



AD SERVER CASE STUDY

The document describes in brief the AD Server created by TAASHA Technologies for a Payment Processing Service provider.

This AD Server has been built ground up at the offices of TAASHA Technologies using Open Source Technologies.

TAASHA Technologies has extensive AD Serving Technology experience, having resources who have worked on TURN and Google DOUBLECLICK projects.

CLIENT BACKGROUND AND PROBLEM STATEMENT

A leading name in offering POS solutions to small and medium businesses, the client aimed to expand their revenue portfolio by augmenting their systems to further support advertising.

The organization which predominantly caters to markets in rural India, **seeks to enable in-shop digital advertisements via POS devices.**

Through advertising, the business could partner with other brands and organizations to enhance consumer awareness and facilitate growth. Hence, it was crucial that the advertisements were specifically tailored keeping in mind the rural backdrop which was a challenge in itself, since **not many ad servers supported location-based advertisements**, and more so in rural areas.

The primary motive of supporting advertising **was to increase the penetration in the regional and local markets.**

Therefore, it was concluded that the most appropriate course of action would be to develop an ad tech infrastructure from scratch, which would serve the following purposes:

- Seamlessly integrate ad tech into the existing solution
- Deliver localized ad solutions that are relevant and more specific
- Improve inventory management and valuation
- Swiftly monetize existing spare inventory via integration with current ad servers

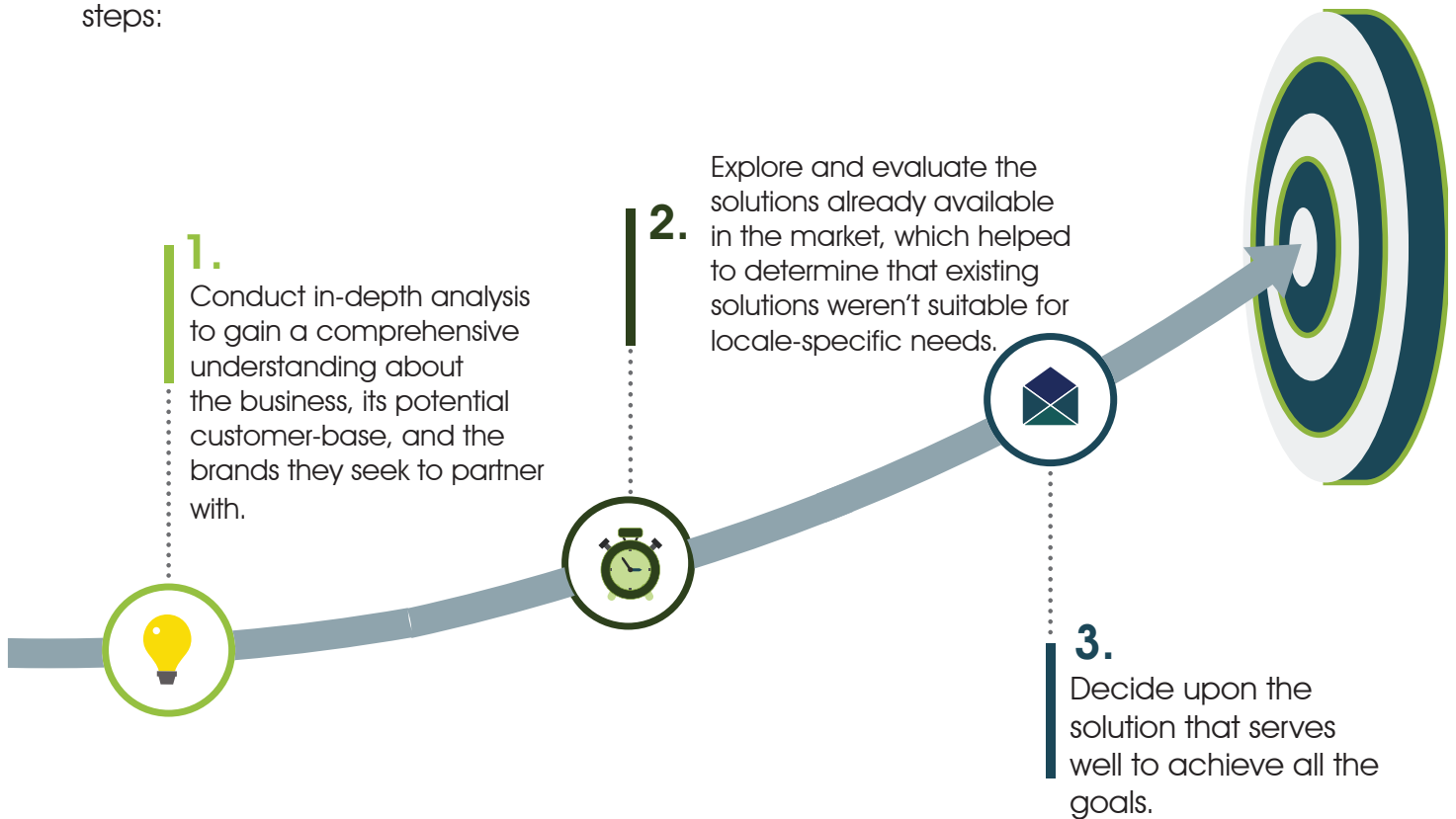


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TAASHA'S APPROACH

Taasha Technologies, with relevant experience in providing ad tech development solutions, worked in close collaboration with the client to chalk out an innovative ad tech strategy.

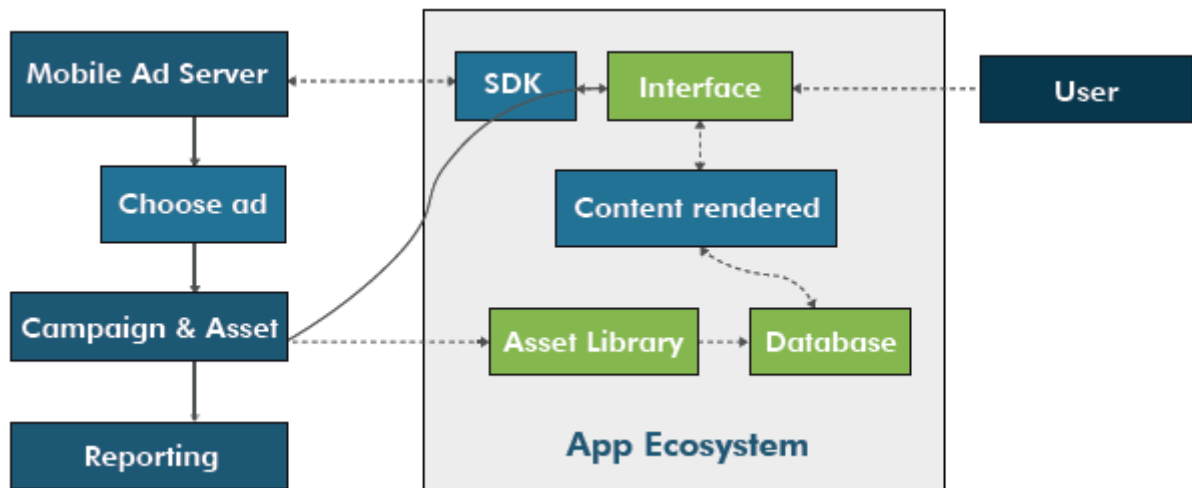
As part of its approach, Taasha Technologies initiated the process by undertaking the following steps:



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TAASHA'S STRATEGY

Taasha Technologies kick-started the first phase of the development by defining the structure of the platform architecture. After a lot of brainstorming, analyses and evaluation, the following architecture was finalized:



Taasha's team also designed a meticulous roadmap, elaborating on the various features to be included:



ROADBLOCKS & KEY CHALLENGES

Developing dynamic enterprise applications that offer real-time results often presents a series of challenges, some of which are:

Functional Complexities

Logic and learning were the core aspects of designing this feature-laden solution.

Some of these features included rotation ad serving and campaign prioritization.

This further increased the need for a deeper understanding of the domain attributes which proved to be a task in itself. Besides, functional complexities further translated into technical and performance issues.

Performance Considerations

We knew that **any lag in the performance of the ad server** would further translate into a performance lag for the application server and therefore we made several performance considerations to ensure that the end product operates flawlessly and efficiently well.

So, we ensured that the platform had the robustness to manage multiple users, campaigns and assets, while being able to integrate successfully with the organization's mobile platform as well. Another important factor to focus on was the solution's ability to receive and resolve requests within milliseconds. To cater to all these factors, it was pertinent that the solution was scalable, robust and agile, something which Taasha's team successfully accomplished.

Technical Complexities

The technical complexities involved were among the bigger challenges to be met. Since the system handles dynamic transactions, and in enormous volumes, it was very important that the code was highly reliable, performance oriented and lean.

A significant amount of effort was invested in developing the technical architecture and system design. Some key aspects considered, include:

- High scalability
- Managing bulk transactions
- Adaptability to cloud

All of these issues were successfully addressed by Taasha Technologies and the end result was a platform that served the purpose of the business while being flawless in its operations.



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THE SOLUTION

Taasha Technologies developed the following server architecture after an in-depth and analysis.



PROMINENT FEATURES OF THE SERVER ARCHITECTURE:

1. USER ACCESS



User access to the server architecture was made available in the following two ways:

- A backend interface was developed to provide complete access and control to the organization and its clients.
- SDK integration was designed to allow access to front-end users or the kiosk.



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PROMINENT FEATURES OF THE SERVER ARCHITECTURE:

2. SECURITY



The security component facilitates authentication and authorization of users. It also provides user access to rest of the modules and enables user login.

The server deploys two types of security authentication:

- **Session Based:** login credentials are required to grant access rights to a user (for web-based use)
- **Token Based:** a JWT token is used to grant access (for mobile clients)



PROMINENT FEATURES OF THE SERVER ARCHITECTURE:

3. BUSINESS PROCESSES



The platform has various business processes that include:

a) Advertiser Management

As the name suggests, this component assists in managing advertisers and the meta-information associated with each advertiser.

b) Inventory Management

Meta-information management, including different media formats (images, video), inventory categorization, rotations, and everything else related to inventory can be administered through this component.

c) Campaign Management

A fundamental component of the platform, campaign management is key when it comes to advertising. It serves the purpose of determining rules and the priorities of running the campaigns. Besides, to ensure maximum audience engagement, the ad platform also offers a unique day part flight time.

For prioritizing campaigns, the criteria included:

- Campaign flight dates
- Delivery burn rates
- Size of ads, in compliance with the standards set by IAB (Interactive Advertising Bureau)
- Creative formats
- Target Audience



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PROMINENT FEATURES OF THE SERVER ARCHITECTURE:

3. BUSINESS PROCESSES

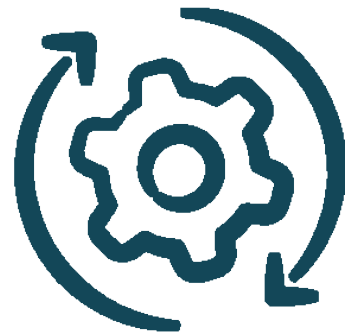
d) Ad Exchange

The platform is designed to ensure thorough utilization of the inventory.

The features allow integration with exchanges and SSPs so that the inventory can be monetized to the maximum. When there are no campaigns to run, the platform seeks campaigns from third party networks, and serves them.

e) Performance Tracking & Reporting

This component assists in tracking campaign performance and ascertaining reports to evaluate the results. This is helpful in optimization as the reports are quite comprehensive and supply sufficient information to enable decision-making.



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PROMINENT FEATURES OF THE SERVER ARCHITECTURE:

4. HIGH PERFORMANCE STORAGE FOR MEDIA



The storage component is utilized for data management across the platform.

Heavy graphics used for ads occupy a lot of space and they need to be managed for ease of accessibility and quick retrieval too.

This includes a CDN for media, and scalable infrastructure to gather significant volumes of data generated.



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PROMINENT FEATURES OF THE SERVER ARCHITECTURE:

5. EXTERNAL ENVIRONMENT



To fetch external data, the platform sets up unidirectional & bi-directional links with various external environments, including:

- **Location picker:** identifies precise locations where campaigns should run
- **Nearest location finder:** identifies general areas where the user can define where the ad should run
- **Exchange integrations:** the platform is integrated with other exchanges, SSPs and networks for inventory monetization



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PROMINENT FEATURES OF THE SERVER ARCHITECTURE:

6. USERS



Typically, the following types of users have access to the ad server:

External users:

- Front-end users: They interact with the ad as shown on the actual service desk, mobile applications and websites

Internal User:

- Organization's employees & representatives
- Advertisers

Client applications integrated with the ad server

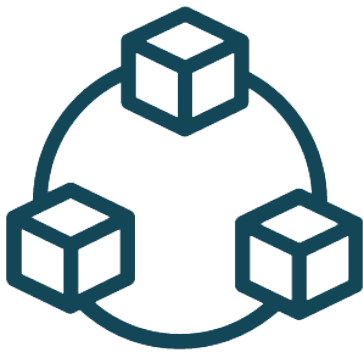
- Organizational Desk
- Mobile Apps
- Websites



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PROMINENT FEATURES OF THE SERVER ARCHITECTURE:

7. TECHNOLOGY



The ad server solution utilizes multiple technologies as listed below.

Server Deployment Environment

- Ubuntu

Server-Side Technologies

- Apache Tomcat
- MySQL
- Java
- SPRING Framework
- JSON web token
- Jackson-data bind
- Amazon BitBucket
- Log4J
- Maven

Client-side Technologies

- CSS - 3
- HTML 5
- Bootstrap
- AngularJS
- jQuery
- Google map API



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PROMINENT FEATURES OF THE SERVER ARCHITECTURE:

8. ENGAGEMENT



During the implementation phase, Taasha Technologies' contribution focused on the following components:

- I. Core ad server platform
- II. APIs to help integrate with the organization's platform

Taasha Technologies' team of professionals engaged with the organization comprises of the following experts, who have already completed the deployment and it is currently operating on a business as usual model.

- Account Manager
- Project Manager
- Product/Business Analyst [Subject Matter Expert (SME)]
- Java Developer (Lead / Architect)
- Java Developers
- Quality Engineers



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THE RESULTS

Taasha Technologies was successful in completing the project within its stipulated budget, and ahead of scheduled time, despite its complex demands.

Taasha Technologies also accomplished the following during development and implementation of the solution:



Near real-time performance:

The ads were delivered in a way that the platform/app did not experience any deterioration in its performance



Scalability:

The server was tested to cater to **more than a million impressions** in a day



Development:

The solution was developed at a fraction of the cost of the established Ad Server with a comparable throughput and performance



Creation of an SDK:

An SDK was created so that I could be easily consumed by the client process to display advertisements without need for complex coding.



The ad server is currently live, and integrated with the organization

The team continues to implement future phases of the product as planned.



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