Reducing backup windows and increasing performance when data reaches the terabyte range

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Grand River Conservation Authority
Our Organization

Grand River Conservation Authority (www.grandriver.ca)

- Based in Cambridge, Ontario.
- Lay claim to being the first watershed management agency in Canada (est. 1932)
- 6800 km²; 925K pop. (about the same as the state of Delaware)
- Grand River 300km long spills out to Lake Erie
- Canadian Heritage River designation
Infrastructure Overview

- 200+ LAN/WAN desktop PCs across 25 sites connected to the domain
- Centralized data centre
- Hyper-V on HP 3-server failover cluster
- Nimble Storage at Primary and DR sites
- 9 TB Data (compressed and growing)
- IT compliment of 3: IT Architect/Supervisor, IT Specialist and Desktop Support Specialist
Before: Infrastructure Overview and Challenges

❖ Data Backup Environment
   - D2D2T; 5 & 7 day GFS rotation (daily, weekly, monthly)
   - Monthly backup tapes off site
   - backup SAN at primary site; RP = 30 days if disaster struck

❖ Workloads
   - MS SQL; MS Exchange; file shares (millions of small files)

❖ Challenges
   - Ever expanding backup window
     - Terabyte range databases; large numbers of GIS files
   - Tape management – newer LTO drives incompatible with older archive tapes
   - Have to juggle what to backup and when
   - Backup failures and no time for make-up jobs
   - Excessive staff time managing backups and tweaking performance
Before: Infrastructure

GRCA Fibre Channel Production and Backup SAN
After Infrastructure

GRCA iSCSI (Storage Area Network)

GRCA Secondary Site – DR Site

GRCA Primary Site – Head Office

Nimble Storage

Nimble CS220

Nimble CS260G
### After: Flash-Optimized Storage

- **Nimble Storage solution**
  - CS260G for production
  - CS220 + ES1-45 at DR site for replication
- **Snapshot Retention/Replication (Primary, DR Site)**

<table>
<thead>
<tr>
<th>Volume Collections</th>
<th>RP</th>
<th>Hourly</th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTRL-MSQL (SQL 2008 R2)</td>
<td>1 hour</td>
<td>24,24</td>
<td>7,30</td>
<td></td>
<td>2,13</td>
</tr>
<tr>
<td>GR-MSQL (SQL 2008 R2)</td>
<td>1 hour</td>
<td>24,24</td>
<td>7,30</td>
<td></td>
<td>2,13</td>
</tr>
<tr>
<td>GR-MXCH (Exchange 2010)</td>
<td>1 day</td>
<td></td>
<td>7,30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRFS (File Shares)</td>
<td>1 hour</td>
<td>24,84</td>
<td>60,395</td>
<td></td>
<td>13,72</td>
</tr>
<tr>
<td>HYPER-V (Windows 2012)</td>
<td>1 day</td>
<td>30,30</td>
<td>6,60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
After: Cloud-Based Storage Monitoring and Analytics

- InfoSight – All Systems Are Go
  - Proactive alerting at multiple levels
  - Replication or Partner failures
  - Snapshot (VMware, VSS, Storage) alerts
  - System health alerts
- Automatically opens support cases
- Comprehensive dashboard views
- Drill down into details
### By Array

<table>
<thead>
<tr>
<th>Array Name</th>
<th>Performance Policy</th>
<th>Space Used (%)</th>
<th>Compressed (GB)</th>
<th>Volumes (#)</th>
<th>Snapshots (#)</th>
<th>Compression (X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>gr-nimble260G-sf</td>
<td>Exchange log</td>
<td>1.3%</td>
<td>300</td>
<td>1</td>
<td>7</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td>SQL Server Logs</td>
<td>1.0%</td>
<td>225</td>
<td>2</td>
<td>110</td>
<td>1.65</td>
</tr>
<tr>
<td></td>
<td>Exchange 2010 data store</td>
<td>2.1%</td>
<td>490</td>
<td>1</td>
<td>7</td>
<td>1.18</td>
</tr>
<tr>
<td></td>
<td>SQL Server</td>
<td>14.7%</td>
<td>3,443</td>
<td>2</td>
<td>110</td>
<td>1.26</td>
</tr>
<tr>
<td></td>
<td>Hyper-V CSV</td>
<td>17.7%</td>
<td>4,154</td>
<td>2</td>
<td>76</td>
<td>1.64</td>
</tr>
<tr>
<td></td>
<td>Windows File Server</td>
<td>28.7%</td>
<td>6,724</td>
<td>1</td>
<td>153</td>
<td>1.50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>65.4%</strong></td>
<td><strong>15,336</strong></td>
<td><strong>9</strong></td>
<td><strong>463</strong></td>
<td><strong>1.47</strong></td>
</tr>
</tbody>
</table>

*Click on an Array Name or a Performance Policy to highlight all views. (To select more than one, hold down Ctrl key.)*

### By Pool

<table>
<thead>
<tr>
<th>Pool: default Array: gr-nimble220-ShadesDam</th>
<th>Group Name</th>
<th>Performance Policy</th>
<th>Space Used (%)</th>
<th>Compressed (GB)</th>
<th>Volumes (#)</th>
<th>Snapshots (#)</th>
<th>Compression (X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool: default</td>
<td>SQL Server Logs</td>
<td>0.8%</td>
<td>226</td>
<td>2</td>
<td>120</td>
<td>1.66</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exchange log</td>
<td>1.5%</td>
<td>434</td>
<td>2</td>
<td>30</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exchange 2010 data store</td>
<td>1.8%</td>
<td>526</td>
<td>1</td>
<td>30</td>
<td>1.29</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQL Server</td>
<td>12.1%</td>
<td>3,465</td>
<td>2</td>
<td>120</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows File Server</td>
<td>26.0%</td>
<td>7,433</td>
<td>1</td>
<td>326</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V CSV</td>
<td>24.6%</td>
<td>7,023</td>
<td>2</td>
<td>166</td>
<td>1.62</td>
<td></td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>66.9%</strong></td>
<td><strong>19,108</strong></td>
<td><strong>9</strong></td>
<td><strong>792</strong></td>
<td><strong>1.50</strong></td>
<td></td>
</tr>
</tbody>
</table>
After: Analytics Cont’d

- Plethora charts and metrics
- Target analytics hourly, work week, monthly or entire range
- System Health and upgrade recommendations
- Executive dashboards ideal for quick overview
After: Performance

- with 463 snapshots
- No appreciable performance hit on array due to snapshots and replication
- Monitoring our cache hit rate (92%) – higher during the day
- Snapshot count will settle out at 206 on primary and 805 at DR
- Unit was scaled properly but we are protected with a scale-to-fit approach in the Nimble architecture
After: Benefits

- Reduced RPO from 1 day to 1 hour.
- Eliminated weekly full-backup window of 30+ hours and nightly 13 hour incremental.
- Saving 1 day a week staff (blended) time previously spent on managing backups and tapes
- DR site array keeps 6 years-worth of monthly backups
  - No tape needed
  - Very little management – works as promised
- Performance integrity is maintained
- We did not hire a coop/contractor in Q4/2013 or Q1/2014 [real savings!]
Conclusion

- No longer a skeptic – Hybrid Storage technology from Nimble delivered as promised
- Our agency has the level of protection and confidence we require