

The use of the streaming data transmission from a Web browser to enhance the work efficiency of the contact center operators

Anton Pavlovich Teykhrub
The NAUMEN Company (Nau-service)
Ekaterinburg, 620028
Russian Federation



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ABSTRACT: *In the article, possible applications of the transmission technology in the context of work of the contact center operator are reviewed. As a result, it becomes clear that the use of the streaming data transmission technology in the direct communication has long been present on the market in a variety of commercial products. In the article, a new scenario is proposed for the use of streaming technology to provide context about the user. Further, on the basis of the analysis of typical calls of customers to the contact center, a conclusion is made that the use of the streaming data transmission technology allows improving the efficiency from 67% to 93% of all calls to the contact center, depending on the subject area of the contact center's work.*

Subject Categories and Descriptors

B.4.1 [Data Communications Devices]; C.1.2 [Multiple Data Stream Architectures]

General Terms

Data Transmission, Streaming data, Web services

Keywords: contact center, work efficiency, Web RTC, Adobe Flash RTMFP.

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Introduction

Since the advent of Adobe Flash RTMFP in 2006 and WebRTC in 2011, the application scope of the technology of streaming data transmission from the user's Web browser has been gradually expanding. One possible

application is the use of this technology for the organization of the client's direct calling to the contact center. In this case, there are several options for such application:

- 1) Direct realization of communication, as shown in RFC 7478 [1], which proposes to use WebRTC technology for the following types of interaction:
 - a. Browser-to-browser data transmission (audio and video);
 - b. Browser-to-server/gateway data transmission for further processing;
- 2) The use of a Web browser allows one to automatically obtain additional information about the context in which the client addresses the contact center.

First option of application of data streaming technology is already being widely used for communication in the commercial applications in the following products:

- 1) VoxImplant is a product of the Zingaya company, which is a cloud platform for the developers of communication services and applications.
- 2) Twilio is a cloud platform, allowing building a communication service and making calls from Web browsers and mobile applications.
- 3) Plivo is a cloud platform, allowing building a communication service and making calls from Web browsers and mobile applications.
- 4) TokBox is a cloud platform for the organization of video communications.
- 5) Zingaya is a service that allows companies to place on their Web pages the "Online Call" button, using which the customers of the company can make a targeted phone call directly from the page of a Web browser.

Second option of application of data streaming technology for obtaining information about the client's context do not have commercial implementations now, so they require separate consideration and will be presented in this article.

A method for increasing the work efficiency of the contact center operators through the use of streaming data transmission from a Web browser

The main method of improving the work efficiency of the contact center operators through the use of streaming data transmission from a Web browser is the possibility of obtaining the context of the customer-operator interaction, which allows optimizing this interaction. The method, as well as the results that are achieved in its usage, are presented in this section.

Application of the technology of streaming data transmission from a Web browser to obtain information about the customer's context.

The main task of the contact center is to increase profits while maintaining high levels of service, where one of the components of such increase is the reduction of the costs of the call processing.

Consider the situation of the client's addressing the contact center. An algorithm of processing the customer's call to the contact center is shown in Figure 1. The highest costs in this algorithm as shown in [2] are connected with the work of operators and the customer's conversation with the operator.

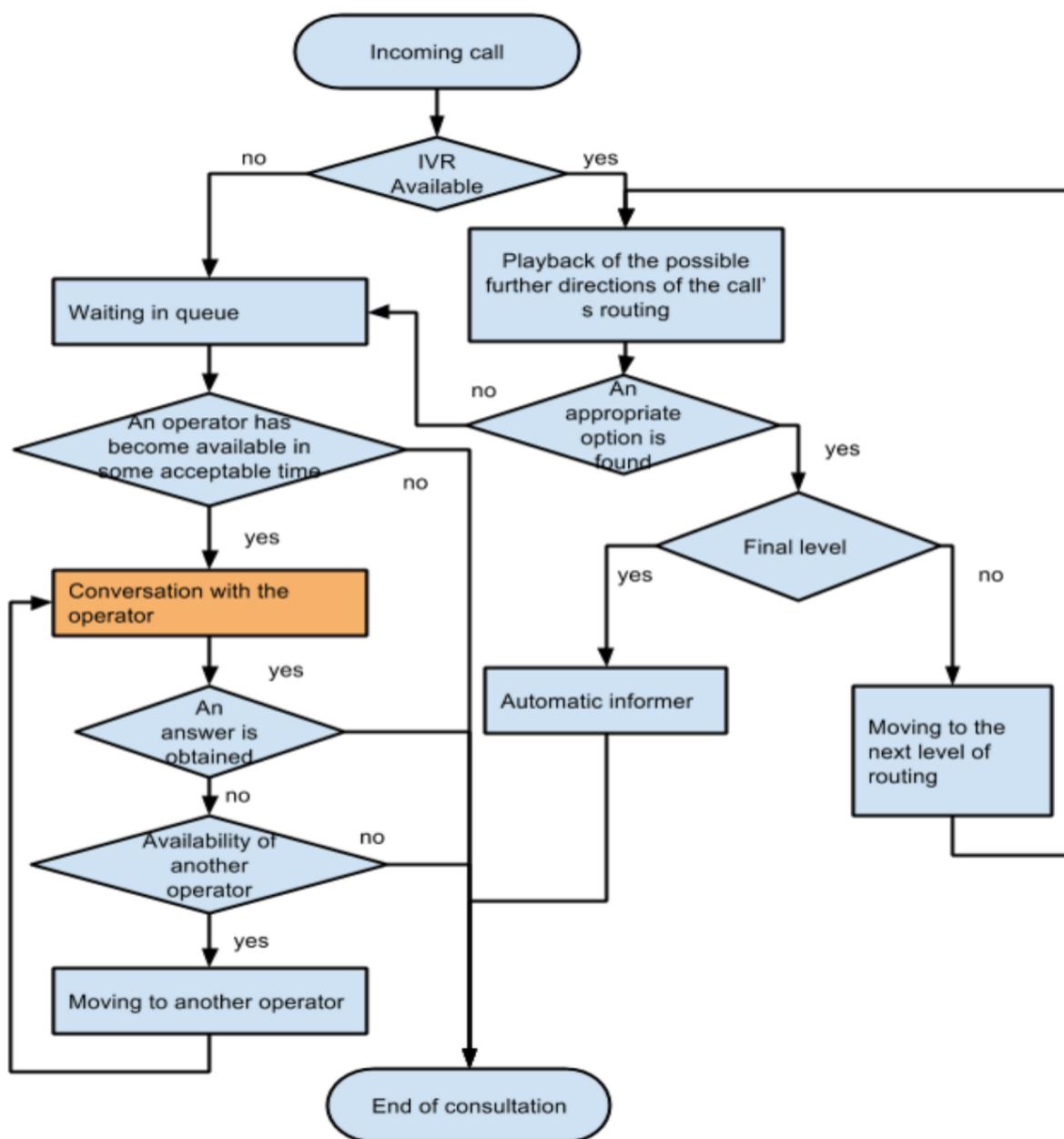


Figure 1. An algorithm of processing the customer's call to the contact center

In this case, there arises a problem of reducing the duration of conversation (and hence reducing the costs), while maintaining the given indicators for the performance of the contact center such as service level (SL), lost call rate (LCR) and first call resolution (FCR) [3], also FCR shown as most important indicator in [4].

Various solutions to this problem have been proposed. In particular, the work [2] proposes to improve the quality of IVR to reduce the number of calls that should be handled by the operator. In the paper [5], it is suggested for this purpose to use a CRM-system, which allows identifying the client by his/her number and providing the operator with the stored data concerning this client. In [6], a strategy is proposed to determine the most suitable operator on the basis of his/her skills. In [7], in addition to the use of CRM, it is proposed to use the knowledge base to accelerate the search for an answer to a user's request. In [8] author propose to use statistical analysis of contact centers calls queues for overall work process's optimization. As you can see, all of these authors propose to solve the problem of call center optimization by using of traditional interaction between the operator and the customer. However, the use of streaming technology allows us to make a fresh look at this issue.

The main problem as shown in [9] is the duration of the user waiting for his/her turn, which reduces the overall performance efficiency of the contact center.

Next, we consider a hypothesis that the use of a Web

browser by the client as an access point to the contact center will reduce the time of the conversation between the customer and the operator.

The impact of the technology of streaming data transmission on the customer calls to the contact center

The streaming data transmission technology allows a new approach to solving the problem of the duration of the customer waiting for his/her turn, because, within this technology, the following possibilities exist which are not available while using the conventional data transmission technologies:

- 1) Obtaining information about a Web page (address) from which the call comes;
- 2) Providing video access to the screen of the customer or the operator;
- 3) Obtaining information about users location using the means of geolocation, built into the Web browser.

To determine how these features affect the client's conversation with the operator, let us consider the main types of calls to contact centers. In the paper [10], the author identifies several key subjects of calls, which are presented in the Table 1:

The distribution of requests with respect to categories is illustrated, for clarity, in Figure 2

No	Subject of the call	Share among the calls, weight
1	Purchase/ordering of goods and services	0.48
2	A problem requiring urgent solving	0.26
3	Advising on products and services	0.19
4	A complaint concerning the work of the company	0.07

Table 1. Main types of calls to contact-centers

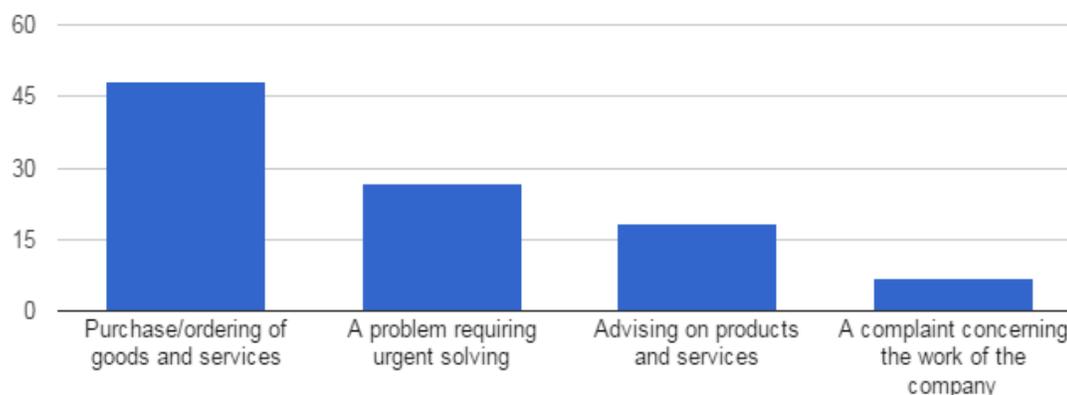


Figure 2. The distribution of requests with respect to categories

These data are generalized and do not take into account the work specifics of a particular contact center, for which the proportions of these categories may be different. However, these data are suitable for the determination of the degree of influence of the use of data streaming from a Web browser on the customer interaction with the contact center, i.e., they allow obtaining an overall assessment of such influence.

Let us consider these categories in more detail in the order of their popularity. Moreover, some categories may be combined in a single call, for example, advice on products and services may eventually be concluded by the purchase of goods and services. This allows considering them independently with the subsequent combining the effects. In order to assess the impact of each category on the call, it is necessary to elaborate the process of addressing and to determine which stages of addressing are influenced by the possibility of streaming data transmission from a Web browser.

The impact assessment will be carried out on a binary scale:

- 0 – no influence;
- 1 – some optimization of calls.

Further, based on the weight of each type of calls (among all calls), one can build an overall assessment of the impact of the application of streaming data transmission technology on the processing of the calls to contact centers according to the following formula:

$$F = \sum_{i=1}^4 M_i * W_i, \quad (1)$$

where M_i is an estimate of the influence of application of the streaming transmission from the Web site on the i -th type of call, where i ranges from 1 to 4;

W_i is the weight of the i -th type of call; moreover, in view of Table 1, the weights form a tuple with the following values $W = \{0.48, 0.26, 0.19, 0.07\}$;

Moreover, taking into account

$$\sum_{i=1}^4 W_i = 1, \quad (2)$$

we get

$$F_{max} = 1 \quad (3)$$

Thus, F shows the share of calls that are optimized by using the technology of streaming data transmission from a Web browser.

The results of applying the method to the considered categories of the customer calls

As previously mentioned, there are several possibilities that data streaming technology brings to contact center

optimization:

- 1) Obtaining information about a Web page (address) from which the call comes;
- 2) Providing video access to the screen of the customer or the operator;
- 3) Obtaining information about users location using the means of geolocation, built into the Web browser.

Now we will consider these possibilities against each type of calls to contact center to check what types of calls can be optimized with these possibilities:

- 1) Purchase/ordering of goods and services
- 2) A problem requiring urgent solving
- 3) Advising on products and services
- 4) A complaint concerning the work of the company

Purchase/ordering of goods and services

This type of customer call to the contact center involves several stages:

- 1) Communicating an identifier of a merchandise or service: it may be a title or some article. Receiving the address of the Web page allows the operator to know from the beginning, concerning which merchandise or service the client is calling, thus practically eliminating this stage from the dialogue;
 - 2) Agreement on the delivery cost and the payment conditions;
 - 3) Agreement on the place and time of delivery, the use of geolocation means built into the Web browser allows shortening this stage due to the preliminary search of the client location;
 - 4) Confirmation of the formed order.
- Thus, within this type of call, the 1-st and 3-d stages can be shortened, therefore $M_1 = 1$.

A problem requiring urgent solving

This type of the customer call to the contact center presupposes the following stages:

- 1) Description of the problem's essence by the client; at this stage, geolocation can be used, which can enable to identify the customer location, which can be significant at the stage of solving the problem; on the other hand, if the request concerns the information system, then providing video access to the user's screen allows speeding up the process;
- 2) Description of the solution of the problem by the operator or direct solving the problem; also, if the call concerns the information system, then the operator can provide video access to his/her screen to vividly demonstrate to the client the description of his/her solution, which is obviously easier and faster than the description of the same solution using only words.

Thus, within this type of call, most effective is the use of a Web browser to solve the problems with the information systems; for other types of requests, the Web browser does not play any significant role, therefore, $M_2 = 0$ for the non-informational systems and so $M_{215} = 1$ for the information systems.

Advising on products and services

This type of the customer call to the contact center involves the following steps:

- 1) Description of the client's question;
- 2) Switching to the operator responsible for the given category of products/services;
- 3) Description of the client's question;
- 4) Client consultation by the operator.

Within this type of calls, there can be reduced the number of operators involved in handling the request in connection with the fact that, on the basis of the data on the page address, an operator with the necessary skills may be selected, thus $M_3 = 1$.

A complaint concerning the work of the company

This type of the customer call to the contact center involves the following steps:

- 1) Description of the complaint by the client;
- 2) If the complaint can be resolved directly at the moment of call, then resolving the complaint (essentially, this transforms the call into the mode of solving the problem or advising); otherwise, registration of the complaint in the system of recording the wishes and calls.

Within the calls of this type, no significant changes appear due to the use of technologies of streaming data transmission from a Web browser, therefore $W_4 = 0$.

Final calculation of the streaming data technology on contact center efficiency

Let us carry out the final calculation of the impact on the work of the contact center of the application of the streaming data transmission technology in the segment between the customer of the contact center and the operator. Taking into account various assessments for the case of information systems (in which $M_{15} = \{1, 1, 1, 0\}$) and non-information systems (where $M = \{1, 0, 1, 0\}$), it is necessary to calculate F by the formula (1) for the given weights:

$$F_{15} = 1 * 0.48 + 1 * 0.26 + 1 * 0.19 + 0 * 0.07 = 0.93 \quad (4)$$

$$F = 1 * 0.48 + 0 * 0.26 + 1 * 0.19 + 0 * 0.07 = 0.67 \quad (5)$$

As one can see in both cases, optimization, which arises from the use of the technologies of streaming data transmission from a Web browser, allows significantly optimizing the processing of incoming calls by the contact center operators. Moreover, in the case when the contact center is associated with some service information system, the optimization is achieved for 93% of calls, whereas for the remaining cases, the optimization of up to 67% of calls is achieved.

Thus, we have confirmed the hypothesis formulated above that the customer using a Web browser as an access point to the contact center will reduce the time of the conversation between the customer and the operator.

Conclusion

Thus, as a result of investigating the possibilities of application of the streaming data transmission from a Web browser to enhance the effectiveness of the work of the call center operator, we calculated the number of calls, which are optimized through the use of the streaming data transmission from a Web browser. This number ranges from 67% to 93%, depending on the work specifics of the considered contact center: 93% for the contact center related to an information system and 67% for other cases.

The obtained results indicate positive prospects of applying a Web browser as the main instrument of the workplace of the contact center operator and access point to contact center, from the viewpoint of improving the work efficiency.

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