The purpose of this document is to provide a return of investment analysis for your VMware SD-WAN Deployment. For this report VMware has compared your deployment against hundreds of similar deployments, based location, and number of edges, in order to provide you clear insights and action items for your consideration.

Document Structure
The document is defined in the following sections:
- Executive Summary
- Overall and Per Edge savings from Brownout/Blackouts
- Overall and Per Edge savings from Operational Enhancements
- Edges with more potential for savings
- Methodology - KPIs

Executive Briefing
A brief summary of the key findings and next steps outlined in this report.

Savings from Brownout/Blackouts
On this section we summarize the savings the SD-WAN solution is doing while preventing brownouts and blackouts.

Savings from Operational Enhancements
On this section we summarize the savings the SD-WAN solution is doing on regular operational tasks such as upgrades, configuration changes and activations.

Potential Savings
On this section we summarize additional savings that can be obtained by changing MPLS links or adding additional links to the devices with more downtime.

Methodology and Assumptions
In this section we will provide the math and methodologies used in all calculations for this report.

Bookmarks and Links
To make this report more navigable, a table of contents was built into this report linking to each section and edge. A formula was used to identify the edges with the most potential savings in the installed base.
Executive Summary

To improve WAN performance, costs, standardization, and traffic visibility, Retail Inc deployed a software-defined Wide Area Network (SD-WAN) solution for branch office connectivity. The SD-WAN solution replaced the current Retail Inc MPLS WAN in a phased approach. To foster better health outcomes, the insurer offers free teleconsultations to approximately 6.5 million people in Asia, including under-served patients in remote, rural areas, with limited healthcare access. Retail Inc plans to extend these services further, including in South East Asia, in solidarity with society.

Key Statistics

Savings from brown outs and black outs

$2.6M
Total with VMware SD-WAN

A total of $2,530,000 of savings were done in the past 6 months from blackouts and brownouts. There were 88641 brownouts and blackouts and SD-WAN was able to correct 96% of all incidents.

Saving from operations

$65K
Total with VMware SD-WAN

A total of $65,175K of savings were done in the past 6 months from operational tasks. There were 1455 configuration changes, 11 software upgrades and 11 activations in the last 6 months.

Potential Savings

$300K
On top 5 sites

Retail Inc can save up to $300K by following the recommendations in the potential saving summary.

Total savings

$2,6M

VMware SD-WAN saved a grand total of $2,595,175 in the last 6 months. We noticed that the biggest savings were in the month of February 2021 when 200 edges were activated.

The following graph shows the savings overtime
Savings from Brownouts and Blackouts

On this section we summarize the savings the SD-WAN solution is doing while preventing brownouts and blackouts.

Overall

VMware SD-WAN was able to protect Retail Inc from most network incidents during the last 6 months. We have noticed an increase in blackouts in the last 3 months that are related to edges that do not have a secondary WAN link. The potential savings summary offers additional details.

**Quick Facts**

<table>
<thead>
<tr>
<th>Branches: 2346</th>
<th>Average Links per Branch: 1.97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Brownout date: 2021-01-31</td>
<td>Max Brownout duration: 1409.76 minutes</td>
</tr>
<tr>
<td>Avg Blackout duration: 67.58 Max</td>
<td>Blackout date: 2021-02-14 Max</td>
</tr>
<tr>
<td>Blackout duration: 1416.9 minutes</td>
<td></td>
</tr>
</tbody>
</table>

**Assumptions**

Cost of brownout/blackouts:

- $25/hour small brownout
- $50/hour medium brownout
- $100/hour large brownout
- $50/hour small blackout
- $100/hour medium blackout
- $200/hour large blackout

**Edges with more savings**

- RETAIL1866
- RETAIL696
- RETAIL5418
- RETAIL2873
- RETAIL2832

### Brownouts

- Total: 71k
- Remediated: 97.9%

### Blackouts

- Total: 16k
- Remediated: 90.6%

### Savings

- Total: $2.3M
- Remediated: $2.387K

Cost without SD-WAN:

- $2,472K
- $2,420K

% Brownouts Remediated by VMware SD-WAN: 97.9%

% Blackouts Remediated by VMware SD-WAN: 90.6%

The graph below shows the distribution of the brownouts and blackouts that were protected by VMware SD-WAN. The main event was on Jan 31, 2021 and lasted 1409 minutes.
Savings from Operational Enhancements

On this section we summarize additional savings that can be obtained by changing MPLS links or adding additional links to the devices with more downtime.

Savings by configuration changes

A total of 1455 configuration changes have been done in the last 6 months. During the period an upgrade from version 3.4 to 4.2.1 was performed on 365 edges. The VMware SD-WAN OPS team also upgraded the Orchestrator and gateways for this customer. There were 4 Activations using the “RMA reactivation” option.

<table>
<thead>
<tr>
<th>Configuration Changes</th>
<th>Company savings from Configuration changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1455</td>
<td>$36K</td>
</tr>
</tbody>
</table>

Savings by Edge Upgrades

During the last 6 months the edges had 2 upgrade cycles, from 3.2.2 to 3.3.1 and from 3.3.1 to 4.2.0.

<table>
<thead>
<tr>
<th>Upgrades</th>
<th>Company savings from Upgrades</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>$16K</td>
</tr>
</tbody>
</table>

Savings by Edge activations

A total of 4 edges were activated using the zero touch technology by VMware in the last 6 months.

<table>
<thead>
<tr>
<th>Edge Activations</th>
<th>Company savings from Edge Activations</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>$12K</td>
</tr>
</tbody>
</table>

QUICK FACTS

- Number of profiles configured: 2

Assumptions

- $33.33 per config change
- $66.67 per upgrade
- $100.00 per activation
- $100 Salary/hour for operational tasks

Edges with more savings

RETAIL1866
RETAIL696
RETAIL5418
RETAIL2873
RETAIL2832

Assumptions

- $33.33 per config change
- $66.67 per upgrade
- $100.00 per activation
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Edges with more savings

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Assumptions

- $33.33 per config change
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Edges with more savings

RETAIL1866
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Potential Savings

On this section we summarize additional savings that can be obtained by changing MPLS links or adding additional links to the devices with more downtime.

Most work from home users have a single link connecting them to the internet. Retail Inc has limited control on the connection of most users but can help or prompt users to procure an alternate ISP.

Please use our WAN report for details in the edges using 1 WAN link and MPLS interfaces.

Savings by replacing existing MPLS links

The security embedded in the SD-WAN solution and the intelligence of DMPO allow to migrate from Low bandwidth and Expensive MPLS to broadband links.

<table>
<thead>
<tr>
<th>MPLS Links</th>
<th>Company savings from changing MPLS Links</th>
</tr>
</thead>
<tbody>
<tr>
<td>162</td>
<td>$320K</td>
</tr>
</tbody>
</table>

Assumptions

- $200 1Mbps
- $300 10Mbps
- $500 50Mbps

Cost of broadband link:
- $30 15-25 Mbps
- $40 35-55 Mbps
- $50 55-100 Mbps

Cost of downtime:
- $100 per hour

Savings by adding an additional WAN link

SD-WAN edges can more effectively prevent blackouts and brownouts by using a secondary WAN link to balance and steer traffic.

<table>
<thead>
<tr>
<th>Edges with 1 Link and bad QoE</th>
<th>Company savings from changing adding an additional WAN Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>$9K</td>
</tr>
</tbody>
</table>
Savings from Brownouts
This edge had an average of 40 minutes of brownouts in the last 6 months and 100% were corrected by DMPO saving up to $4000 dollars.

Savings from Blackouts
This edge had an average of 5 minutes of blackouts in the last 6 months and 98% were corrected by DMPO saving up to $500 dollars.

Savings from Configuration changes
This edge had an average of 40 minutes of brownouts in the last 6 months and 100% were corrected by DMPO saving up to $4000 dollars.
How to read the Report

This section has all the information that are necessary to understand and read the detailed report easily.

Note that the information in this section is presented just for explanation purpose and they don’t reflect any details about customer network, for such details please proceed to next section once you are comfortable with report diagrams and sections.

The section will cover 2 items which are Report Terminologies and Report Graphs.

Report Terminologies

Edge Throughput
It is the 5th highest total WAN utilization consumed by the edge over a 1-month period for a duration of 5 min.

Edge Throughput Calculation Formula

\[
\text{Edge Total Throughput} = \frac{\text{sum of all WAN links consumed bandwidth reported by Edge to VCO}}{\text{5 minutes interval}}
\]

i.e. (All links consumed total traffic (Bytes)/5 Min interval) which gives a throughput sample then by repeating the step for a 1-month duration, we will be able to get all samples for a complete month. Then pick 5th highest throughput/sample to avoid unplanned/unusual peaks.

Edge Capacity
It reflects the actual Edge utilization across the links defined by dividing Edge 5th Top throughput to Edge available Bandwidth. i.e. (50 Mbps throughput / 100 Mbps Links * 100) would give 50% Capacity consumed

Edge QoE
As a general term used by VCO on the Edge Tab, QoE is a graph displayed for 3 applications (Voice, Video, Transactional) where we show Link metrics (Latency, Jitter and Packet Loss) before and after using SD-WAN during specific duration (Monthly is used in our report).

Edge QoE Before
Displays the Link readiness for traffic based on the actual measured jitter, latency and packet loss.

Edge QoE After
Displays the quality of experience for this Edge after optimizations have been applied.

QoE Link Colors
The VCO display the links based on 4 colors which are green (Completely health), Yellow (Moderately impacted), Red (Severely impacted), and Gray (disconnected).

Link Blackout
It is the state where the link QoE goes from any color state to unknown state (blackout).

Link Brownout
It is the state where the link QoE goes from green state Completely health) to Red state (Severely impacted).

Link Score/Quality Score
The quality score gives a value between 0 (being the worst) and 10 (being the best) to show delivered service level for an application.
Report Assumptions

Assumption Name
List of all assumptions used to create this report

Value Used for this report
These are the customer provided values for each cost evaluated on this document.

Value Recommended by VMware
This are the VMware SD-WAN recommended values for each cost evaluated on this document.

<table>
<thead>
<tr>
<th>Assumption Name</th>
<th>Value used on this report</th>
<th>Value Recommended by VMware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hourly rate legacy CLI device - CCNP - Admin</td>
<td>$70</td>
<td>$60</td>
</tr>
<tr>
<td>Cost of blackout per minute - Large Branch</td>
<td>$200</td>
<td>$4,000</td>
</tr>
<tr>
<td>Cost of blackout per minute - Medium Branch</td>
<td>$100</td>
<td>$2,000</td>
</tr>
<tr>
<td>Cost of blackout per minute - Small Branch</td>
<td>$50</td>
<td>$1,000</td>
</tr>
<tr>
<td>Cost of brownout per minute - Large Branch</td>
<td>$100</td>
<td>$2,400</td>
</tr>
<tr>
<td>Cost of brownout per minute - Medium Branch</td>
<td>$50</td>
<td>$1,200</td>
</tr>
<tr>
<td>Cost of brownout per minute - Small Branch</td>
<td>$25.00</td>
<td>$600.00</td>
</tr>
<tr>
<td>Failover Time blackout</td>
<td>3 minutes</td>
<td>3 minutes</td>
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<tr>
<td>Failover Time brownout</td>
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<tr>
<td>MPLS 1-10 Mbps</td>
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<tr>
<td>MPLS 10-20 Mbps</td>
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<tr>
<td>MPLS 20-50 Mbps</td>
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<tr>
<td>Broadband 15-25 Mbps</td>
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<tr>
<td>Broadband 25-50 Mbps</td>
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<tr>
<td>Broadband 50-100 Mbps</td>
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<td>$50.00</td>
</tr>
<tr>
<td>Average configuration change duration per device in CLI</td>
<td>20 minutes</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Average upgrade duration per device in CLI</td>
<td>40 minutes</td>
<td>40 minutes</td>
</tr>
<tr>
<td>Average Activation duration per device in CLI</td>
<td>60 minutes</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Average configuration change duration per device in SD-WAN</td>
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<td>5 minutes</td>
</tr>
<tr>
<td>Average upgrade duration per device in SD-WAN</td>
<td>20 minutes</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Average Activation duration per device in SD-WAN</td>
<td>20 minutes</td>
<td>20 minutes</td>
</tr>
</tbody>
</table>