



Bullet Proof™

Dimension Technology Solutions, Inc.

Methodologies and Practice Concerning
Monitoring, Backups and Recovery



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Bullet Proof™

The Concept

Monitoring, Backup, Recovery, Business Continuity. All of these activities have become and continue to press firther into the realm of “must haves”. Dimension Technology Solutions, Inc. strives to maintain the leading edge in each of these areas with dedicated resources, highly skilled staff, and proprietary methodologies that meet the ever changing demands of our customer base.

Bullet Proof™ is the current culmination of our efforts on this front. Bullet Proof™ is a combination of technologies engineered and combined in the TEC (Technical Excellence Center) under the leadership of our Operational Vice President, David B Brown.

The Leadership

Mr. Brown has been a functional leader in the technology industry since 1994, and has a mastery of infrastructure, technology, and leading methodologies and practices that few will ever match. His technical prowess, hard-driving standards, and unwavering pursuit of excellence has brought his technical team to a “bar setting” level for an entire industry.

In the next few pages, we will present the Bullet Proof™ methodology, technical rationale, and implementation scope. We hope that you will find this information valuable, and should you have any questions about the Bullet Proof™ concept, please feel free to contact Mr. David B Brown himself at our headquarters in Englewood, CO.

David.Brown@dts-global.com or 303-406-2400.



Bullet Proof™ Monitoring

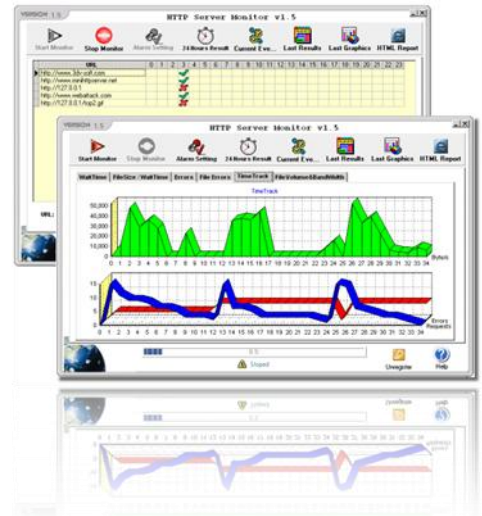
Core Monitoring Beliefs

Solid Monitoring capabilities are at the heart of any reliable infrastructure. The “you don’t know what you don’t know” line of thinking has no place in addressing today’s IT infrastructure issues. “The criteria for a solid infrastructure monitoring methodology are changing drastically as applications and hardware get ‘smarter.’ In the world of systems analysis and monitoring, you can either monitor what you are told you can see, or you can look further for root cause, mean-time to failure, end of life indicators, etc.” ~ David B Brown, Dimension Technology Solutions.

Monitoring Practice at DTS

DTS has developed a methodology surrounding monitoring comprised of the following aspects

- Monitor the infrastructure
- Report on infrastructure failures
- Report on items that have led to failure historically
- Monitor the connectivity
- Report on connectivity issues
- Report “next best” routing if available
- Monitor the applications
- Report “tattle” on yourself as well as other applications
- Monitor the dependencies
- Report on dependencies outside core application control



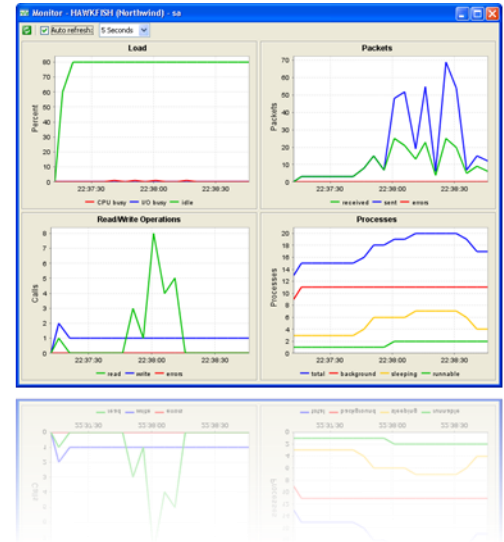
Monitoring Steps

The monitoring steps (for a hosted DTS infrastructure as an example) are as follows:

- Machine availability is monitored
- Connectivity pipe (speed and latency) is monitored
- Application(s) at machine are monitored
 - Availability
 - Access
 - Response times
- Dependant process, infrastructure, and applications are monitored
 - Services
 - Other applications
 - Incoming communications



- User experience is monitored
 - Average response times
 - Average page latency
 - Any errors
 - User response forms
- Errors (any) from monitoring report on themselves
 - Report on self (tattle)
 - Report on others (tattle on dependant apps)
 - Report any application errors with cause
 - Report user latency impacting experience



Monitoring in a Nutshell

“There is a philosophy that has always worked for me, **everyone knows everything**. By this, I mean that the more awareness of any issue occurring within an infrastructure, the better we can manage, repair, and prevent the issue in the future.” ~ David B Brown Dimension Technology Solutions, Inc.

Monitoring the Future

This methodology is all taken one step further with the latest Bullet Proof™ initiative, **NOFail™**. NOFail™ is the latest effort by DTS to further improve monitoring, and the steps taken between failure and repair.



Project NOFail™ is part of the CORE™ infrastructure that essentially monitors the DTS application (eMESA™ or AlertBuilder™, for instance), and upon error, recognizes the release level, the proximity between current release and failure cause, and applies required updates for immediate resolution. DTS’ staff is excited about this new technology, and intends to implement it fully by Q2 of 2009. More updates will be available at www.DTS-Global.com as testing, application, and BETA tests complete.



Bullet Proof™ Backups

Core Archiving Beliefs

Backups have traditionally been based upon a business' established threshold for pain. Pain being the length of time a company can afford to "roll back" to when confronted with a data corruption or similar issue.

DTS strives to extend our "threshold" to each and every one of our customers. At DTS, we believe that the most important asset any company has is its data. Data is the lifeblood of any organization, whether that data is retail sales figures, transportation cost figures, raw materials management, or simply customer or vendor transaction records. If that fact (that your data is your primary asset) holds true, then why should your business tolerate any means of backup that are less than up-to-the-minute, accurate, and fully recoverable?

The Backup Plan

Any company can readily recognize what it needs from a backup solution. The problem is implementing what it has been identified as "needs." At DTS – and we'll again use the SaaS model customer for reference – it is our belief that the core data backup model must address the following:

- Recoverability from change
- Recoverability from Data Loss
- Recoverability from human error
- Recoverability from disaster

For DTS, *none* of these are addressed with any single, conventional, currently available backup "solution." DTS, instead, takes the following multifaceted approach:

- Backup the data at a bit level (per change)
- Backup the Databases at multiple recovery points
- Backup the application at multiple recovery points
- Backup the infrastructure (yes, the whole thing) at a rollback point



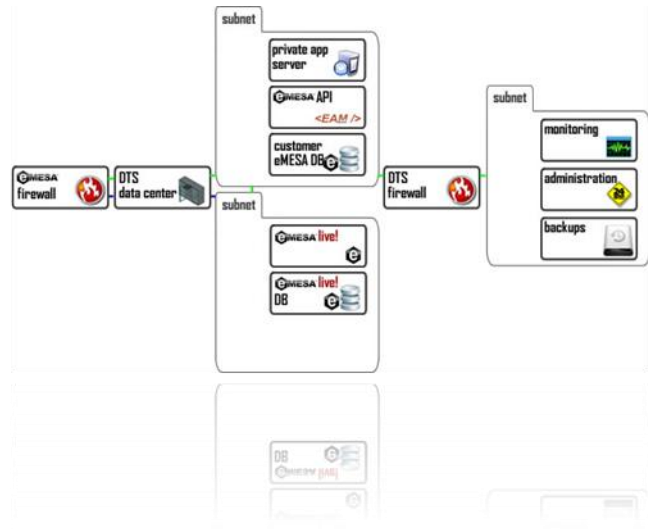
DTS does backups

Below is a quick, 10,000 foot view of the DTS backup architecture as it relates to a hosted (eMESA SaaS onDemand customer);

As referenced in our security documentation, DTS SaaS customers are separated from both DTS and the Internet, courtesy of *at least* two firewall solutions at all access points.

Only Admin, Backup, and Monitoring traffic is allowed from the DTS side to the customer side.

The backup levels are listed below...

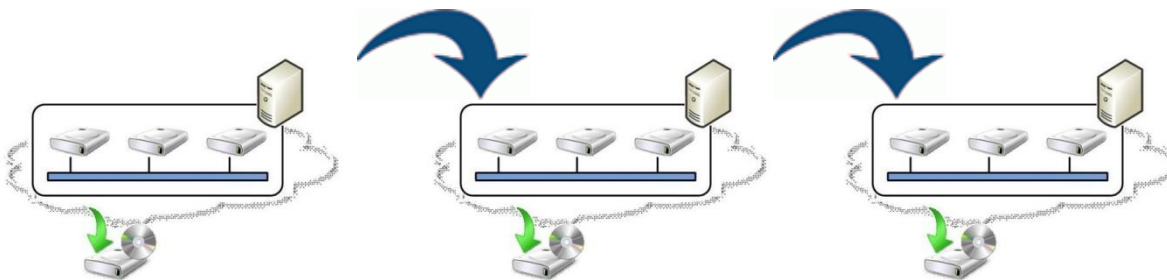


Safe, Safe, and more Safe

DTS only differentiates backups on two levels:

- Number of times that the data is replicated
- Increments at which data is backed up

The minimum backup replication location count at DTS is two (2). The minimal back up increment is once per day.



Ready, set, RECOVER!

Beyond that simple starting point, Backups really become more of the recoverability tool that they were intended to be. Next we'll take a look at the most important aspect of ANY backup... recoverability.



Bullet Proof™ Disaster Recovery

Core Recovery Beliefs

“Recovery” and “Disaster Recovery” are truly one in the same. The view that there separate recoveries and disaster recoveries really only serves to complicate a rather simple issue. Since any data loss, infrastructure unavailability, or application failures could potentially be considered “disastrous,” we will use the term Disaster Recovery for each model that DTS employs.

Traditional Disaster Recovery has been based upon the premise that a data center or locale has been degraded beyond usability, or is simply wiped from the map by fire or storm or malicious act. Wouldn't the loss of your critical shipping data (for example), whether caused by a fire, vandalism, or just a careless administrator, cause your company the same duress? Indeed it would. The reason for the data loss becomes immaterial, and the focus shifts to recovery.

What can your organization tolerate?

In the above scenario, we refer to the loss of “shipping data.” The first question in any disaster recovery plan must be, “How long can the business survive without the restoration of this information?”

Some companies that we have worked with argue that they are comfortable with a 12, 24, and even a 48 complete recovery solution. DTS would prefer not to push the tolerance levels during *any* Data or infrastructure related outage. Below is a high level view of the DTS (internal) disaster recovery solution:



The illustration above may seem a dramatic over-simplification, but in reality, this is exactly what it takes for DTS to claim 100% availability for its internal operations and to support its SAS70 Type II audits.

The DTS internal Infrastructure is comprised of approximately twenty-three servers ranging from development, monitoring, application, lab environments, testing, e-mail, and storage use. In order to claim and support the 100% uptime for our internal staff and integrated vendors, DTS had to first establish a plan, and then realize it with the currently available technology.



Planning

The plan to achieve 100% availability for DTS involved the following points:

- We cannot afford an outage longer than one minute
- We must (at all costs) impede the loss of ANY data
- We must be able to survive ANY outage type
- We must be able to demonstrate recoverability on a moment's notice

Those were the marching orders. Nothing crazy, just an administrative directive that needed to be met.

Some immediate realizations based upon this directive were:

- Active redundancy
- Geographically diverse sites
- Multiple Failover Locations

Solution

Given the capabilities of our SAS 70 type II certified Data Center, this was actually a somewhat simple task to accomplish. The main components of the order were:

- Infrastructure replication
 - DTS is built entirely on a virtual infrastructure
 - Virtual Machines are simply files that can be replicated as such
- Geographic Dispersion
 - As many as eight active sites are available
 - Replication can “roll” from one Data Center to the next, essentially turning DTS’ secondary site to our primary site, and the tertiary into the secondary as a matter of recovery course
- Failover
 - Active replication
 - Automated failover
 - Failover tolerance
- Testing
 - Readily testable
 - Manual failover capable



Execution

As this plan was executed, it was also being captured as a replicable plan for the DTS customer base. Currently, Disaster Recovery for our customer base starts here:

- All machines are Virtualized
- All machine images are backed up daily
- All machine backups are replicated (once) offsite
- All machine backups are retained for one week
- All machines have at least one matching standby

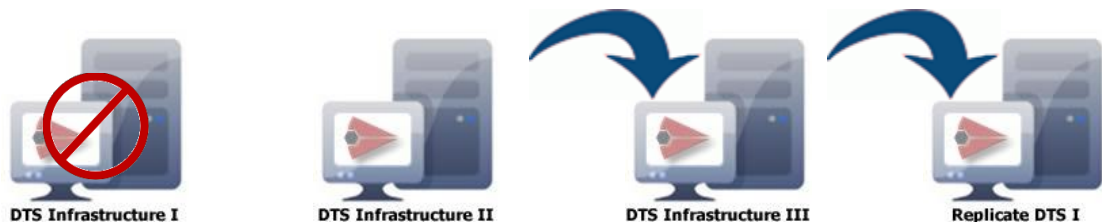


Each customer infrastructure will come with different requirements. DTS can currently range the disaster solution from the above (entry level) solution to the current, active plan that supports the DTS infrastructure:

- All Machines are Virtualized
- All Machine images are backed up at a *bit level per every change*
- All Machine backups are replicated six times offsite
- five of the six offsite replications are geographically disperse
- four of the six offsite replications participate in automated failover plan
- Entire environment recovery plan is executed bi-weekly

Some customers may require even more redundancy. DTS stands ready, capable and excited about employing newer, faster, and even more robust DR solutions to our clients.

“If it is not the interest of a Technical Organization to move themselves and their customers forward, then it is also not their interest to be a Technical Organization for very long.” ~ David B Brown, Dimension Technology Solutions, Inc.



Bullet Proof™ in review

Core Beliefs

It is the passion of the Technical Team at DTS to drive innovation, and deliver it with the level of excellence that a customer base that began almost 20 years ago has come to expect.

Bullet Proof™ represents a practice that applies to all DTS customers, including DTS itself. DTS has, since inception, been part of the same infrastructure and relied upon the same applications that its customers depend upon.

DTS is proud of its people, process, applications and practice. Should you have any questions or comments, please contact a member of the DTS team at 303.406.2400.

