique, easy to find on Google?
  – Easy to spell?
Once you have a name: Give it a story

GEOTiQ

- GEO :: Earth
- Boutique :: specializes in elite and fashionable items
- GEOTiQ :: Specializing in the fashion of connecting consumer products to the world

Get Everything On The Internet – Quickly!
Got the name - Now Incorporate!

• Seems like it’d be easy ... but...

• When we filed in June, the State was still working on April

• We paid CutRedTape.com $100 + State expedite fees - and it was done in a few days

• The $800 minimum corporate tax is not due until 4th month of your 2nd taxable year
First Company Meeting

• Finding space and the first all hands meeting
Financials

• Founder + 3 individual investors raised $25K
• Production run of 250 systems cost $17K
• Payments to Arrayent totaled $4.5K
• Other expenses total $2K over 6 months
• That leaves $1.5K in the bank
• Cash is king – don’t squander it
Start Up Challenges

- Idea to hardware
- Software
- Manufacturing
- Keeping on task and focused
- Operations
- Software ... still working on it ...
- Real World Trials
- Software development ongoing ...
- GEOTiQ team members start getting salaried job offers ...

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15 Feb 2011
• Whoops, not that production ...
GEOTiQ Production

• Remember there are lots of details in selling hardware ...

Simple things like serial numbers

Or more complex items like manufacturing program and test jigs
Bumps along the way

- Occasionally along the way you hit a few snags

GEOTiQ under estimated the work to be done on software and web development and under staffed it as well.

This lead to big delays in product launch and a loss of momentum.

As mentioned, staff was diminishing as paid positions kept being offered elsewhere; still GEOTiQ persevered!
Product Finally Released

Easily web enable your stuff!

Geotiq announces immediate availability of the G900 Developers Kit. Be one of the first to grab hold of the internet by the tail and swing it around with your embedded device. Easily control and access your product's information from anywhere on the planet via the internet on your smart phone, tablet computer, PC or if you prefer via tweets or e-mails. No large MCU, no TCP/IP, virtually no memory required; just pure, plain, easy to use all 'net!

To learn more, please visit our products page.

Follow GEOTiQ on

GEOTiQ Videos

Order your GEOTiQ G900 Dev Kit

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What is the G900DEV-KIT

- G900 gateway connects to your existing broadband (DSL, Cable Modem, etc.) router

- G900 node has on board temperature and battery sensors in addition to available GPIO and ADC channels for controlling and sensing just about anything

- G900 node can be used with any existing microcontroller based design by tapping into the RS232 port
And the web interface: Login

GEOTiQ Wireless Node Web Portal

Arrayent Utility Application

Customer Login

Customer Account Name
Customer Account Password
System Account Id

Login
Manage Devices

GEOTiQ Wireless Node Web Portal

Arrayent Utility Application

<table>
<thead>
<tr>
<th>Device Code</th>
<th>Device Type</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>NC103310015</td>
<td>Jerre Light Meter</td>
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</tr>
<tr>
<td>NC103310018</td>
<td>Jerre Light Meter</td>
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</tr>
<tr>
<td>NC103310020</td>
<td>Eval Board</td>
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<tr>
<td>NC103310022</td>
<td>Eval Board</td>
<td></td>
</tr>
<tr>
<td>NC103310054</td>
<td>Jerre Light Meter</td>
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</table>

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GEOTiQ Wireless Node Web Portal

Arrayent Utility Application

Device Monitor and Control

<table>
<thead>
<tr>
<th>Device Code: NC103310022</th>
<th>Device Type: evalboard</th>
<th>Display Name: Eval Board</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Attribute Display Name</th>
<th>Active Value</th>
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<tbody>
<tr>
<td>adc2</td>
<td>Light Meter</td>
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<tr>
<td>adc2-ts</td>
<td>LightTS</td>
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</tr>
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<td>adcp1</td>
<td>ADC_P1</td>
<td>Set</td>
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<tr>
<td>adcp2</td>
<td>Light Meter Sample</td>
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<tr>
<td>gpi1</td>
<td>Button 1</td>
<td>1</td>
</tr>
<tr>
<td>gpi2</td>
<td>Button 2</td>
<td>Set 1</td>
</tr>
</tbody>
</table>

View History
View Historical Data

Light Level in the Garage

Architecting the Internet of Things
Not limited to our web interface

- There are many ways to interface with a device using GEOTiQ and to display its data!!
Getting the word out!

• We were ready to take orders … Now What?
• Promotion
  – Videos; creating a product info video with only a PC; no actors, no cameras, no microphones
    “if you can type, you can make movies”
  – [http://www.youtube.com/watch?v=Y5ilwvXqmss](http://www.youtube.com/watch?v=Y5ilwvXqmss)
Getting the word out!

- Videos showing how easy the product is to use, after all seeing is believing, right?!
- Quick simple video, done in several takes, but no editing, just kept filming until we got a take we liked. And we used several people in the company as “actors”.

http://www.youtube.com/watch?v=WMRFrBi9Mi8
Getting the word out!

• Going retro, silent film ...targeted to go viral...
• This took about a day to shoot and several days to edit and add music to get it the way we wanted; the idea was to have the video go viral.

http://www.youtube.com/watch?v=iBoER-GbPsE
Getting the word out!

• Of coarse, the website and content (videos) are only a baseline; now we needed to drive people to the site.

• **YouTube**, **Facebook**, **LinkedIn**, **Twitter** ...

• Still in the process of posting where appropriate on forums; working to send units to editors for reviews; and writing and speaking about the company and its products.
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  – www.youtube.com/user/Geotiq
  – www.facebook.com/pages/GEOTiQ/137537249601115
  – www.linkedin.com/company/geotiq
  – www.twitter.com/GEOTiQ