**SSO IndiaToday Cross Domain Hub and Spoke**

**Cross Domain Authentication Engine**

**Table of Contents**

[Introduction SSO - IndiaToday Hub and Spoke 3](#_Toc323224661)

[Architecture of SSO - IndiaToday Hub and Spoke Cross Domain Login 5](#_Toc323224662)

[Cross domain SSO Implementation Architecture: 5](#_Toc323224663)

[SSO – IndiaToday Hub and Spoke Implementation 5](#_Toc323224664)

[Assumptions 5](#_Toc323224665)

[Security Considerations 5](#_Toc323224666)

[API’s for Cross Domain Login 5](#_Toc323224667)

[List of Error Codes 5](#_Toc323224668)

## Introduction SSO - IndiaToday Hub and Spoke

SSO IndiaToday Hub and Spoke – Cross Domain Authentication Engine make use of **OAuth** (Open Authorization) is an open standard for authorization. It allows users user can Hub and Spoke over cross domain without having to hand out their credentials, typically supplying username and password tokens instead. Each token grants access to a specific site and for a defined duration (e.g., the next 4 hours).OAuth allows users to hand out tokens instead of credentials to their data hosted by a given service provider. Each token grants access to a specific site for specific resources and for a defined duration.

The OAuth protocol enables websites or applications (Consumers) to access Protected Resources from a web service (Service Provider) via an API, without requiring Users to disclose their Service Provider credentials to the Consumers. More generally, OAuth creates a freely-implementable and generic methodology for API authentication.

An example use case is allowing printing service printer.example.com (the Consumer), to access private photos stored on photos.example.net (the Service Provider) without requiring Users to provide their photos.example.net credentials to printer.example.com.

OAuth does not require a specific user interface or interaction pattern, nor does it specify how Service Providers authenticate Users, making the protocol ideally suited for cases where authentication credentials are unavailable to the Consumer.

**The features available in IndiaToday Hub and Spoke:**

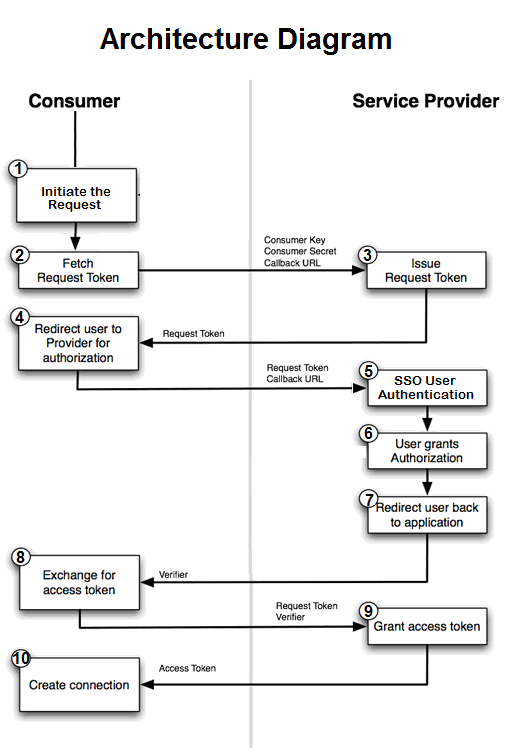
* IndiaToday Hub and Spoke will generate a unique Identification key for every registered consumer.
* IndiaToday Hub and Spoke will let the consumer to handover the user authorization and authentication at a centralized service provider.
* IndiaToday Hub and Spoke will let the users to login to different domains without providing their credentials again and again.
* Access Token will automatically expire according to the defined time by the service provides.

**Important Key Definitions:**

1. Service Provider: A web application that allows access via OAuth.
2. Consumer: A website or application that uses OAuth to access resources controlled by the Service Provider.
3. Protected Resource(s): Data controlled by the Service Provider, which the Consumer can access through authentication.
4. Consumer Key: A value used by the Consumer to identify itself to the Service Provider.
5. Consumer Secret: A secret used by the Consumer to establish ownership of the Consumer Key.
6. Access Token: A value used by the Consumer to gain access to the Protected Resources on behalf of the User, instead of using the User's Service Provider credentials.
7. Access Token Secret :A secret used by the Consumer to establish ownership of an Access Token

## 

## Architecture Diagram



## Cross domain SSO Implementation Architecture:

## aajtak.in

## 

Chrome

indiatoday.in

## 

sso.com

## 

**businesstoday.in**

There are many IndiaToday client sites which could participate under a "Single Sign On" umbrella, with the help of a single "Single Sign On" server (call this the SSO site, www.sso.indiatoday.com). In this model, the browser will not store an authentication cookie for each different client site. Rather, it will store an authentication cookie for only the SSO site (www.sso.indiatoday.com) which will be used by the other sites to implement Single Sign On.

In this model, each and every request to any client site (which takes part in the SSO model) **will internally be redirected to the SSO site (www.sso.indiatoday.com)** for setting and checking the existence of the authentication cookie. If the cookie is found, the authenticated pages for the client sites (that are currently requested by the browser) are served to the browser, and if not found, the user is redirected to the login page of the corresponding site.

## 

## SSO – IndiaToday Hub and Spoke Implementation

Initially, the browser doesn't have any authentication cookie stored for www.sso.indiatoday.com. So, hitting any authenticated page in the browser for www.aajtak.in, or www.indiatoday.in, or www.businesstoday.in redirects the user to the login page (via an internal redirection to www.sso.com for checking the existence of the authentication cookie).

Once a user is logged onto a site, the authentication cookie for indiatoday.in is set in the browser with the logged in user information (most importantly, the user Token, which is valid only for the user's login session).

Now, if the user hits any authenticated page URL of www.aajtak.in, or www.indiatoday.in or www.businesstoday.in, the request is internally redirected to www.sso.indiatoday.com in the user's browser and the browser sends the authentication cookie, which is already set. www.sso.indiatoday.com finds the authentication cookie, extracts the user Token, and redirects to the originally requested URL in the browser with the user token, and the originally requested site validates the Token and serves the page that was originally requested by the user.

Once the user is logged onto any site under this SSO model, hitting any authenticated page on www.indiatoday.in, or www.aajtak.in, or www.businesstoday.in results in an internal redirection to www.sso.indiatoday.com (for checking the authentication cookie and retrieving the user Token) and then serving the authentication page in the browser output.

### Assumptions

With OAuth, it's important to keep in mind which pieces are happening "server-to-server" and which pieces involve the browser ("user agent"). The "point" of OAuth, if you like, is to get a server-side access token **and secret** to the consumer's back-end server, without ever having the secret pass through the browser.

With this in mind: when a user authorizes a request token, the "callback" happens through the user-agent, via HTTP redirection. In other words, any data (i.e. a verifier code and the request token but NOT the request token SECRET) in the callback is "seen" by the browser. This is why an access token (and secret) can't be parameters of the callback step: this need to be communicated directly from server-to-server, not via the browser.

### 

### Security Considerations

All secrets and the Authentication Session Handle SHOULD only be transmitted using HTTPS.

**For security purpose session and cookies are tracked in the following steps:**

* The user logs into the website in the browser.
* The website issues them a cookie with a session key.
* Provider validates the cookie.
* The api validates that it is a valid & active session and issues the extension its access tokens.
* These tokens last for a maximum of one hour before they expire.
* There will also be lower rate limits on the JavaScript issued cookies.

**It operates under the following assumptions:**

* If another application has access to your cookies, then they can impersonate you on the website anyway, so access to the api is no different.
* All authentication methods still go through our control.

Regular expiry of tokens means that if they are compromised then there is a limited time for exploitationAPI’s for Cross Domain Login

1. To use the Cross Domain Login functionality, all the consumers must register themselves with the provider by calling the below API.

**URL:**

[http://sso.indiatoday.com/sso/generateConsumerKey?siteId={siteId}&siteName={siteName}&redirectUrl={redirectUrl}](http://jsso.indiatoday.com/sso/generateConsumerKey?siteId=%7bsiteId%7d&siteName=%7bsiteName%7d&redirectUrl=%7bredirectUrl%7d).

Where siteName=domain or subdomian name.

& redirectUrl=absolute url to which the page will be redirected after users logged in. This url is static as the user will always be redirected to this url if dynamic url is not provided.

**Output:** This API will generate the unique Identification key for the consumer which will be used by the provider to identify different consumers.Output would be display in XML format.

<apiKey>

<siteName>test1.indiatoday.in</siteName>

<siteId>8d9867489968d350b59a00842780b088</siteId>

<redirectURL>test1.indiatoday.in/sso/crossDomainLogin</redirectUR>

<consumerKey>qUSwjkRmE9eAg@Zf6Nu0$bUBR8M=</consumerKey>

<consumerSecret>ZlNxc@UfTeK7$H3Q4qkC9O5izLg=</consumerSecret>

<consumerName>test1726071885</consumerName>

<createdDate>2012-04-26 12:36:04.0</createdDate>

</apiKey>

**Error handling:**

* + Site id is null or blank: Error message with an error code is thrown as an xml response.

**Output:**

**<Error>**

**<ErrCode>ES002</ErrCode>**

**<Message>siteId cannot be NULL.</Message>**

**</Error>**

**<Error>**

**<ErrCode>ES003</ErrCode>**

**<Message>Site Id cannot be blank</Message>**

**</Error>**

* + Site name is null or blank: Error message with error code is thrown as an xml response.

**Output:**

**<Error>**

**<ErrCode>ES0012</ErrCode>**

**<Message>Site Name cannot be NULL.</Message>**

**</Error>**

**<Error>**

**<ErrCode>ES0013</ErrCode>**

**<Message>Site Name cannot be blank</Message>**

**</Error>**

* + Redirect Url is null or blank: Error message with error code is thrown as an xml response.

**Output:**

**<Error>**

**<ErrCode>ES0014</ErrCode>**

**<Message>Redirect URL cannot be NULL.</Message>**

**</Error>**

**<Error>**

**<ErrCode>ES0015</ErrCode>**

**<Message> Redirect URL cannot be blank</Message>**

**</Error>**

* + Site id is invalid: Error message with error code is thrown as an xml response.

**Output:**

**<Error>**

**<ErrCode>ES0011</ErrCode>**

**<Message>Site Id is invlaid</Message>**

**</Error>**

* + Unable to insert consumer details into DB. Error message with error code **ES009** is thrown.

**<Error>**

**<ErrCode>ES009</ErrCode>**

**<Message>Unable to insert consumer details into DB</Message>**

**</Error>**

1. For the first time consumer must login the user by calling the below API:

[http://sso.indiatoday.com/sso/authenticateRequest?siteId={siteId}&userId={username}&password={password}&ru={dynamicRedirectUrl}](http://jsso.indiatoday.com/sso/authenticateRequest?siteId=%7bsiteId%7d&userId=%7busername%7d&password=%7bpassword%7d&ru=%7bdynamicRedirectUrl%7d).

ru is an optional parameter which takes redirect url as its value.

If ru is provided, then the user will be redirected to this dynamic redirect url instead of the static url which the consumer has given while registration to IndiaToday Hub and Spoke.

For e.g.

1. [http://sso.indiatoday.com:8080/sso/authenticateRequest?siteId=708031f40f82871cbdddd2b20608ed97&userId=suhasagg@gmail.com&password=123456](http://jsso.indiatoday.com:8080/sso/authenticateRequest?siteId=708031f40f82871cbdddd2b20608ed97&userId=suhasagg@gmail.com&password=123456)

**Output:** This API will authenticate the user, upon successful authorization of user; it will generate the Access Token as a response which will be used through out the application for accessing different functionalities.

[http://sso.indiatoday.com/sso/crossDomainLogin?uid=suhasagg@gmail.com&ot=14DFBAFB0DBEC77A1731234C196AA509466617B632CA07E3537C9B3A8AB4ED4EE393A3827A851F3AC2F3CF8B47B20E8D](http://jsso.indiatoday.com/sso/crossDomainLogin?uid=suhasagg@gmail.com&ot=14DFBAFB0DBEC77A1731234C196AA509466617B632CA07E3537C9B3A8AB4ED4EE393A3827A851F3AC2F3CF8B47B20E8D)

where [http://indiatoday.in/sso/crossDomainLogin](http://indiatoday.com/sso/crossDomainLogin) is the static Redirect URL provided by the consumer while registration with the service provider.

uid is the email id of the logged in user.

ot is the Access Token generated by the service provider after authenticating the consumer and user.

1. [http://sso.indiatoday.com:8080/sso/authenticateRequest?siteId=708031f40f82871cbdddd2b20608ed97&userId=suhasaqg@gmail.com&password=123456](http://jsso.indiatoday.com:8080/sso/authenticateRequest?siteId=708031f40f82871cbdddd2b20608ed97&userId=suhasaqg@gmail.com&password=123456)&ru=www.google.com.

**Output:** This API will authenticate the user, upon successful authorization of user; it will generate the Access Token as a response which will be used through out the application for accessing different functionalities.

[www.google.com?uid=suhasagg@gmail.com&ot=14DFBAFB0DBEC77A1731234C196AA509466617B632CA07E3537C9B3A8AB4ED4EE393A3827A851F3AC2F3CF8B47B20E8D](http://www.google.com?uid=suhasagg@gmail.com&ot=14DFBAFB0DBEC77A1731234C196AA509466617B632CA07E3537C9B3A8AB4ED4EE393A3827A851F3AC2F3CF8B47B20E8D)

[www.google.com](http://www.google.com) is the dynamic Redirect URL provided by the consumer while login.

uid is the email id of the logged in user.

ot is the Access Token generated by the service provider after authenticating the consumer and user.

**Error handling:**

* + User authorization fails. Error message with error code **ER004** is thrown showing either the username or password in incorrect.

**Output:**

**http://{**static redirectURL/dynamic redirectURL**}?error=ER004**

**Action to be taken:** Provide correct user credentials and call the Authenticate Request API again.

* + Requested user is already logged in with another session. Error message with error code **ER001** is thrown.

**Output:**

**http://{** static redirectURL/dynamic redirectURL **}?error=ER001.**

**Action to be taken:** Call the logout API first and then Login again.

* + Current session does not hold the cookies of requested user. Error message with error code **ER005** is thrown.

**Output:**

**http://{** static redirectURL/dynamic redirectURL **}?error=ER005.**

**Action to be taken:** To login from a different user, first logout the existing logged in user and then login again.

* + Requested user cookies have been forcibly removed from browser. Error message with error code **ER007** is thrown.

**Output:**

**http://{** static redirectURL/dynamic redirectURL **}?error=ER007.**

**Action to be taken:** Login again.

* + When the consumer object found corrupted while the application is running. Error message with error code **ER008** is thrown.

**Output:**

**http://{** static redirectURL/dynamic redirectURL **}?error=ER008.**

**Action to be taken:** Login again.

* + Requested consumer name and secret found null. Error message with error code **ER009** is thrown.

**Output:**

**http://{** static redirectURL/dynamic redirectURL **}?error=ER009.**

**Action to be taken:** Consumer is not registered with IndiaToday Hub and Spoke. Call the Generate Consumer key API.

* + Cookies persist in browser but session is invalid. Error message with error code **ER0013** is thrown.

**Output:**

**http://{** static redirectURL/dynamic redirectURL **}?error=ER0013.**

**Action to be taken:** Provide Login credentials and login again.

* + Invalid Access Token is provided by the consumer. Error message with error code **ER0014** is thrown.

**Output:**

**http://{** static redirectURL/dynamic redirectURL **}?error=ER0014.**

**Action to be taken:** Provide valid access token and call the API again

* + Site id is invalid: Error message with error code **ES0011** is thrown as an xml response.

**Output:**

**<Error>**

**<ErrCode>ES0011</ErrCode>**

**<Message>Site Id is invlaid</Message>**

**</Error>**

**Action to be taken:** Provide valid site Id.

* + Site id is blank: Error message with an error code is thrown as an xml response.

**Output:**

**<Error>**

**<ErrCode>ES003</ErrCode>**

**<Message>Site Id cannot be blank</Message>**

**</Error>**

**Action to be taken:** Provide a valid value for siteId.

* + Provider Object is corrupted: Error message with error codes **ER0010** and **ER0012** is shown.

**Action to be taken:** Login again.

1. Once the consumer gets the Access Token, all the requests must calls the provider by using the below API

[http://sso.indiatoday.com/sso/authenticateRequest?siteId={siteId}&accessToken=14DFBAFB0DBEC77A1731234C196AA509466617B632CA07E3537C9B3A8AB4ED4EE393A3827A851F3AC2F3CF8B47B20E8D](http://jsso.indiatoday.com/sso/authenticateRequest?siteId=%7bsiteId%7d&accessToken=14DFBAFB0DBEC77A1731234C196AA509466617B632CA07E3537C9B3A8AB4ED4EE393A3827A851F3AC2F3CF8B47B20E8D)

OR

[http://sso.indiatoday.com/sso/authenticateRequest?siteId={siteId}](http://jsso.indiatoday.com/sso/authenticateRequest?siteId=%7bsiteId%7d).

\*accessToken parameter contains the encrypted Access Token generated for the first time. This access token is valid upto 1 hr .After that user must login again and a fresh access token will be provided.

\* ru parameter can also be provided if the user wants to redirect to a dynamic redirect url.

For eg. [http://sso.indiatoday.com/sso/authenticateRequest?siteId={siteId}&ru=www.google.com](http://jsso.indiatoday.com/sso/authenticateRequest?siteId=%7bsiteId%7d&ru=www.google.com).

1. If the user has logged in [www.indiatoday.in](http://www.indiatoday.com) and an access Token is generated for this domain. Then the same user can also logs in into [www.aajtak.in](http://www.aajtak.com) if that domain is a registered consumer with the provider.

Call the below API:

[http://sso.indiatoday.com/sso/authenticateRequest?siteId={siteId}&userId={username}](http://jsso.indiatoday.com/sso/authenticateRequest?siteId=%7bsiteId%7d&userId=%7busername%7d).

\* ru parameter can also be provided if the user wants to redirect to a dynamic redirect url.

1. To Log out the user call the below API:

[http://sso.indiatoday.com/sso/logoutService?siteId={siteId}&userId={userId}](http://jsso.indiatoday.com/sso/logoutService?siteId=%7bsiteId%7d&userId=%7buserId%7d).

\* ru parameter can also be provided if the user wants to redirect to a dynamic redirect url.

It will return the response as :

{static /dynamic Redirect url}?logout={true/false}.

1. To fetch the profile of the IndiaToday Hub and Spoke authenticated user.
2. [http://sso.indiatoday.com/sso/userProfile?emailId=suhasagg@gmail.com&siteId=ef55d27920fbf01f58c0da43430f5c6a&oauthToken=FB9938B846D453742FE90F23B72473ACA5C70D9FF7FC492DFB2FF9A8D179F335D52A6E30AFD5ABD79C3CD58B6AEDD500](http://jsso.indiatoday.com/sso/userProfile?emailId=suhasagg@gmail.com&siteId=ef55d27920fbf01f58c0da43430f5c6a&oauthToken=FB9938B846D453742FE90F23B72473ACA5C70D9FF7FC492DFB2FF9A8D179F335D52A6E30AFD5ABD79C3CD58B6AEDD500).

**Output:**

<NewDataSet>

−

<Table>

<usr\_id\_vc>Suhas</usr\_id\_vc>

<eml\_vc>suhasagg@gmail.com</eml\_vc>

<psswrd\_vc>1234</psswrd\_vc>

<CRT\_DT/>

<DateRegistered/>

<site\_reg>sd</site\_reg>

<frst\_nm\_vc>Suhas</frst\_nm\_vc>

<lst\_nm\_vc>Aggarwal</lst\_nm\_vc>

<Address>qw</Address>

<Gender>M</Gender>

<city/>

<state/>

<country/>

<dob>1990-07-27</dob>

<pin/>

<frgt\_psswrd\_qstn\_vc/>

<frgt\_psswrd\_answr\_vc/>

<mobilephone/>

<Referrel/>

<UserType>1</UserType>

</Table>

</NewDataSet>

**Error Handling:**

* + Site id is incorrect: Error message with error code E108 is thrown.
  + Email id does not exist: Error message with error code E104 is thrown.
  + Invalid Parameters: Error message with error code E118 is thrown.
  + The oauthToken provided is not valid. : Error message with error code ER0014 is thrown.

## List of Error Codes

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Error Codes** | **Meaning** | **Action to be taken** |
|  |  |  |  |
| 1 | ER001 | Requested user is already logged in with another session | Call the logout API first and then Login again |
| 3 | ER004 | User authorization fails. Either username or password in incorrect. | Provide correct credentials and Login again |
| 4 | ER005 | Current session does not holds the cookies of requested user | Display an appropriate error Message to user |
| 6 | ER007 | Requested user cookies has been removed from browser. | Login Again |
| 7 | ER008 | Consumer Object is corrupted | Login again |
| 8 | ER009 | Requested consumer name and secret found null | Call the generate Key API |
| 9 | ER0010 | Accessor Object is corrupted | Login again |
| 10 | ER0012 | Requested Token does not match with expected token | Login again |
| 11 | ER0013 | Cookies persist in browser but session is invalid in Memcache | Provide Login credentials and Login again |
| 12 | ER0014 | Invalid Access Token | Provide valid access token |
| 13 | ES009 | Unable to insert consumer details into DB. | Display an appropriate error Message to user |
| 14 | ES0011 | Provided Site id is not valid | Provide a valid site Id |
| 15 | ES002 | Site id cannot be null | Provide site id |
| 16 | ES003 | Site Id cannot be blank | Provide valid value for site id |
| 17 | ES0012 | Site Name cannot be null | Provide site name |
| 18 | ES0013 | Site Name cannot be blank | Provide valid value for site name |
| 19 | ES0014 | Redirect URL cannot be null | Provide redirect url |
| 20 | ES0015 | Redirect URL cannot be blank | Provide valid value for redirect url |

**CROSS DOMAIN FIRST PARTY Ids Sync –** (For Users/Browsers which block third party cookies)

IndiaToday Network Synchronization – Network A

Third party network – User id synchronization – Network B

There are three levels of synchronization –

1)Network A

2)Network B

3)Network A and Network B

Protocol Description – First Party Id Sync

3) 302 redirect

(Cuberoot/Indiatoday Userid)

Buyer Id

User Browser Visiting page with Match tag

4)Invisible pixel

2) Response -

Cuberoot/Indiatoday

CookieId

Redirect Url

1)Request for Pixel – Cuberoot/IndiaToday CookieId/Buyer Id

Buyers Service

Cuberoot – IndiaToday

UserId Match Service

Matched UserIds are stored in respective Match Tables.

1)A buyer can use the Cookie Matching workflow to populate their own match table by providing only the cuberoot/indiatoday uid/nid  in their match tag.

2)After UserId Sync, respective user data points segments/data points sync can follow. There is Access Control Layer available in Personas Sync within Network A, Network B and Network A and B.

**Some applications of Access Control**

1)Persona Sync between selective entities only – Indiatoday, Aajtak but not Business today.

2)Persona Sync with selective third party Publishers.

**Persona Connect**

Persona Connect uses Hub and Spoke Architecture. User Persona will full data points is present in Local Storage.

A sample Persona is attached -

This persona format is currently activated on Aajtak/India Today with feature of selective specific domain segments.    
  
f21761a0\_203d\_4657\_bdf2\_e414378fc050:@danbury@@united\_states@@apple\_iphone\_2013\_june@@Seg2493,automotive and vehicles vehicle brands peugeot,null,art and ente  
rtainment movies and tv tamil movies,Seg931,religion and spirituality buddhism,Seg826,religion and spirituality hinduism@@Seg826,religion and spirituality hin  
duism,Seg931,religion and spirituality buddhism,Seg806,art and entertainment movies and tv bollywood,Seg2426,style and fashion jewelry rings,Seg2493,automotiv  
e and vehicles vehicle brands peugeot,Seg2397,automotive and vehicles electric vehicles,null,art and entertainment movies and tv tamil movies,Seg1662,automoti  
ve and vehicles vehicle brands bentley,Seg1202,education alumni and reunions,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0@@auto,technology,trending news,elections,india today insight,india,movies,news analysis,itweben,twitter,Quarter3,0,0,0,0,4,4,7,28,6,6,4,6,5,4,4,7,4,6,5,9,2,24,24,2,28,6,4,28,4,4,6,4,7,8,56,4,9,7,6,  
4,8,2,24,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,8,4,8,101,3,6,7,7,0,0,0,0,0,0,0,348,61,1,loyal,323,35,41,36,36,32,34,40,38,35,35,39,32,35,34,35,36,40,35,35  
,40,39,36,34,33,33,34,32,42,oxford blue,powder blue,earl grey,dull magenta,emerald green,heather purple,0,0,0,0,0,0,56,53,56,67,61,52,56,56,56,55,63,59,0,0,38  
,56,41,41,56,59,55,59,48,52,53,57,55,56,59,55,56,64,62,64,61,62,61,70,56,61,63,65,61,63,60,59,57,62,56,62,61,65,63,69,66,65,67,68,65,52,50,51,52,53,55,53,51,51,51,52,64,56,59,61,56,56,59,62,59,62,59,56,62,60,59,61,57,55,59,57,62,60,47,44,50,52,56,59,55,56,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,38,35,49,43,50,62,  
56,64,50,45,59,57,54,50,47,56,48,43,56,56,40,60,64,40,55,59,56,47,40,37,35,53,51,44,37,34,65,51,44,37,64,47,59,52,39,62,32,59,68,62,53,51,42,49,45,52,38,43,46,35,37,44,35,40,49,63,49,46,49,47,36,45,51,48,37,46,45,46,45,43,53,40,53,47,52,51,59,43,50,49,45,62,54,41,56,40,57,33,35,51,42,48,47,50,46,37,59,42,49,46,51,48,43,50,59,55,55,42,50,50,68,48,40,64,41,55,42,40,46,56,54,54,65,40,41,41,64,57,51,47,41,38,41,32,38,60,37,59,56,57,61,39,32,54,57,33,54,34,37,61,61,50,43,51,47,47,49,53,37,56,63,50,40,46,56,43,60,49,39,44,57,44,55,60,54,64,54,55,50,39,60,56,57,57,56,54,57,53,46,57@@male,327,female,334,male,402,female,396,male,58,female,39,wikipedia,twitter,commonsense@@baby,395,children teens,441,youth adolescent,466,adult millennials,491,middle age,436,old,356,baby,314,children teens,  
461,youth adolescent,504,adult millennials,519,middle age,488,old,327,baby,78,children teens,156,youth adolescent,47,adult millennials,150,middle age,109,old,  
81,wikipedia,twitter,commonsense@@poor,350,middle income working class,532,rich wealthy,424,poor,341,middle income working class,601,rich wealthy,435,poor,33,  
middle income working class,147,rich wealthy,43,wikipedia,twitter,commonsense@@tesla,tesla tweet,ashok gehlot,bjp suvendu adhikari,viral,trending videos,sisir  
 adhikari bjp,royal enfield interceptor 650,suvendu adhikari,sisir adhikari tmc bjp,musk,rajasthan phone tapping,nick jonas,trending,tmc,bengal polls,2021 roy  
al enfield continental gt 650 new colours,pm modi bengal rally today,pm modi brigade ground,2021 royal enfield continental gt 650 price,suvendu adhikari famil  
y,march 2021,suvendu father sisir,suvendu adhikari father,priyanka nick,priyanka chopra,royal enfield,elon musk,rajasthan politics,nandigram  
  
☺  
  
**Persona format Description**

Cubesection key contains –

1)Publisher Analytics + Emotion Persona + Color Persona + User Knowledge graph + Creative knowledge graph (Hyper personalisation)

2)Publisher segments - User Topic Engagement Metric (one to one map with topic) + User segment engagement metric (one to one map with segment) + User section engagement Metric (one to one map with sections).

After these user session properties, loyal properties are present.

These are present in first slot of dense signals after section list in cubesection.

Emotion Persona - User emotion persona developed - one score each for 28 emotions.  
Color Persona - User color persona/color wheel.  
100 scores are supplied based on knowledge graph of users (taking weighted persona vectors into consideration).  
Padding is there to fill missing values for missing values and symmetry, so that

CTR/Recommendation models can do feature interactions.  
Max 250 signals are supplied for hyper personalisation (Breadth First (for specific campaigns on Aajtak/indiatoday + Depth first approach(for campaigns based on business requirements))  
This is based on Creative Knowledge graph built using external data mining/crawling from google trends, dbpedia and other databases.

Third party data knowledge graph is also available.

Knowledge graph embeddings based on these databases (as well extended knowledge graph using  [DBpedia](https://wiki.dbpedia.org/), [WikiData](https://www.wikidata.org/wiki/Wikidata:Main_Page) or the [EU Open Data Portal](https://data.europa.eu/euodp/en/home)) is available as well for deriving affinity metrics and other scores.Before using Persona in other applications – Persona Preprocessing can be applied. Persona can be extended using third party data sets, machine Learning datasets, persona can be trimmed, sub set can be derived as well.

For example – In case of AdManager 🡺 Persona trimming is done to reduce Persona Size as per Ad Manager Key value limit requirement.