



Uptime is Revenue.

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In this Industry Brief, we explore the relationship between company revenue, SLA, the annual cost of downtime, and one tool in the IT administrator's toolbox to help maximize uptime of the datacenter.

In today's always on, mobile world of smartphones, tablets, laptops, desktops, streaming services and Smart TVs, the technology that makes the internet the pervasive tool behind our connected lifestyle has spent the past 30 years evolving from the original IBM PC into a compute swarm/cloud/fog where millions of servers are at our beck and call, answering the non-stop call for more data, more email, more connectedness. Performing such tasks as serving up maps, online commerce, books, photos, movies, trading stocks, monitoring our homes, and monitoring our environment, the internet provides the proverbial Swiss Army knife of convenience and utility that enables us to work, play, and entertain ourselves from anywhere at any time.

As the internet matures, the individual pieces of hardware and software powering the internet has become both more versatile and more robust. However, as the number of machines grow and the number of software layers grow, the increased complexity of the internet results in outages that become more and more calamitous in nature. As we rely more on constant connectivity to the internet, the financial and productivity impact of downtime has escalated to the point where we do not consider any downtime as acceptable. David Chernicoff of ZDnet quotes a survey by the Ponemon Institute and Emerson Network Power of 450 datacenter professionals experiencing an unplanned datacenter outage where they calculated the average datacenter outage costs about \$7900/minute, or roughly \$474K/hr.¹

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David Chernicoff – ZDNet

The annual cost of downtime due strictly to lost revenue during a datacenter outage for a datacenter with an assumed SLA value is depicted in **Figure 1** (next page). This is actually a "lower bound" for downtime costs as there are a number of other components that make up downtime cost.

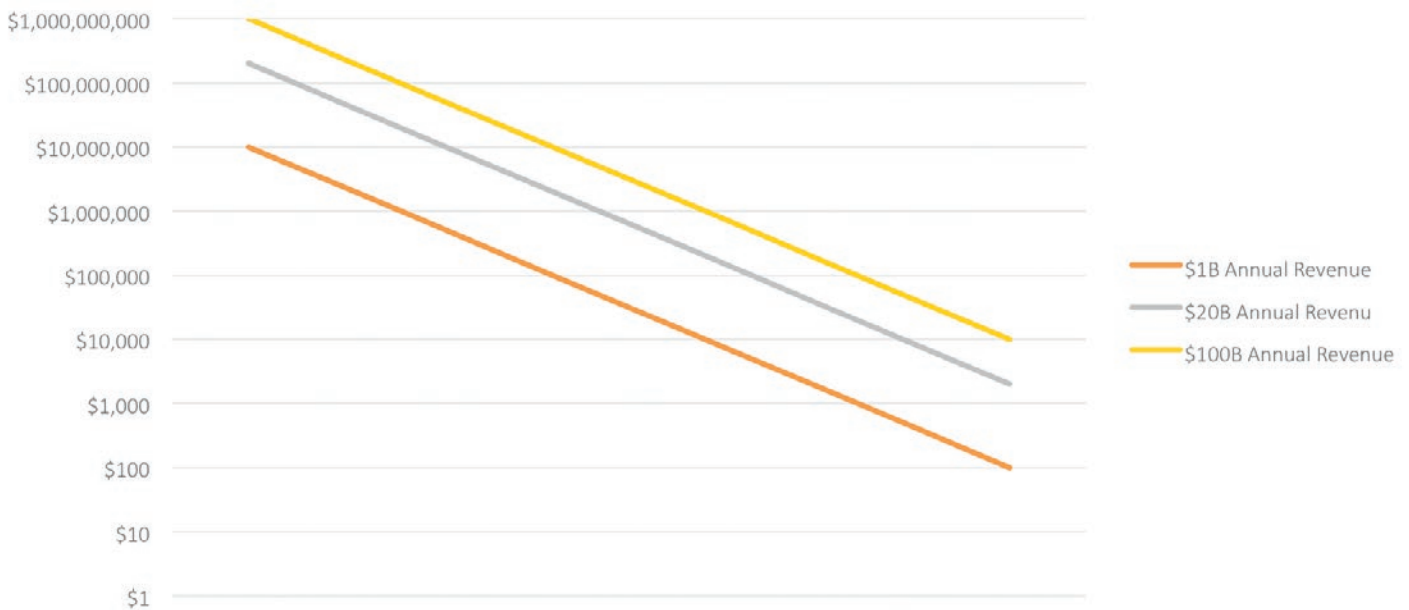
Providing the electrical power to the racks of storage, compute, and networking hardware that comprises the cloud constitutes "the last mile" of physical infrastructure before the all-important data makes its return journey from the datacenter to the consumer. Without the right amount of power at the right voltage and amperage, the hard drives don't spin, the servers don't function, and the network sits idle.



Uptime is Revenue. (cont...)

FIGURE 1:

Annual Cost of Downtime vs. SLA



The larger and more profitable the company, the more heavily the IT infrastructure is leveraged as a revenue generator. In **Figure 1**, if we assume all company revenue is a function of the company datacenter, then an hour of datacenter downtime is equivalent to an hour of lost revenue.

"On average, businesses lose between \$84,000 and \$108,000 (USD) for every hour of IT system downtime, according to estimates from studies and surveys performed by IT industry analyst firms. In addition, financial services, telecommunications, manufacturing and energy lead the list of industries with a high rate of revenue loss during IT downtime. (Assessing the Financial Impact of Downtime). For a total datacenter outage, which had an average recovery time of 134 minutes, average costs were approximately \$680,000."

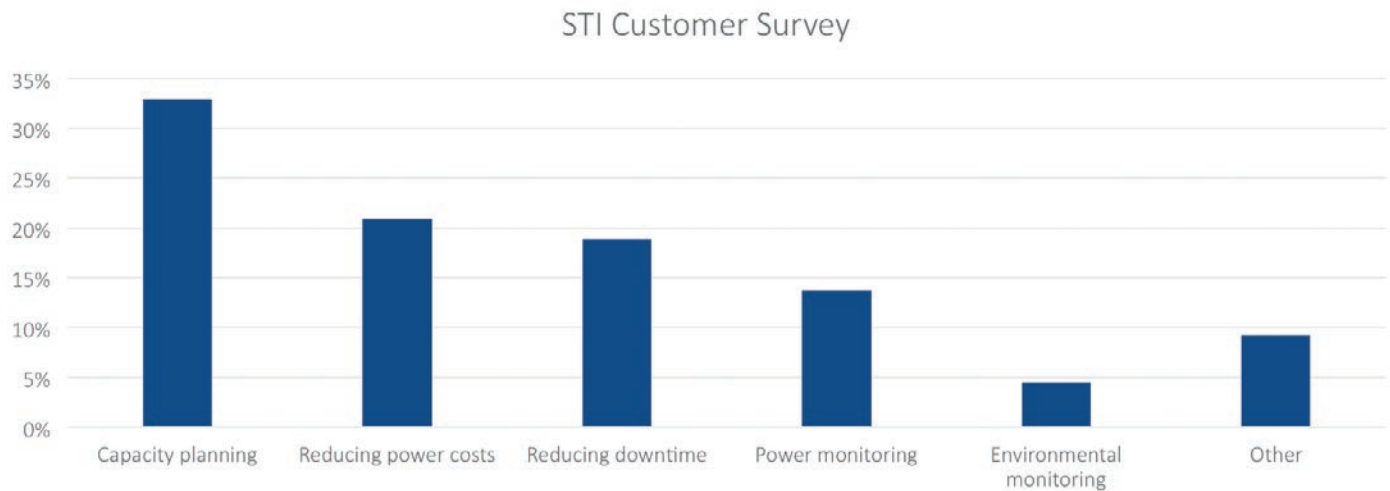


Uptime is Revenue. (cont...)

Achieving the Best Uptime for the Datacenter

In a recent customer survey, Server Technology learned that minimizing downtime was the number three reason for purchasing our PDU versus the competition.

FIGURE 2 | Why STI Customers Purchased Our Products



Whenever uptime is discussed for a datacenter, the conversation quickly focuses on the goals established for the datacenter design, end user expectations, and the tradeoff between infrastructure costs and the financial impact of the downtime. The modern datacenter is composed of intricate systems of interwoven hardware such as servers, switches, balancers, security appliances, and storage that are running multiple layers of software like hypervisors, operating systems, middleware, databases, analytics engines, and presentation layers. Maximizing uptime requires detailed knowledge of the architecture that joins the layers of hardware and software, along with a thorough understanding of how the hardware and software work together.

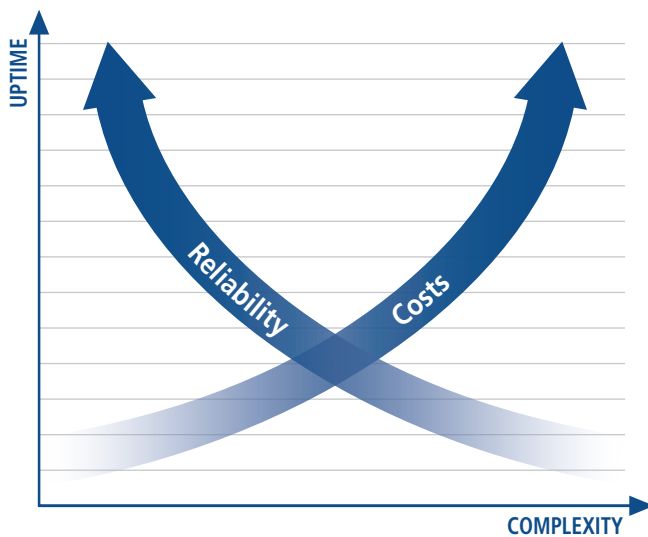


Uptime is Revenue. (cont...)

Factors that Influence Uptime

The expectations of the future datacenter owner/operator greatly influence the designers and architects of the infrastructure supporting the datacenter. Achieving the best uptime for the available money is both an art (in compromise) and a science (in engineering and redundancy). Knowing the nature and criticality of the computational loads that are expected to run within the datacenter along with the requisite budgetary constraints drive the decisions behind the level of uptime (SLA) to be supported.

FIGURE 2 | Why STI Customers Purchased Our Products



Uptime Factors:

- > Design of the datacenter physical plant
- > Redundancy of mains power sources, compute infrastructure, network bandwidth, and storage
- > Fault tolerance built into the hardware and software
- > The use of virtualization and containers
- > Automation of the datacenter management systems
- > Usage of DCIM software for monitoring and coordination between otherwise disparate systems
- > Tradeoffs in price versus redundancy, as guided by customer expectations and design goals
- > Maintenance performed on the infrastructure, hardware and software
- > Security of the networks, the servers, and not getting hacked

Factors that Influence Costs

The other side of the datacenter equation for return on investment is dependent on the costs associated with downtime. Some examples of the costs of downtime follow:

Cost Factors:

- > Loss of revenue
- > Replacement costs of failed hardware
- > Loss of good will with customer(s)
- > Lost employee productivity
- > System restoration costs
- > Impact on company morale
- > Labor expense

There are a number of available tools for the datacenter operator to model her downtime costs. By using these tools to evaluate the impacts of design decisions, an informed choice can be made regarding initial capital expenditures versus uptime and SLA of the datacenter.



PRO2. Your Uptime Solution.

PRO2 from Server Technology

The principles of Kaizen embody the spirit of the words of Santayana: ***“Those who cannot remember the past are condemned to repeat it.”***

In creating the PRO2 product family, Server Technology has taken the best of existing features and designs found in our current products and placed them all in a single product. We then progressed another step by architecting the PRO2 for the future, with more redundancy, more outlets, more customization, and more resiliency built right in.

PRO2 enables communications with a Master unit even when the Master has lost input power, by back-feeding power to the network interface from a Link unit. The network interface is hot swappable in the field without changing the state of the outlets. The firmware in PRO2 allows even more opportunity for configurability and customization, while maintaining a clean and simple to use interface. And the units have been tested to operate in conditions up to 60C.

Key PRO2 Benefits:

- > Hot-swappable, redundantly-powered network card; from link CDU (Figure 3)
- > Branch current measurements and multi-level alerts
- > Shallower enclosure when compared to previous generation CDU
- > More alarms and configuration options compared to previous generation CDU
- > Star architecture multi-linking (Figure 4)

Key Intelligent CDU Benefits:

- > PIPS® and/or POPS® high-accuracy measurements of current, voltage, power, and other key power metrics
- > Environmental measurements via plug-and-play probes (including link CDU)
- > Use SPM (Sentry Power Manager) for data center monitoring
- > SNMP traps and email alerts

FIGURE 3 | Hot Swappable Network Card



FIGURE 4 | Star Multi-Link Expansion Module





Why Server Technology?

Server Technology's power strategy experts have provided power solutions for labs, data centers, and telecommunications operations for 30 years. Over 60,000 customers around the world rely on our cabinet power distribution units and award winning power management solutions to reduce downtime, facilitate capacity planning, improve energy utilization, and drive efficiency. With the best quality, best technical support and most patents, Server Technology products provide uncompromising reliability, innovation, and value for the datacenter.

Only with Server Technology will customers **Stay Powered, Be Supported & Get Ahead** — www.servertech.com

Learn More

www.servertech.com

See STI White Paper: **"Advances in Power and Environmental Monitoring for Increasing Efficiency in the Data Center"**

See STI App Note: **"How do I maximize uptime using cabinet power data?"**

Citations & References:

¹ <http://www.zdnet.com/the-actual-cost-of-datacenter-downtime-7000023925/> – The actual cost of datacenter downtime; by David Chernicoff

² <http://www.evolver.com/blog/downtime-outages-and-failures-understanding-their-true-costs.html>

³ <http://www.sudora.com/downtime.html> – Cost of Downtime Calculator

⁴ <http://roc.cs.berkeley.edu/talks/pdf/LISA.pdf> – Company morale can suffer

⁵ <http://en.wikipedia.org/wiki/Kaizen>

<http://perspectives.mvdirona.com/2010/09/18/OverallDataCenterCosts.aspx>

<http://mvdirona.com/jrh/TalksAndPapers/PerspectivesDataCenterCostAndPower.xls> – datacenter costing spreadsheet

<http://www.newhorizonit.net/web/datacenter-design.html>

Interested in learning more about Server Technology's solutions? Visit us online at: www.servertech.com/products/



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