

# Background, Data, and Business Requirements (BDBR)

## Background

Satellite Ads Inc. (SAd\_INC) is the latest corporation to try to monetize space advertisements through the use of microsatellites. SAd\_INC's new generation-2 satellites are smaller, cheaper, and brighter, enabling more satellites to be launched and more space-based advertisements to be broadcast. To support this second wave of advertising satellites, the company needs to implement a new cloud-based automation system. The system will need to handle expected loads during advertising windows and monitor for continuing use of the cloud-based back-end system for the organization. The core requirement is ensuring advertisements are smooth and available throughout a year of anticipated ups and downs due to advertising being available only at night, word-of-mouth advertising, and positive press around the world. The following timeline outlines the intended schedule:

- November through April: The launched initial satellites and online back-end systems will be stress tested before advertisements go live.
- Early April: Advertising sales will go live in the United States.
- Late April: Advertisements will begin broadcasting from the satellites; the launch will coincide with additional satellite launches and press conferences to highlight the satellites' capability. When advertisements air via the satellites, the cloud-based automation system must scale to support the additional load of active satellites.
- August: Additional marketing will support more advertising, and sales will begin worldwide.
- October: Worldwide satellite coverage and sales and the cloud-based automation system will scale up or down based on where in the world the advertisements are happening and how many satellites are included in the advertisements.



When the holiday seasons in Europe, North America, and sections of the Asia-Pacific region arrive, advertisements are expected to receive a holiday sales boost. (See the projected data in Data Table 2.)

Current advertisements: As seen in Data Table 1, generation 1 was successful because the company continues a base advertisement load of 2,500 ads a month and has maintained a 10% retention rate from repeat customers. SAd\_INC believes that given the publicity around the microsatellites, the company should see a substantial increase for generation 2 of SAd\_INC satellites. Data Table 1 shows next year's forecasts of advertisements and the return customers over time for SAd\_INC as a reference for loading. The initial design for the first generation did not always function as planned, and advertisements were sometimes lagging at critical times. SAd\_INC wishes to avoid these same problems with generation 2 based on the company's projections (in Data Table 2).

<b>Data Table 1</b>		
	<b>Ads per Month</b>	<b>Customer Retention</b>
<b>March</b>	2,500	250
<b>April</b>	3,500	350
<b>May</b>	4,900	490
<b>June</b>	6,860	686
<b>July</b>	9,604	960
<b>August</b>	13,446	1,345
<b>September</b>	18,824	1,882
<b>October</b>	26,353	2,635
<b>November</b>	36,895	3,689
<b>December</b>	51,653	5,165
<b>January</b>	72,314	7,231
<b>February</b>	101,239	10,124
<b>March</b>	141,735	14,173

Management has used heavy marketing for SAd\_INC, including positive press as well as featured marketing using advertising conferences and live media streaming platforms. Consequently, management believes SAd\_INC will far surpass the sales of terrestrial advertising. For clients to have a great impression of their experience, it is critical for advertisements, including initial upload, data saves, subsequent purchases, and space display, to be flawless. Based on projections, the company needs to ensure that the scalability of the cloud-based back end is preset to address the effect that these marketing plans and the holiday season will have on the back end for SAd\_INC. These projections do not include the possibility of the system being featured as an innovative technology.



Projections for SAd\_INC are as follows:

<b>Data Table 2</b>		
	<b>Advertising Hours</b>	<b>Satellite Cluster Potential</b>
<b>March</b>	208	1
<b>April</b>	292	1
<b>May</b>	408	2
<b>June</b>	572	3
<b>July</b>	800	4
<b>August</b>	1,120	6
<b>September</b>	1,569	8
<b>October</b>	2,196	11
<b>November</b>	3,075	15
<b>December</b>	4,304	22
<b>January</b>	6,026	30
<b>February</b>	8,437	42
<b>March</b>	11,811	59

## Business Requirements

- ✓ *Ability to scale to critical events based on projections and actual data and lessons learned from the initial launch and based on the projections for updated launches. (See the previous data tables.)*

The cloud-based base-station system requires one satellite terminal, one web server, one database server, and one master time server. Since each ad will play across multiple synchronized satellites, timing is critical to the success of the ad venture. Each scaled cluster should contain a satellite terminal server, a web server, a time server, and a database server for every 400 satellites in use. Uploads and updates are managed separately through the satellite terminal server. This means there are four template images per cluster serving 400 satellites. If the estimate of 400 satellites is *not* a good number for the performance of the system, revise the number of satellites per system cluster and revise the number of clusters needed for this process.

- ✓ *Ability to monitor the capability of systems and use elastic services.*

Back-end core systems should be provided based on actual demand plus a projected demand of an additional 10%. There should be 10% of core systems in ready status. For example, when satellite usage reaches 300 satellites, new terminal, web server, time server, and database server images are changed to active status. Load balancers should register the new systems ready for use if properly initialized.

Satellite expansion servers are a separate group cluster that advertisements can be entered into by accessing the subgroup area within the cloud-based automation. Expansions are also scaled based on time of day and geographical region.



The following scripts must use preconfigured template images in protected stores:

- Satellite Terminal Server
- Master Time Server
- Web Server
- Database Server
- Scaled Satellite Terminal Server
- Scaled Web Server
- Scaled Time Server
- Scaled Database Server

The scaled server setup is one core. The setup can handle up to 300 satellites per scaled cluster. Autoscaling should monitor how many satellites are in use and turn scaled clusters on and off as needed. A minimum of one scaled cluster should always be available.

Autoscaling services should automatically roll back to reduce the number of servers after the load balancer quenches those connections as they age off. For example, if a scaled cluster (e.g., sat-term, web front end, web back end, and database) is to be taken offline, the load balancer will be notified to stop sending traffic to that cluster. Also, when connections = 0 (zero), the cluster will be taken offline.

Each new activated or deactivated cluster should send a message via a queuing service to the help desk ticketing system via [helpdesk@satelliteads.com](mailto:helpdesk@satelliteads.com) when activated, deactivated, or in error condition. If a cluster is in an error state, steps should be taken to remove the cluster from service and follow the procedure for removing a cluster from the cluster queue in the load balancer.

