TAG Product Specification for Payment ID System

The Payment ID System is designed to reduce the volume of illegitimate ad inventory sold by enabling media buyers to identify and avoid untrustworthy parties in the supply chain; and take effective remedial action if some party is supplying illegitimate inventory. Building atop earlier versions, this product specification describes the mechanisms for transferring Payment IDs, how to implement Payment Identifiers, and how to utilize resulting data.

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Background

Transparent practices enable principled actors to differentiate themselves from sources that generate or trade in poor quality or fraudulent traffic. Principles that achieve this, in addition to other tools and resources available to the market, allow companies across the industry to take important strides towards fraud-detection and fraud-resolution.

Consider a case where certain ad impressions have been confirmed as having been fraudulently hidden. If some party has gone to the effort of deliberately hiding ad slots, then this party is likely to be defrauding media buyers in ways that have not yet been confirmed. This party should not be trusted by media buyers. Unfortunately, because it is currently not possible to identify all the parties in the supply path of any individual ad impression, it is not possible to identify and isolate this untrustworthy party. This makes it difficult for media buyers to avoid buying inventory from this untrustworthy party in the future.

The lack of transparency into the supply path of any individual ad impression also makes effective remedial action more difficult. If a media buyer makes a valid claim for a refund because illegitimate inventory has been supplied, then it is currently difficult to propagate this claim back to the party ultimately responsible for supplying the illegitimate inventory. It is also currently difficult to pass on recommendations of corrective action to the appropriate parties.

Scope and Applicability

Automation of the buying of media has led to the evolution of a very complex advertising supply chain. In any given set of transactions (which combined, result in the purchase of an ad slot and the delivery of an ad) each member of this supply chain has knowledge only of the business entity directly adjacent to them. In many cases, this knowledge is itself limited or false. It is nearly impossible for any entity on that supply chain to trace a piece of media back to an actual source, and know who will ultimately benefit monetarily from the transaction. The opaque nature of the supply chain has been a contributing factor to increased abuse of the ad ecosystem.

For the buying of media to reach its full potential as an important component of the advertising industry, it needs more transparency. This document seeks to address the transparency issue as it relates to the flow of money. Adoption of the proposal detailed herein by a significant portion of the programmatic industry will make it possible for any buyer and/or their agent, to "follow the money" back through the supply chain to the original source of inventory. The benefits of which include but are not limited to:

- The ability to identify and stop buying from suppliers engaged in the transaction of Non-Human Traffic (NHT) or otherwise Invalid Traffic (IVT).
- The ability of an exchange, or network to in turn stop buying or brokering in IVT and NHT based on knowing the source.
- To provide recourse to a buyer who programmatically purchases media that has been misrepresented by a seller.

In short, this proposal represents a major step toward limiting the proliferation of fraud in the ad ecosystem.

The buyer of any non-blind ad slot should be passed a chain of unique, persistent supplier identifiers with each purchased impression. Any full chain of payment IDs comprises a set of IDs that distinctly identifies the publisher and each intermediary involved in the transaction.

- We strongly encourage (but do not require) that a "centralized" identifier be adopted by each and every **intermediary** who is either paid to supply the ad slot (e.g. exchange, network, sell-side platform) or in some way handles the inventory during the transaction (buy side ad server, sell side ad server, etc.). Centralized in this case simply means, **intermediary** ids do not collide.
- At the point of the chain creation, downstream **intermediaries** assign and issue a "decentralized" identifier for the source of the inventory they are representing. Decentralization means the IDs could indeed collide as they will be issued at the discretion of each **intermediary**.
- Any identifiers created by prior intermediaries passed to a given intermediary are also passed forward to the purchaser of any given impression.

Taking the perspective of the inventory, the most ***upstream*** entity is the end publisher, while the most ***downstream*** entity is the advertiser. Illustrations in below sections flow left to right to reflect this. Every intermediary must maintain the chain and add their own intermediary ID (optional) and a unique, persistent supplier identifier, as follows:

1. Intermediaries issue persisting supplier identifiers for each entity (intermediary source or source publisher) that they pay, meaning that the supplier identifier should map 1:1 with

the supplier entry in the intermediary's accounting system.

2. The first intermediary in any path includes the appropriate supplier identifier (inventory source) with each ad slot received from upstream publishers (or, in the case of a recognized intermediary selling owned-and-operated inventory, the intermediary includes an identifier for themselves). Details of each ad slot together with the newly included supplier identifiers are then passed to downstream parties.
3. The second intermediary in any path appends the appropriate supplier identifiers (for their own source of the inventory) to the identifiers received from the first intermediaries. Details of each ad slot, together with supplier identifiers provided by both the first and second intermediary, are then passed to downstream parties.
4. Intermediary N in any path appends the appropriate supplier identifiers to the identifiers received from intermediary (N-1). Details of each ad slot together with supplier identifiers provided by intermediaries N through 1 are then passed to downstream parties.
5. The chain is created and added to when an impression is put out to bid, such that bidders/buyers can use the chain as input when deciding whether to bid/buy or not and how much to bid. The chain will be 'recorded' when there is a buyer who bought the impression.

Note:

- There is deliberately no requirement that some entity will be given the same supplier identifier by two distinct downstream intermediaries.
- Identifiers are not necessarily globally unique. Each intermediary is required to assign distinct identifiers to each upstream party that is paid. However, there is nothing to prevent overlap in identifiers assigned by different intermediaries

Ad Tech Supply Chain

The ad tech supply chain can have many nodes as it passes through systems. The following diagram is an attempt to simplify the various diagrams in the TAG document.

Entities vested in the workflow:

0) Content: Some digital content such as a video (vimeo.com) website (cnn.com), app (CNN for iPhone) or embedded content inside of some other app or webpage (cnn's instant articles within Google News or Facebook)

1) Seller Technology: Some SDK, content management system, ad server or header- bidding container that coordinates the advertising in real-time either via some completely server-side technology or hybrid server and client side tech.

2) Exchange: The technology that offers the impression for auction, generally via an ad tag or other HTTP GET request (for header bidding). There is an emerging class of server-side connections between the "Seller Tech" and the "Exchange" that may be one of:

- Ad Tag via HTTP
- HTTP GET or POST API (header bidding for instance) ● Server-side custom protocol (JSON in a few variants)

3) Buyer Technology: This could be a legacy ad network using ad tags, a DSP that serves a redirect to an agency/advertiser ad server, or a "native ads system"

4) Advertisement: Some technology that supplies the ad creative itself via some mechanism. Delivery maybe via redirect in a web view, or some server-side ad-content stitching. Generally, an ad server, but may vary in the case of video or native ads which function differently.

Terminology

Intermediary ID: The optional, self-assigned global identifier for the entity appending a new node to the chain, as an act of self-signing.

Inventory Source ID: This required identifier is appended by the intermediary to the full chain to represent the immediate preceding upstream entity that sold the impression opportunity.

Node/ID pair: A single segment of the Payment ID chain, separated by dashes, and appended to the full chain. A node presents itself in the form of a pairing of the Intermediary ID and an Inventory Source ID. Nodes must be appended by each relevant intermediary before passing on to the next downstream entity.

Chain: A series of linked nodes denoting the flow of inventory originating from an end publisher, where each node represents either a transaction or redirection by a downstream entity. This captures all varying scenarios in chain structure resulting from won bids, forms of resale, or redirects.

Intermediary: Any business which represents/sells programmatic inventory that is not their own or any party involved in redirection of a programmatic impression.

> With the exception publishers, each type of company listed in the table below will fall into the intermediary categorization dictating the guidance it should follow throughout the present document.
>
> ***Typical*** intermediaries include entities that are party to the financial transaction to the extent that they either represent or sell media inventory.
>
> ***Atypical*** intermediaries, like buy-side or sell-side ad servers, are classified as such when their functions are limited to facilitating a redirection of an impression and do not act as the buyer or seller of that opportunity.
>
> This distinction is made to provide guidance on who should append to the chain and what they are appending. Typical intermediaries are required to append at least the Inventory Source ID to the chain and pass along the existing chain. Atypical intermediaries have the option of appending only their Intermediary ID to the chain and not the Inventory Source ID (unless they are explicitly party to the transaction). All intermediaries that receive a payment ID chain are required to pass along the complete payment ID chain to the next downstream party. Publishers are the most upstream party so they do not initiate chains and would not append any IDs.

Further descriptions on industry stakeholders:

Type	Description
Publisher	Owns and operates the media property and offers their own ad placements to buyers.

Embedded Content Provider	A third-party content component embedded on media properties which incorporates paid advertisements
Publisher Network	Represents a group of publishers, typically in a vertical, for purposes of acquiring advertisements
Ad Network	Aggregates supply and fills advertisements for Publishers and Publisher Networks based on their own demand relationships
SSP/Exchange	Marketplace connecting publishers and networks with ad buyers
DSP	Marketplace providing media buying opportunities for advertisers and their trading desks.
*Buy-Side Ad Server**	Hosts Advertising Creative on behalf of Agencies and Advertisers
*Sell-Side Ad Server**	Delivers an Ad to the Publisher's Site where the Ad Server account holder is the publisher.

*Atypical intermediaries

Technology-Neutral Product Requirements

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This section will expand on the fundamental concepts underlying any Payment ID build. Requirements described below are technology-neutral and apply to all entities developing Payment ID systems.

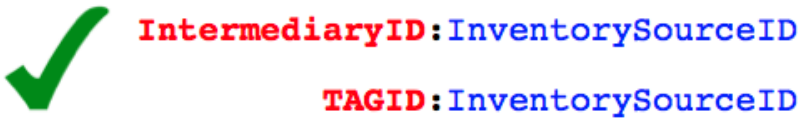
Identifiers

A Payment ID chain is a series of identifiers that provides information about a particular impression opportunity's financial record. Two types of identifiers may appear in a Payment ID chain:

- The Intermediary ID, and,
- The Inventory Source ID

Individual companies are responsible for using these two identifiers in order to create a piece of a Payment ID chain. The ***Intermediary ID*** is an optional, self-assigned and persisting global identifier that a company uses to represent itself across all of its Payment ID activity throughout the supply chain.

Companies that are TAG Registered may opt to use their TAG-ID as the Intermediary ID within a Payment ID segment and are strongly recommended to do so.



Since the Intermediary ID is optional and self-assigned (as opposed to originating out of a centralized environment), companies that decide to use a different global identifier should be advised that they risk operating under a colliding identifier.

Given the significance that intermediary IDs may carry across partnerships, it is problematic for the market if there are sets of duplicate Intermediary IDs existing at the same time (even if they never collide in reality). Colliding Intermediary IDs can only be discovered by an upstream party possessing the duplicate so it is the responsibility of every intermediary to call attention to colliding sets of IDs. TAG will host an internal volunteer registration of Intermediary IDs in order to keep track and for reference when a resolution is needed.

Intermediary IDs provide significant value in "signing" the required ***Inventory Source ID***. An intermediary company must append the Inventory Source ID to the full chain in order to identify the immediately preceding, upstream entity that sold them the impression opportunity. Note that the Inventory Source ID does not always refer to the end publisher.

The only scenario in which the Inventory Source ID will refer to the end publisher is when the company has a direct relationship with the publisher and is the first party to offer up the impression opportunity and so creates a Payment ID chain from scratch.

Payment ID Nodes

Within any single node in a payment ID chain, the ID pairs should not be conjoined and should be separated in order to easily determine the ID type. Additionally, when separating the two identifiers, the Intermediary ID should exist to the left of the separator, leaving the Inventory Source ID to be located at the right side.

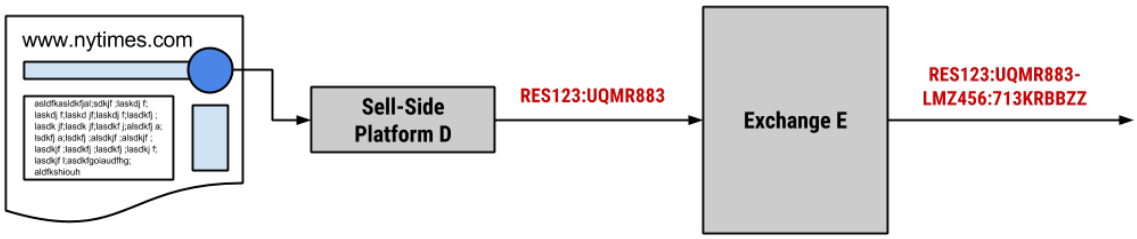
Core differences between the two identifiers:

Intermediary ID	Inventory Source ID
Optional	Required
Identifies the intermediary appending	Identifies the adjacent source of the sold impression opportunity
Leftmost ID in a single node	Rightmost ID in a single node
Can be appended by **any** intermediary type	Can be appended by only **typical** intermediaries

Examples in which the identifiers are easily distinguished by a colon demarcating them (angle brackets included for ease of reading):

<IntermediaryID>:<InventorySourceID>

Figure 1



Each ID type is easily recognized so long as there is a separator between the two ID pairs. A different example with sample identifiers divided by a colon:

XYZ01234:ABCD56789

Owing to the optional nature of the Intermediary ID, nodes in payment ID chains that only contain a single identifier must include the colon in order to signal its position relative to the delimiter. An example in which the identifier is located to the right of the colon, indicating that it is the Inventory Source ID:

:ABCD56789

If the node is being appended by an ***atypical*** intermediary choosing to self-identify, the identifier needs to sit at the left of the colon to show that it is the Intermediary ID:

XYZ01234:

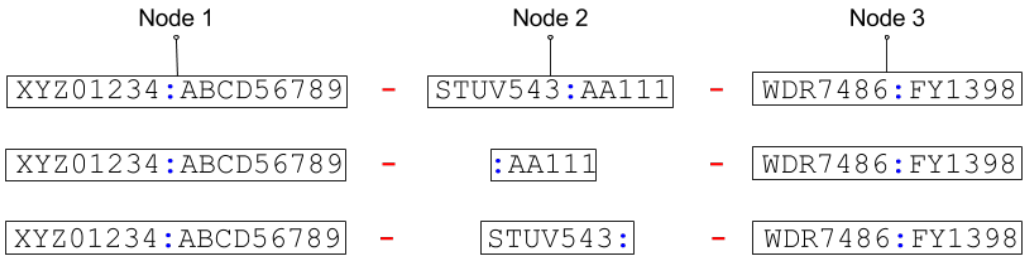
Appending to the chain should be a function of adding a unique separator like a hyphen, allowing you to distinguish your ID pairs as a separate piece from the other nodes received in

the chain. Companies must always pass along the preceding chain as they received it, without any modifications to the original nodes within the chain.

For instance, multiple nodes separated by a hyphen (note: “IntermediaryID” and “InventorySourceID” shortened to “IntID” and “InvSoID,” respectively, to avoid confusion due to line breaks):

<IntID>:<InvSoID>-<IntID>:<InvSoID>...

Figure 2 with three chains, each containing three nodes:



Note: The first chain contains three full nodes. The second chain contains a node (Node 2) with only the Inventory Source ID, appended by a typical intermediary choosing to not self-identify. The third chain contains a node (Node 2) with only the Intermediary ID, appended by an atypical intermediary choosing to self-identify.

In the first two chains, the Inventory Source ID in each node **subsequent** to the initial node (Node 2 and Node 3) refers to the adjacent intermediary that received payment for the sold impression opportunity, and not the end publisher. In the first hop, the Inventory Source ID (i.e. *ABCD56789*) is the identifier assigned to the publisher by the first intermediary. In the second hop, the Inventory Source ID (i.e. *AA111*) is the identifier assigned to the first intermediary (existing at Node 1) by the second intermediary (existing at Node 2).

In the final chain, the Inventory Source ID located at Node 3 (i.e. *FY1398*) refers to the intermediary in the first node that received payment for the sold impression opportunity. This chain is different from the two chains above it in that it contains two typical intermediaries and an atypical intermediary (e.g. an ad server). The first two chains contain nodes all appended by typical intermediaries.

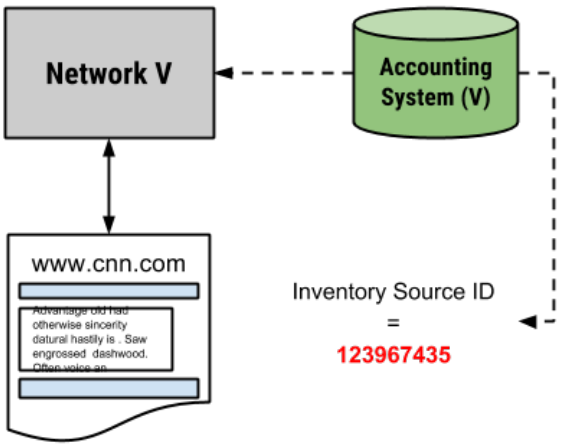
Mapping Payment Identifiers to Accounting Records

Existing internal IDs may be used as payment identifiers for the inventory source provided these IDs meet the identifier requirements detailed in the section above. If existing internal IDs do not meet the requirements, inventory source IDs must be generated anew and linked 1:1 to each inventory source. Successfully mapping Payment identifiers to individual inventory sources enables the company offering the impression for auction to generate a new Payment ID chain using the syntax.

What are the systems involved for linking?

Technology platforms should ensure that supply sources have an identifier that is associated with their inventory and with their accounting information.

Figure 3



Generating New Identifiers

A company should have one Intermediary ID that it consistently uses across the supply chain. Additionally, a company should have one inventory source IDs mapped 1:1 to the supply source. These Inventory Source IDs must also be consistently used within the company's platform.

When deciding what identifiers to use for partners, the company should consider whether their existing ID system meets the below requirements. There is no explicit need to generate an entirely new set of IDs provided the requirements for what are considered acceptable Identifiers are met. At a minimum, an identifier within a single segment of a chain must be:

- Alphanumeric (A-Z; 0-9); and contain only URL-friendly characters (with no special characters), and
- **Case sensitive**,

See Appendix A for enumerated examples and further guidance on how identifiers should look.

Intermediaries Not Handling Financials

Only intermediary systems that handle and transmit money from payers to payees should assign IDs. For instance, an ad/content server (and associated vendor) automates the process of serving ads for supply creator X. It doesn't handle the money. An Exchange Y that gets the impression from the ad server for auction handles the money. A Bidder Z that wins an impression from Exchange Y typically handles the money for Buyer Q. If Bidder Z is not handling the money to pay Exchange Y, the Bidder Z should not append its own ID and simply append the ID of the buyer that is directly paying the Exchange Y.

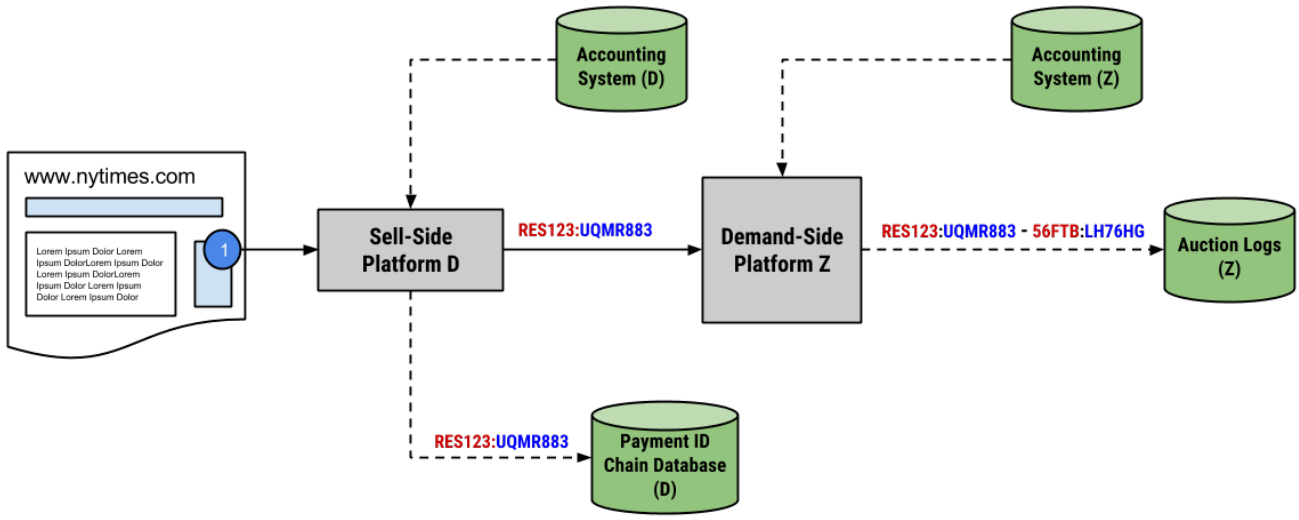
Payment ID Data Governance

Companies should ensure that the Payment ID chains are being captured upon the sale of an impression opportunity such that they are recording their segment in the transaction. These might live in the markup or in a separate database where the company regularly keeps track of transactions occurring through their platform.

In terms of how long a company must keep these records - this is ultimately up to the company's data governance policies. Ideally, payment ID chains should be kept for a long enough period of time such that a company can begin to accumulate patterns.

The point at which the payment ID chain can be recorded will most likely depend on how the company defines the billing event.

Figure 4



Supply Side Implementation

OpenRTB Implementation

We are recommending that OpenRTB represent the Payment ID chain as single string. Bidders will be able to create easy-to-define logic that blocks bidding on any bid request that contains an Inventory Source ID or Intermediary ID that is on their blacklist. Bidders can also record the chain for post-buy analysis.

The below table demonstrates how Payment ID should be expressed in OpenRTB v2.5. The “pchain” attribute is added to the Source object (referenced in section 3.2.2 Object: Source of OpenRTB 2.5).

Attribute - Type - Description

pchain - string; recommended - Logical Payment ID chain string containing embedded syntax described in the TAG Payment ID Protocol document version 1.0

Logical Payment ID chain string containing embedded syntax described in the TAG Payment ID Protocol document version 1.0

To use it in prior v2.x versions and stay compliant, the “pchain” field would need to be added as an extension, “ext”, within the top-level bid request object rather than directly.

> Example chain containing one node
> "pchain": "XYZ01234:ABCD56789",
>
> Example of a chain containing two nodes
> "pchain": "XYZ01234:ABCD56789-STUV543:AA111",
>
> Example of a chain containing two nodes with missing information
> Note the intermediary is not provided in the second node.
> "pchain": "XYZ01234:ABCD56789-:AA111",

Seller technologies representing or selling media inventory must be able to execute on three main tasks:

1. Operate a working system whereby payment identifiers are mapped to the accounting records of partners.
2. Generate and append new Payment ID chain segments where a chain does not exist when:
3. The Exchange/SSP has a direct relationship with the end publisher and is initiating the chain, ***or***,
4. A previously existing Payment ID chain has been compromised and lost.
5. Pass forward a Payment ID chain to the next downstream party without modifications to any preexisting nodes within the chain.

Flow of Inventory

In the diagrams below we illustrate how identifiers should be assigned by upstream intermediaries and passed along to downstream parties.

With transparency into these supply paths, media buyers can take effective proactive remedial action (blacklisting problematic paths where fraud has been detected) and effective reactive remedial action (requesting refunds for inventory previously bought from these paths). Each entity passes on the information it gets, its understanding of where the inventory is coming from, as well as the self-issued Intermediary ID. If used correctly, you can see when fraud appears and cut it off.

Figure 5

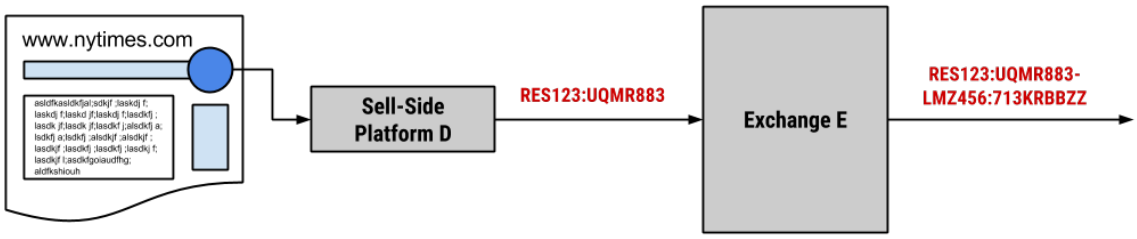
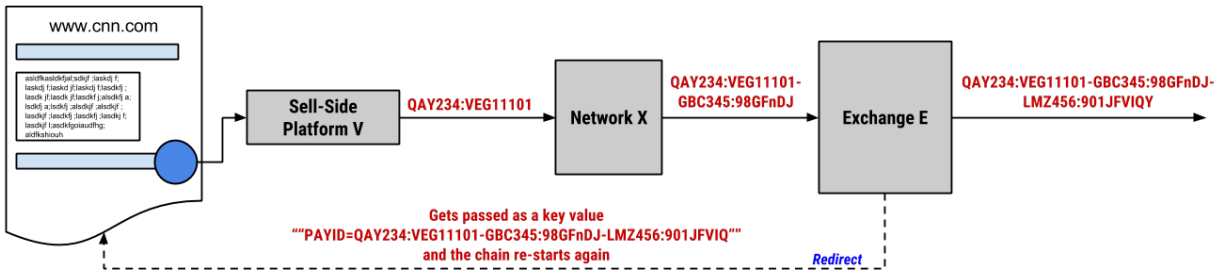


Figure 6 with a highlighted redirect scenario:



Companies in the supply paths in the above figures and their identifiers:

Name	ID
NY Times (Inventory Source ID *from SSP-D*)	UQMR883
CNN (Inventory Source ID *from SSP-V*)	VEG11101
SSP-D (Intermediary ID)	RES123
SSP-D (Inventory Source ID *from Exchange E*)	713KRBBZZ
SSP-V (Intermediary ID)	QAY234
SSP-V (Inventory Source ID *from Network X*)	98GFnDJ

Network X (Intermediary ID)	GBC345
Network X (Inventory Source ID *from Exchange E*)	901JFVIQY
Exchange E (Intermediary ID)	LMZ456

The two complete supply paths for inventory sold through Exchange E are uniquely identified with the following concatenated identifiers forming unique payment ID chains:

1. RES123:UQMR883-LMZ456:713KRBBZZ
2. QAY234:VEG11101-GBC345:98GFnDJ-LMZ456:901JFVIQY

Flagging Events

Missing Identifiers Where One is Expected to Exist

If a publisher network starts the chain; any intermediary that does not have a direct relationship with the publisher will append to the chain (unless it was missing). Once a relationship is established, if you start noticing inventory missing identifiers, this should be a flagging event.

This requires some mechanism where the system is able to recognize that the network participates and should send an id. So, knowing that a specific network is supposed to initiate a chain is crucial. When a chain was expected to exist and has disappeared the exchange/SSP has to create anew.

“-XYZ01234**:**ABCD56789”
“:XYZ01234**:**ABCD56789” (one missing node)

Example of a chain containing two nodes with missing information
Note the intermediary is not provided in the second node.
"pchain": "XYZ01234:ABCD56789-:AA111"

Incorrect identifiers / Spoofed Identifiers

If spoofed (someone pretends to be someone they are not) you can see the inconsistency in the pattern of IDs, traffic, etc. to identify a spoofed source.

Self-issued IDs can be spoofed -- TAG is recommending that intermediaries use their TAG-IDs and established links to internal systems for monitoring consistencies in IDs and payment information.

Mapping Payment Identifiers to Accounting Records

Existing internal IDs may be used as payment identifiers for the inventory source provided these IDs meet the identifier requirements detailed in the section above. If existing internal IDs do not meet the requirements, inventory source IDs must be generated anew and linked 1:1 to each inventory source.

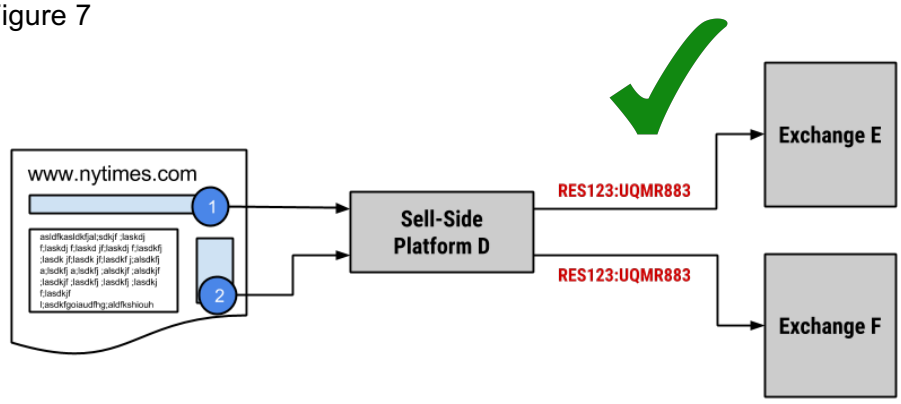
Dependency: Successfully mapping Payment identifiers to individual inventory sources enables the company offering the impression for auction to generate a new Payment ID chain using the syntax

What are the systems involved for linking?

Seller technology should ensure that supply sources have an identifier that is associated with their inventory and with their accounting information.

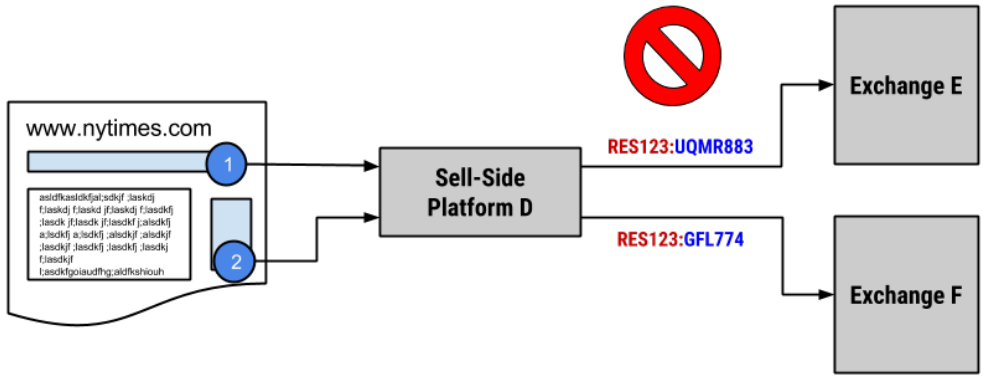
Compare Figure 7 and Figure 8 below:

Figure 7



Sell-Side Platform D (SSP-D) is offering two impression opportunities for sale to Exchange E and Exchange F. SSP-D provides both exchanges with the same Payment ID chain where their self-assigned Intermediary ID is "RES123" and their Inventory Source ID for NY Times "UQMR883."

Figure 8



Sell-Side Platform D (SSP-D) is offering two impression opportunities for sale to Exchange E and Exchange F. SSP-D provides each exchange a variable Payment ID chain where they do not use a consistent Inventory Source ID for NY Times ("UQMR883" vs. "GFL774").

Relevant scenarios

Redirects

This section concerns passing along Payment ID chains across server-side connections between a seller technology and exchange. The main challenge facing companies in this scenario involves maintaining the chain and passing forth data up towards the buyer.

Widgets and other Embedded Content Providers

The publisher has a relationship with the advertising widget and is paid by the widget provider. In scenarios where there is no way to know from payment ID if something is an ad injector, companies will have to build up reputations for ID chains in order to assess the quality of inventory.

Demand Side Implementation

On the opposite side of seller technology is buyer technology. Bidders that enable advertisers and agencies to connect to ad exchanges in order to purchase impression opportunities must be able to:

1. Recognize Payment ID chains in bid requests.
2. Identify segments of the chain for pre-bid decisions and any pertinent chain investigation.
3. Consume the Payment ID chain for recording, making sure to append their own ID pair to the end of the chain.

Recognize Payment ID chains in bid requests

To recognize Payment ID information in OpenRTB v2.5, the bidder should be able to recognize a pchain attribute within the Identifier object at the bid request level. This field is delivered as a string so a DSP should treat this as a parsable string with distinct parts to it.

In order for the segments of the chain to contain meaning, the DSP must have an existing accounting system that maps Intermediary IDs to their internal partner records.

Identify segments of the chain for pre-bid decisions and any pertinent chain investigation

Successfully mapping Payment identifiers to individual inventory sources enables the company buying the impression for auction to enable for pre-bid decisions whereby a buyer on a DSP platform can modify their buying practices. This may entail bid prices, blacklists, etc.

Consume the Payment ID chain for recording

When the bidder wins the auction for the impression opportunity, the chain should be ‘recorded’ with the bid response logs. The chain should be closed by the Intermediary ID belonging to the bidder that won the impression opportunity.

Recording

Companies should ensure that the Payment ID chains are being captured upon the sale of an impression opportunity such that they are recording their segment in the transaction. These might live in the markup or in a separate database where the company regularly keeps track of transactions occurring through their platform.

In terms of how long a company must keep these records - this is ultimately up to the company’s data governance policies. Ideally, payment ID chains should be kept for a long enough period such that a company can begin to accumulate patterns.

Examples of this in practice my entail assessing for the presence of any deltas in ID chain presentations. These can be used to create aggregated reputation models to ingest and flag data on changes in Payment ID chains.

A reasonable starting point for Payment ID chain storage may be 180 days. For purposes related to building reputation, it may not be necessary to keep the chains for as long a period. Companies may consider building data models that utilize the data to act on it. For purposes related to billing, it may be necessary to reference the chains and history of impression opportunities attached to them (e.g. for referencing with law enforcement).

The point at which the payment ID chain can be recorded will most likely depend on how the company defines the billing event.

Opportunities for Capturing the Payment ID Chain

Additional points for capturing Payment ID chains may be at the point of the bid request or via an optimization utilizing win notifications and the existence of a defined macro. Depending on a particular organization's practice for defining the billing event - recording payment ID chains should at least be tied to these events. Both of these use cases for capturing the chain can support efforts to assess quality of inventory and performance (e.g. "win rate by pchain"), amongst others.

Win Notification and Macros

In order for the winning bidder to consume the Payment ID chain, a Payment ID macro should be supported in the "nURL" and "adm" parameter.

${PAY_ID} – Full Payment ID Chain

Prior to calling a win notice URL, search the specified URL for the defined macro and replace it with the appropriate data.

Appendix A: Examples of Acceptable Identifiers