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Liquid Web Research Paper

Local, redundant, and growing, three words that describe the current state of Michigan based web services company Liquid Web. Founded in 1997 by Matthew Hill, Liquid Web has since been providing a wide variety of web services, ranging from standard web hosting packages to powerful dedicated servers that can host complex applications and databases.(Rzepka, M) In the highly competitive and expanding field of IT Services, Liquid Web has managed to retain a 3-year growth rate of 95%, with revenue reaching \$39.6 million in 2011.(Inc. 5000) Liquid Web achieves this high rate of success from providing high quality technology and services along with excellent support. Before diving into the technology that powers Liquid Web, let's take a look at the history of the company.

HISTORY

The current multi-million dollar company started out small when Matthew Hill was a junior at Holt High School, located just south of Lansing, MI. At this time Liquid Web did not host the millions of websites it does today, rather Hill managed web sites for customers remotely using servers located in New Jersey.(Rzepka, M) Hill continued to operate Liquid Web in this fashion until 2003 when the company opened its first data center in Lansing, Michigan.

The first data center, named Data Center One, or DC1, is an 11,000 sq. ft. building that houses 2,000 servers.(Liquid Web) With the launch of DC1 Liquid Web continued to grow alongside the ever expanding growth of the global internet. In the following years Liquid Web began to outgrow the capacity DC1 could provide, and in 2005 a second data center, DC2, was opened next to DC1 providing 32,000 sq. ft. of building space that has the capacity to house 8,000 servers. The company continued to grow, even through the tough economic times of the 2008 recession, and in 2008 opened a third data center in Lansing, DC3. This data center is 90,000 sq. ft. and has the capacity to house 25,000 servers.(Liquid Web) While many companies in Michigan at this time were downsizing, Liquid Web was rapidly expanding and needed to hire many technically skilled workers who could

administer Red Hat Linux enterprise servers. According to Crain's Detroit, Liquid Web, "grew 67% from 2007 to 2008", and needed to hire workers to fill DC3.(Rzepka, M) Instead of outsourcing the work or hiring international talent, which is a common trend in the IT industry, Liquid Web decided to train and hire locally in Mid-Michigan. Taking advantage of nearby resources at Michigan State University and Lansing Community College, Liquid Web partnered with Capital Area Michigan Works! to develop a training program geared at getting displaced workers qualified and hired at Liquid Web. (Rzepka, M) Today Liquid Web continues to grow, consistently ranking in the INC. 5000 rankings for five years in a row since 2007. (Rzepka, M)

TECHNOLOGY

The history of Liquid Web truly embodies the typical American dream, a local entrepreneur who starts a company from the ground up, bringing a new industry, success, and jobs to the area he was raised. But what is the secret behind all of Liquid Web's success? What makes the company operate on a day to day basis, allowing them to keep up with customer demand and expectations? The following information details the technology and supporting services that are behind the scenes at Liquid Web's data centers.

- DC1 technologies (Liquid Web)
 - The technology featured at Liquid Web's first data center include the following:
 - Custom built servers that feature a wide variety of components including:
 - AMD and Intel single, dual, and quad processor offerings
 - AMD Phenom II and Opteron processors, Intel Xeon processors
 - Networking equipment that includes:
 - Cisco GSR 12000 Border Routers
 - Cisco 6509 Sup720 Core Network
 - Cisco 3550 Distribution Switches
 - Power system that includes:

- 300kva Powerware 9315
 - Cummins 313 kVA Diesel Generator
 - Kohler 650 kVA Diesel Generator
 - Cooling system that includes:
 - Liebert Precision 22 ton up flow air conditioning units
- DC2 technologies (Liquid Web)
 - The technology featured at Liquid Web's second data center includes the following:
 - Custom built servers that feature a wide variety of components including:
 - AMD and Intel single, dual, and quad processor offerings
 - AMD Phenom II and Opteron processors, Intel Xeon processors
 - Networking equipment that includes:
 - Cisco 2960 48 port 10/100 rack switches
 - Fully redundant Gigabit Ethernet links to DC1
 - Redundant Gigabit Ethernet links to each rack switch
 - Redundant Fiber Entrance expandable to 1840 Gigabits per second
 - Power system that includes:
 - 2500 kVA utility power feed
 - ASCO Closed Transition Transfer Switch
 - Multiple Kohler 1250 kVA Diesel Generators
 - Kohler Generator Paralleling Switchgear
 - Multiple Powerware 9315 500 kVA UPS
 - Liebert PDU Units
 - Cooling system that includes:
 - Multiple Liebert 20 and 22 Ton Upflow AC Units
- DC3 technologies (Liquid Web)

- The technology featured at Liquid Web's third data center include the following:
 - Custom built servers that feature a wide variety of components including:
 - AMD and Intel single, dual, and quad processor offerings
 - AMD Phenom II and Opteron processors, Intel Xeon processors
 - Networking equipment that includes:
 - Redundant Fiber Entrance expandable to 1840 Gigabits per second
 - Multiple Redundant Gigabit Ethernet links to DC1 and DC2
 - Fully Redundant Cisco 6509 Sup720 Distribution Switches
 - Redundant Gigabit Ethernet links to each rack switch
 - Cisco 2960 48 Port 10/100 rack switches
 - Power system that includes:
 - 8,000 kVA utility power feed - Expandable to 32,000 kVA
 - Redundant ASCO Closed Transition Bypass Isolation Transfer Switches
 - Multiple N+1 Generac Diesel Generators
 - Multiple N+1 Powerware 9395 550 kVA UPS
 - Liebert PDU Units
 - Capability to provide Tier-4 Power
 - Cooling system that includes:
 - Multiple Liebert 20 and 22 Ton Upflow AC Units
 - Designed for addition of Air-side Economization

NETWORK

As listed above, Liquid Web offers a very impressive line of both powerful and redundant servers capable of hosting simple informational websites to large scale web applications. However all of the data housed in the servers needs to reach the intended audience at extremely fast and reliable rates. This is accomplished through the design of a

fast and redundant network. To do this Liquid Web has partnered with multiple Tier 1 bandwidth providers. Direct connectivity is provided to the Liquid Web data centers from companies such as AT&T, Verizon, Sprint, Savvis, and Level3. (Liquid Web) Network traffic is routed across these networks in a redundant manner, so if one network goes down traffic will still arrive to and from the data centers. Liquid Web states that, "Our aggregate connectivity reaches an astounding 8,500+ networks just a single network away from our up-links." (Liquid Web) Tier 1 bandwidth providers such as the companies mentioned are essentially the backbone to the Internet. These providers typically have extremely fast networks composed of both single and multi-mode fiber optics. Because of the partnership with these Tier 1 bandwidth providers, Liquid Web is able to maintain a high level of customer trust and satisfaction.

SOFTWARE

While server hardware and infrastructure are extremely important components of Liquid Web's data centers, the software that controls them is of equal value. Liquid Web offers a wide variety of server operating systems and accompanying software applications. The following lists some of the software options available that operate within the data centers: (Liquid Web)

- Microsoft products including:
 - Windows Server 2008 R2
 - SQL Server 2005
 - SQL Server 2008
 - Microsoft Exchange Server
- Linux products including:
 - Variety of Linux Server Distributions
 - cPanel support
 - Wordpress
 - Drupal
 - MySQL Database Hosting

The software options available to customers vary depending on what type of hosting plan is chosen. Basic web hosting plans come with Linux and Apache installations, while dedicated server plans can have either Linux or Windows server installations.

SERVICES

One area Liquid Web prides itself is in the Heroic Support and services the company offers. The support staff is available 24x7 and stationed in Lansing, Michigan and can be reached through many outlets such as phone, email, forums, or instant chat through the Liquid Web website. Because of Liquid Web's dedication to supporting their customers, they boast what the hosting industry calls five nines uptime, which means they guarantee servers will remain online 99.999% of the time.(Liquid Web)Complementing the Heroic Support services, Liquid Web also offers a multitude of web services that enhance the user experience. Some of these services include:

- DDos Attack Protection
- Security Services
- E-mail Hosting
- Database Hosting
- IPv6 Transition

FUTURE DEVELOPMENT

Although Liquid Web has its roots in Michigan, they have expanded to reach the west coast markets by building a data center in Phoenix, Arizona. This data center features new cloud computing servers offered by Liquid Web named "Storm Servers". Storm Servers are extremely powerful VPS, Dedicated, or Block Storage cloud servers that contain dedicated firewalls, integrated backups, and automatic migrations. (Liquid Web, Storm Servers) With Liquid Webs expansion into a fourth data center and entering the market of high performance cloud computing, they are a company that is surely to continue growth and success.

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