TSX Smart Order Router

Business Design Guide

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For set-up and configuration of TSX SOR, including cancel on disconnect, jitney mappings, route rankings, and trouble-shooting, please contact Vendor Services at vendor_services@tsx.com, 416-947-4705.

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Chapter 1 Introduction

The TSX smart order routing (SOR) solution is a turnkey, centralized service offering marketplace-neutral, customizable routing algorithms designed to meet regulatory best-price obligations. Regardless of how your desk connects to the equity exchanges, the TSX smart order router allows you to leverage your existing TSX/TSXV/TMX Select order entry connections to access all visible marketplaces, minimizing technology, connectivity, and data costs. The TSX SOR gives customers the ultimate flexibility to set routing decisions by firm and/or for each individual trader (by session) and dynamically control key routing decisions as needed for each order. This flexibility is further enhanced with the addition of the Automated Jitney service. SOR users now have the option of automatically giving up their trades to another broker ("Jitney Provider") on marketplaces they are not a member of. TSX SOR is the definitive smart order router in Canada.

1.1 Key Features

1.1.1 Advanced functionality

Customers no longer need to choose between a router that generates iterative orders as it "probes" the top of book vs. a router that generates orders to simultaneously "slice and spray" to multiple marketplaces. Both approaches are valuable depending on market conditions. TSX SOR is the first Canadian offering to support both iterative probing and slice and spray routing strategies. Layered onto these two approaches TSX SOR offers even more advanced routing features so the SOR user can preference marketplaces, intelligently route to hidden liquidity on TSX while maintaining any order attributes unique to each marketplace.

1.1.2 Automated Jitney Service

The TSX Smart Order Router offers Automated Jitney, a service that utilizes leading-edge routing algorithms to execute your orders at the best price across all protected Canadian markets, without subscribers having to join all marketplaces. This service automatically gives-up your trade directly to another broker, your Jitney Provider, if the best price is available on a marketplace where you are not a subscriber.

1.1.3 Low latency and high throughput

The TSX SOR gathers feeds directly from protected Canadian marketplaces to quickly find the best price at every depth. TSX SOR has been designed for initial throughput of 10,000 orders per second and average latency in a low single digit millisecond range. TSX SOR architecture allows for linear scalability with no latency impact.

1.1.4 Order Protection Rule (OPR)

TSX SOR will protect subcribers from trading through the better-priced quotes on all protected marketplaces that are accessed through the TSX SOR, with the use of a best-price compliant routing algorithm. Users also have the option of using other marketplaces' Order Protection rule options by directing them to the marketplace of choice. For more details, see the section on "Order Protection Rule" on which OPR options on each marketplace is supported.

1.2 Routing Algorithms Offered

The following is a summary of all the available routing algorithms. For detailed flows, see Routing Logic section.

Routing Algorithm	Description	Best-Price Compliant
Slice and Spray	Router slices the parent order once, based on a snapshot of displayed quotations in all supported marketplaces and iceberg volumes on the TSX book. The router will contemplate as many price levels as needed to exhaust the volume of the order, up or down to any included limit price, and send a single order to each marketplace at the deepest price point. Child orders sent to marketplaces other than the preferred Booking Marketplace will be marked IOC bypass, and will be priced to walk down each marketplace's book. Unfilled portions of orders are booked on the Booking Marketplace. This algorithm is ideally suited to clients seeking fast executions of the entire order. Its simultaneous nature allows it to interact with multiple pegged posted orders, while still taking advantage of any hidden liquidity at TSX/TSXV.	Yes
Iterative Probe	Iterative Probe is designed to go after each liquidity source sequentially, sending an IOC order for all remaining order volume to the marketplace with the best visible price (in case of a price-tie, active ranking table is used to determine priority). A new snapshot is taken after execution(s) against the first price level, and another child order is sent to exhaust the next available visible price level. This process continues until the volume of the parent order is exhausted, or until the limit price is reached. The Iterative algorithm tries to probe the market for hidden or reserve quantity. This algorithm has the potential to execute against hidden orders on Away Marketplaces, however it is slower then a Slice and Spray order and may be adversely impacted by refresh feature of pegged orders.	Yes

Routing Algorithm	Description	Best-Price Compliant
Directed	Order is routed to execute/book on the specified marketplace only.	No
None (pass through)	Excluded from Smart Order Routing Service	No

1.3 Marketplaces Connected

TSX SOR is connected to all Canadian, visible, protected marketplaces. At this time, they are:

- Toronto Stock Exchange and Toronto Venture Exchange (TSX and TSXV)
- TMX Select
- Chi-X
- Pure
- Omega
- Alpha

Additional marketplaces will be added as needed.

Chapter 2 Set-Up and Configuration

2.1 Configuration

Each firm will have at least one session bundle in order to connect to TSX SOR. Firms can choose to have more than one session bundle if desired, and assign users to different session bundles. The table below outlines the parameters controlled by the SOR user, at a firm-wide or session bundle level or at the individual order level. The Default market priority is discussed in more detail in the next section.

Table 1: Summary of User-Controlled Parameters

	Controlled by Firm	Controlled by session	Controlled by order
Default market priority for active orders (Active ranking table)	Yes	Yes	No
Default market priority for booking orders (Passive/booking ranking table)	Yes	Yes	No
Routing algorithm approach	Yes	Yes	Yes
Directed orders	Yes	Yes	Yes

Changes to default/ranking parameters controlled by firm or by session are typically effective for the next business day.

2.2 Marketplaces

TSX SOR users will be properly configured and enabled to access every marketplace where they have a membership or a jitney relationship. TSX SOR subscribers are responsible for ensuring that appropriate Trader IDs are set up and validated at all away venues they intend to access. TSX will facilitate the set-up on each marketplace. If the TSX SOR encounters a quote from a marketplace to which the broker does not have access (not a member and does not have a jitney relationship set-up), the order will skip the quote and trade through it.

2.3 Default Market Priority

All routing algorithms require the SOR user to rank marketplaces in order to make the proper routing decisions. The default marketplace priority is created by SOR users when the SOR user initializes SOR Smart Order Routing Service setup. It allows the SOR user to rank each marketplace they have access to, controlling the sequence in which they are accessed by active orders - all else being equal.

2.3.1 Active Ranking

The marketplace ranking in the "active" priority table will determine the order in which the marketplaces are accessed for active flow. Active ranking will also be used to determine the priority in case of price-ties.

Marketplace priority ranking cannot be set on an order-by-order basis (without the use of a directed order). Marketplace priority ranking is managed by the TMX Trading Services team, and any updates are typically effective for next business day.

2.3.2 Passive/Booking

All unfilled or non-executable orders are booked on the "Booking Marketplace". If the Booking Marketplace is not available, the marketplace ranking in the passive (booking) ranking table will determine the order in which the marketplaces are accessed for booking residual quantity from the smart-routed order. For regulatory routing, the "Booking Marketplace" is TSX/TSXV or TMX Select, as selected by the user.

How to use it:

TMX Trading Services will set SOR user's active ranking for SOR user's session bundle based on SOR user's instructions. Once complete, they will provide the SOR user with a confirmation via email.

Example:

ACTIVE Ranking Table

RANK	Code	Marketplace	
1	"X"	TSX	← Top Ranked
2	"P"	PURE	
3	"C"	CHI-X	
4	"O"	OMEGA	
5	"A"	ALPHA	
6	"Y"	TBD	

In this example, TSX is the top ranked marketplace.

In case of ties on price for active/marketable orders, a routing priority will be given to TSX/TSXV, followed by Pure, Chi-X, Omega and Alpha. However, if Chi-X and Omega both had 200 shares bid at the best price level, and all other markets had inferior top-of book price levels, a 200-share sell order would execute on Chi-X because it is ranked higher in the active marketplace priority table. Likewise, a 300-share order would fill 200 shares from Chi-X, and 100 shares from Omega.

If the order (or remaining portion) is not marketable, the Booking Marketplace would be used to determine where to send it. If the Booking Marketplace is TSX/TSXV, any unfilled (passive) orders or portions thereof would book at the TSX/TSXV. If

TSX/TSXV is unavailable, the orders would book on TMX Select, because it is the back-up Booking Marketplace.

2.4 Default Routing Algorithm

Any of the routing algorithms offered can be chosen as the default for each SOR session bundle user profile. This can be overridden on an order by order basis by using the ExchangeAdmin tag.

How to use it:

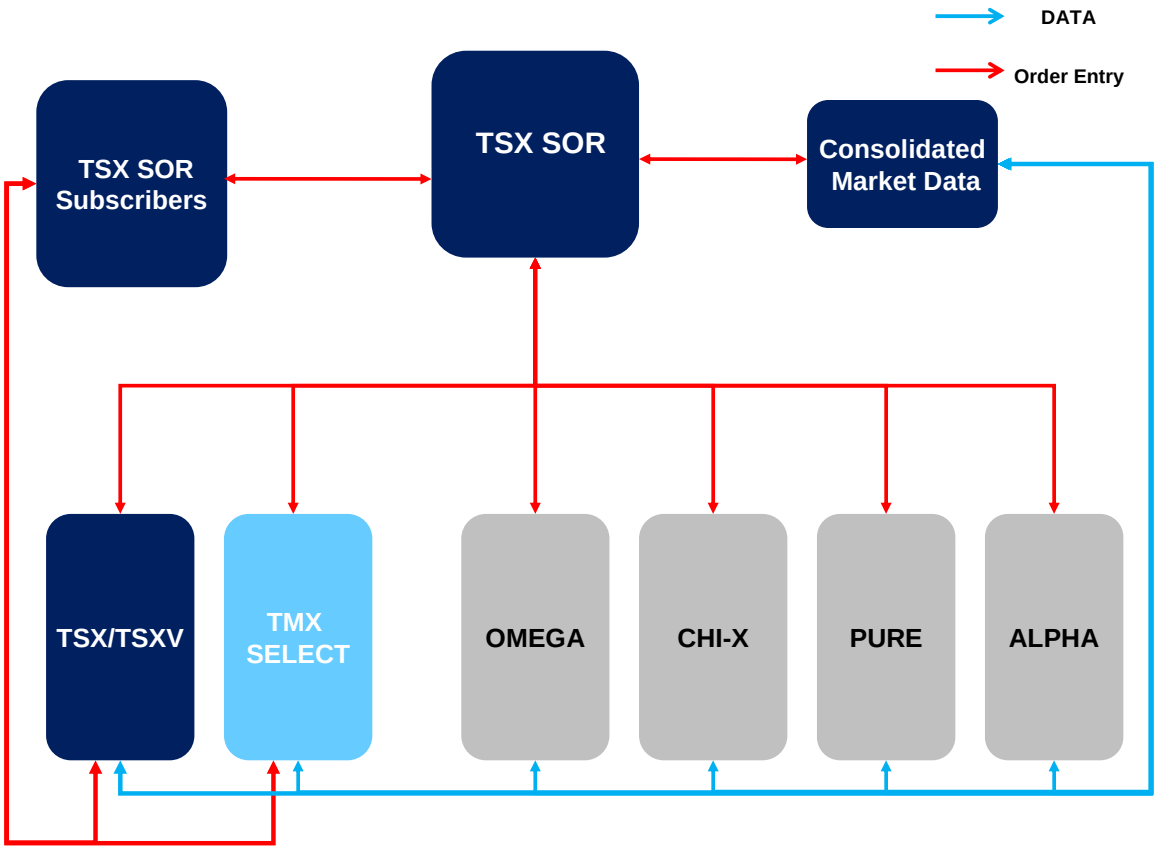
TMX Trading Services will set the SOR default routing algorithm for each SOR user's session bundle based on SOR user's instructions. Once complete, they will provide the SOR user with a confirmation via email. Users can also use the ExchangeAdmin tag to choose the routing algorithm and marketplace to send each order to, which will override the default. If this tag is not sent, then the default will be used. See Appendix A and B for details on how to use these tags.

2.5 Automated Jitney Set-up

For jitney set-up, please see section on Automated Jitney.

Chapter 3 Usage

3.1 System Diagram



1. TSX Customers subscribing to TSX SOR submit orders through TSX SOR but can also continue to maintain session bundles to submit orders directly to the TMX Gateway, which routes directly to TSX, TSXV or TMX Select
2. TSX Customers preferring not to use TSX SOR will have their TSX/TSXV/TMX Select-bound orders routed directly to the TMX Gateway
3. For directed orders, TSX SOR routes directly to the other marketplaces.
4. For smart-routed orders, TSX SOR uses market data, as well as customized logic, to determine how and to whom order is routed.
5. Execution messages are sent back to the TSX Customer by TSX SOR.

3.2 Connectivity and Protocol

TSX SOR customers will be able to leverage and benefit from existing connectivity and protocols, with support for both STAMP and FIX. SOR subscribers can send orders using existing TSX STAMP and/or FIX specification, and TSX SOR will translate this into the appropriate protocol for each market place.

The following modifications may be necessary to process trades routed to other marketplaces.

1. IP address change (one-time set up only)
2. New optional custom order types using ExchangeAdmin tag, position 5 – for details see Appendix A (FIX) and Appendix B (STAMP)
3. Fills and booked order messages will be indicated using ExchangeAdmin tag, position 6 – for details see Appendix A (FIX) and Appendix B (STAMP)

The Protocol Mapping for most tags is identical for orders submitted through TSX SOR vs. orders submitted directly through TMX Quantum Gateway. Below outlines the tags which exhibit different behavior to allow for reconciliation of orders routed and filled at multiple marketplaces.

- **ExecID (FIX Tag 17) or OrderNumber (STAMP Tag 40)** - This field contains SOR's Unique Order #, which is a SOR generated identifier attached to the parent order when it first reaches SOR and which is subsequently appended to all Child Orders, Fills, CXLs, etc.

- **TSXSOROrderID1 (STAMP Tag 511/FIX Tag 7710)** – This field contains marketplace assigned OrderID

- **TSXSOROrderID2 (STAMP Tag 512 /FIX Tag 7711)** – This field contains marketplaces assigned ExecID

- **ExchangeAdmin (STAMP Tag 380) / TSXExchangeAdmin(FIX Tag 6780)** – This tag is normally only used on the outbound messaging by the TSX/TSXV/TMX Select. However, SOR clients have the option of utilizing this tag inbound to indicate/override routing preferences.

Note 1: TSXSOROrderID1 & TSXSOROrderID2 contain a maximum of 15 alphanumeric characters. If the original OrderID or ExecID is longer than this it may need to be shortened accordingly.

Note 2: ExchangeAdmin(STAMP)/TSXExchangeAdmin(FIX) includes Booking marketplace information (in position 6) for orders booked by SOR to allow clients to reconcile & determine booking destinations. Booking Marketplace is not indicated for orders submitted directly to TMX gateway, as the booking destination is always TSX/TSXV.

Note 3: ExDestination(FIX) / TSXExDestination(STAMP) is used to show that TMX Select is the booking marketplace for orders submitted directly to the TMX gateway. However, for orders booked through TSX SOR, the ExchangeAdmin(STAMP) / TSXExchangeAdmin(FIX) tag will be used in its place to keep consistent with TSX SOR protocol.

3.3 Order Entry and Management

TSX SOR utilizes the concept of parent and child orders, where orders submitted to TSX SOR by subscribers are considered to be parent orders and the orders generated by TSX SOR and sent to execution venues on behalf of the parent order are known as child orders.

The router allows users to perform order entry using existing, familiar standards (i.e. TSX STAMP and TSX FIX) and manages reconciliation with the unique order features of other markets. Effectively, this means that TSX SOR manages both the parent order and the child orders derived from each parent order for the all SOR subscribers. The router also links back and reconciles child orders to the parent order via the TSX SOR Unique Order Number that is created by TSX SOR before any orders are routed to the various marketplaces. Since the router manages all direct interactions with marketplaces, all the client needs to do is to keep track of the parent orders assigned by TSX SOR. An additional Order Number field is provided if the subscriber wishes to create a parent order number in addition to the order number created by TSX SOR.

3.3.1 FIX users

FIX Protocol commonly uses an “Ack” or Acknowledgment response as a form of notification that the order was received by the trading system. TSX SOR uses the Ack approach to confirm that indeed the order was received and to relay the original TSX SOR Unique Order Number to the client. Users will get 2 acks:

1. An initial pre-ack will be sent when SOR first gets the order. At this point, TSX SOR is in the process hunting liquidity but has not sent any orders yet, so no order number is given.
2. Once orders are sent and the residual is posted on TSX/TSXV/TMX Select, the TSX/TSXV/TMX Select order number is known, and this is sent back in a second message (re-instatement message) to the user.

All subsequent reporting on child orders will include the parent order number as a reference.

3.3.2 STAMP users

TSX/TSXV’s STAMP protocol nomenclature uses a Booked Message issued by the trading engine in a similar fashion to the Ack concept commonly used in FIX.

To mimic conventional behaviour of STAMP TSX SOR generates a STAMP booked message upon receipt of the order into the SOR. This is necessary since the client routing an order to SOR expects to receive a “TSX-like” Booked message even if the order is ultimately routed to destinations other than TSX/TSXV. The Booked message generated by SOR includes the unique SOR parent order number, which will be included in all subsequent trade reporting, related to that order.

For greater clarity, the TSX SOR protocol/behaviour described above is unique from direct order entry via STAMP into TSX/TSXV/TMX Select trading system. Despite receiving an initial "Booked" message generated by SOR it is possible that the order will never actually be booked on a destination (i.e. the routing outcome may potentially result in an immediate fill, cancel or a reject).

3.4 Monitoring and Investigative Tools

The TMX Trading Services desk will provide report details in the event that regulators request information for trade through investigations. The routing decisions are captured for each child order. When enquiries arise, TMX Trading Services will be able to indicate the routing decisions and the specific quote each order was routed against.

3.5 High Availability/Disaster Recovery

3.5.1 High Availability

TSX SOR architecture is designed with full High Availability contingencies. The TSX SOR is able to maintain service in any case of any single hardware and or software failure via multi-redundant architecture. Any failover due to a hardware/software incident, while being visible to the TSX Customers, will not require TSX Customer manual intervention to reconnect.

3.5.2 Disaster Recovery

Separate non-SOR bundles can be maintained by POs to mitigate outage to SOR or SOR connectivity due to a catastrophic event at no extra charge.

3.6 Action Source

SOR subscribers should not submit Action Source on orders to TSX SOR. The Action Source will be "LVA" for all TSX SOR routed orders.

3.7 Clearing/Settlement

Orders routed to & filled on non-TMX Group marketplaces will be handled and will settle via relevant clearing/settlement arrangements made by that marketplace.

Orders that execute on TMX Group marketplaces (TSX/TSXV/TMX Select) will be handled via normal existing settlement arrangements made by TSX/TSXV/TMX Select (i.e. "Special" handling of smart routed orders filled at TSX will not be necessary).

3.8 Cancel on Disconnect / Cancel on Command

Subscribers have the option of turning on the “cancel on disconnect” option for each SOR session bundle. If this option is enabled, any time the session disconnects, all open orders entered through that session will be cancelled automatically, including any child orders associated with that parent order. The TSX SOR OS (Operating System) detects TCP/IP socket disconnects to determine when a session has disconnected. A graceful logoff will not trigger the cancel on disconnect functionality. Clients can connect and start sending orders again at any time. Upon re-connection, unsolicited cancel acknowledgement messages will be sent back for each of the canceled orders during the disconnection, as well as any queued messages that were not sent during disconnection. Please contact Vendor Services to enable the “cancel on disconnect” option for your specific session bundle.

Please note that the “cancel on disconnect” functionality described here is only applicable to FIX SOR sessions. This does not apply to STAMP SOR session bundles nor direct connections to the TSX. For information on “cancel on disconnect” functionality for direct connections to the TSX, please contact your account manager.

If subscribers wish to cancel specific orders, they can call Vendor Services and request open orders to be cancelled. Vendor Services staff have the ability to cancel orders filtered on a number of criteria, including by session, by traderID, and by symbol.

Chapter 4 Routing Logic

4.1 Routing Algorithms – Summary

For descriptions below, the Booking Marketplace refers to the marketplace ranked at the top of the passive ranking table. This is the marketplace where any residual quantity that could not be immediately executed is sent. For example, if TSX/TSXV is the Booking Marketplace, then all other marketplaces other than TSX/TSXV will be considered an Away Marketplace.

4.1.1 Slice and Spray

TSX SOR will have the ability to instantly "slice & spray" each order to multiple marketplaces. If no other marketplace has quotes within the limit price, then the order will post to the Booking Marketplace immediately. Where multiple quotes at various marketplaces exist, the "parent" order is sliced into "child" orders and aggressively sprayed to all price levels up to the limit simultaneously in one pass as follows depending on the marketplace:

- **Booking marketplace:** For immediately executable quantity, child orders sliced and sprayed to the Booking Marketplace are marked IOC (fill any part of and kill remaining) with the order's volume/price set within the constraints of the parent order to equal the marketplace's displayed quote size/price and will include a bypass marker to meet regulatory obligation. The volume will be sized to match the visible the Booking Marketplace displayed quote volume. If there is undisplayed TSX Registered Trader minimum guaranteed fill participation, the bypass marker will not be sent on TSX orders to allow interaction with MGF fills. The remaining quantity will be sent as a separate child order, and will be priced identical to the original parent order and with the same Time-In-Force as the parent order (IOC, Day, etc).

- **Away marketplace:** Child orders sliced and sprayed to marketplaces other than the Booking Marketplace are marked IOC (fill any part of and kill remaining) with the order's volume/price set within the constraints of the parent order to equal the marketplace's displayed quote size/price and will include a bypass marker to meet regulatory obligation. If the marketplace has multiple quotes within the order's constraints all volume will be sent to that marketplace in one child order at the most aggressive displayed quote price. Any child orders routed to other marketplaces that remain unfilled will then be posted to the Booking Marketplace. If a portion of the parent order has already been booked on the Booking Marketplace it will re-aggregate all other child orders that return unfilled from other marketplaces so that it books as one order on the Booking Marketplace rather than multiple booked orders. The time priority of the booked order will be reset each time the volume is increased.

How to use it:

- **As Default:** Choose “Slice and Spray” as your default routing algorithm on your TSX SOR configuration and do not send the ExchangeAdmin tag
- **On each order:** Mark the order as “Slice and Spray” by sending the ExchangeAdmin tag (STAMP tag 380 or FIX tag 6780) with position 5 set to S for “Slice and Spray”.

4.1.2 Iterative

Probing will iteratively route to the top-of-the book to seek hidden liquidity at each marketplace individually. Probing routes SOR orders as follows:

- The Iterative algorithm tries to probe the market for hidden or reserve quantity. It is designed to go after each liquidity source sequentially, sending an IOC order for the entire open quantity to the marketplace with the best visible price (in case of a price-tie, active ranking table is used to determine priority). A new snapshot is taken after execution(s) against the first price level, and another child order is sent to exhaust the next best visible price level. This process continues until the volume of the parent order is exhausted, or until the limit price is reached.
- Any remaining volume is posted or is cancelled if SOR user’s order is marked IOC.
- The Iterative order is slower to execute than the Slice and Spray order, but it has the potential execute against hidden orders on Away Marketplaces.

How to use it:

- **As Default:** Choose “Iterative” as your default routing algorithm on your TSX SOR configuration and do not send the ExchangeAdmin tag
- **On each order:** Mark the order as “Iterative” by sending the ExchangeAdmin tag (STAMP tag 380 or FIX tag 6780) with position 5 set to I for “Iterative”.

4.1.3 Directed Orders

Individual orders can be directed to a specific marketplace when the SOR user wishes to manage SOR user’s best price obligations manually. Directed orders essentially ignore best price routing and are sent directly to the marketplace the SOR user specifies for the order.

How to use it:

Mark SOR user’s order as “Directed” by adding ExchangeAdmin (STAMP tag 380 or FIX tag 6780) to the SOR order with position 5 set to X to direct SOR user’s order to TSX or use the other market identifiers to direct SOR users order to another marketplace (See Appendix A and B for additional details).

4.2 Routing Algorithms - Detailed Logical Flows

In all of the routing algorithms, TSX SOR will only check the marketplaces that the user has been set-up to access, either directly or through a jitney relationship. If the TSX SOR encounters a quote from a marketplace to which the broker does not have access (not a member and does not have a jitney relationship set-up) or the marketplace is currently unavailable, the PO's order will skip the quote and trade through it.

4.2.1 Slice and Spray

Limit Orders

The Slice and Spray Limit order will aggressively access all price levels up to each marketplace's active limit price simultaneously, by making a single pass against the SOR's consolidated order book. The passive portion of the order will be posted to the Booking Marketplace with the limit price and the time-in-force of the parent order.

On order entry, a snapshot of the consolidated order book will compiled and examined by TSX SOR. If there are no quotes within the limit price, then the post to the Booking Marketplace can occur immediately. If there are quotes within the limit price, then they will be analyzed in price-priority order, in the order specified by the active ranking at each price level, and the processing will be as follows:

- For each quote from an Away Marketplace:
  - If a child order has not yet been created for that marketplace, then the TSX SOR will create a new order as follows:
    - Set the quantity of the order to the lesser of the quote quantity or the remaining quantity on the parent order.
    - Set the price of the order to the price of the quote.
    - Set the time-in-force of the order to IOC
    - Add a bypass marker
  - If there is an existing child order to this marketplace, then the TSX SOR will update that existing order as follows:
    - Increase the quantity of the existing order by the lesser of the quote quantity or the remaining quantity on the parent order. Update the quote information captured with the order to indicate the total quote quantity being routed against the most aggressive price.
    - Update the price of the order to the quote price. Note that if we are routing after multiple quotes for a given marketplace, all quantity will be sent in one order at the most aggressive price (Aggressive price is the "deepest" price in the book of a particular marketplace for which Best Price protection applies). This complies with regulatory obligations as all of the child orders for this pass will go out at the same time.

Note: To meet regulatory requirements, TSX SOR will add a Bypass Marker to all Slice and Spray orders routed to remove immediately executable quantity to avoid unexpected interaction with hidden liquidity, except when executing against TSX MGF volume.

- For each Booking Marketplace quote

- If a child order has not yet been created for the Booking Marketplace, then TSX SOR will create a new order as follows:
  - Set the quantity of the order to the lesser of the quote quantity or the remaining quantity on the parent order.
  - Set the price of the order to the price of the quote.
  - Set the time-in-force of the order to IOC
  - Add a bypass marker
  - For MGF-eligible orders sent to the TSX/TSXV only, utilize MGF settings to increase the quantity of the order as appropriate within the bounds of the available quantity on the parent and remove bypass marker.
- If there is an existing child order for the Booking Marketplace, then TSX SOR will update that existing order as follows:
  - Increase the quantity of the existing order by the lesser of the quote quantity or the remaining quantity on the parent order. Use MGF settings to increase the quantity of the order as appropriate within the bounds of the available quantity on the parent.
  - Update the quote information captured with the order to indicate the total quote quantity being routed against the most aggressive price.
  - Update the price of the order to the quote price. Note that if we are routing after multiple quotes for a given marketplace, all quantity will be sent in one order at the most aggressive price (Aggressive price is the "deepest" price in the book of a particular marketplace for which Best Price protection applies). This complies with regulatory obligations as all of the child orders for this pass will go out at the same time.

- Stop when there are no more available quotes or no more available quantity on the parent order
- When done processing quotes, if there is quantity still available on the parent order
  - Create an order to the Booking Marketplace as follows:
    - Set the quantity to the remaining quantity
    - Set the price to the limit price of the parent order
    - Set the time-in-force to the time-in-force of the parent order
  - Note that while there will only ever be one IOC order sent at the most aggressive price for each market during the spray phase, the residual quantity for booking will always be sent as a separate order with the properties of the parent order.
- Submit all orders that were created
- If any of the IOC orders to the Away Marketplaces returns with unexecuted quantity, then that quantity will be handled as follows:
  - If the parent order is in the process of being canceled for any reason, then just treat this quantity as canceled
  - If an order to the Booking Marketplace has been created, then create a cancel-replace request to the Booking Marketplace to increase the quantity of the Booking Marketplace order by the unexecuted quantity and submit the cancel-replace request
  - If an order to the Booking Marketplace has not been created, then create an order to the Booking Marketplace as follows:

- Set the quantity to the unexecuted quantity
- Set the price to the limit price of the parent order
- Set the time-in-force to the time-in-force of the parent order
- Submit the order

- When an order is created to route after multiple quotes, the TSX SOR will capture the fact that multiple quotes were routed against, but will only capture the total size, most aggressive price, and most recent timestamp.

Market Orders

A Slice-and-Spray Market order type will work like the Slice-and-Spray Limit except that there will not be a limit price on the parent order. The main differences are as follows:

- When requesting the consolidated order book, the entire side of the book will be requested as opposed to just the quotes within the limit price.
- When walking down the list of quotes to create orders, continue until there are no more quotes or the parent order quantity has been exhausted.
- Child orders to Away Marketplaces will still always be sent as limit orders with a bypass marker. However, the child order to the Booking Marketplace will be sent as a market order.

4.2.2 Iterative Probe

Limit Orders

Iterative Probe is designed to go after each liquidity source sequentially, sending an IOC order for all remaining order volume to the marketplace with the best visible price (in case of a price-tie, active ranking table is used to determine priority). A new snapshot is taken after execution(s) against the first price level, and another child order is sent to exhaust the next available visible price level. This process continues until the volume of the parent order is exhausted, or until the limit price is reached. The Iterative algorithm tries to probe the market for hidden or reserve quantity.

When examining the set of quotes for a probing limit order, if at any time the only set of quotes remaining within the limit price that have not yet been accessed are from the Booking Marketplace, then the post to the Booking Marketplace can occur immediately. The post to the Booking Marketplace will always be for the current remaining quantity on the parent order, using the limit price of the parent order, and the time-in-force of the parent order. The post portion can occur as soon as there are no quotes within the limit that have not been accessed. Thus, the order type does not have to wait for all quotes to be deleted before posting.

Market Orders

This works similar to the limit orders, except when sending the post order to the Booking Marketplace, a market order will be sent instead of a limit order.

4.2.3 Directed

The order is sent directly to the specified marketplace destination.

4.3 Immediate Or Cancel (IOC)

When a marketable and/or non-marketable order is routed (from a routing algorithm) to a marketplace other than the Booking Marketplace, the order will be converted into an IOC duration to ensure that available portion is immediately filled or returned to be booked at the Booking Marketplace. For Slice & Spray routing algorithm orders sent to the booking marketplace, only the first spray order based on the available quotes will be sent as IOC. The residual quantity will be sent at the parent order's limit price for booking.

4.4 Market Hours

Smart Order Routing will be applied to all orders placed during TSX/TSXV regular market hours (currently 9:30AM-4:00PM EST).

Prior to the open (between 7:00AM and 9:30AM), the TSX SOR will treat all orders as directed orders to the TSX/TSXV.

The TSX SOR will not consider a symbol group open until it has received notification of the official opening of each symbol group of TSX/TSXV via the MSCS feed. Prior to this, orders are treated as pre-market and all are directed orders to the TSX/TSXV. However, if an order is sent to TSX/TSXV during the opening session (i.e. after "pre-open" & before "open"), it will be rejected.

After market close (4:00PM), all orders will be treated as directed orders to the TSX/TSXV. SOR will maintain a mapping between symbol and symbol group.

TSX SOR users can direct orders to marketplaces open outside of regular trading hours (9:30AM-4:00PM EST). If the market is open and accepts orders at that time, it will book or trade according to that marketplace's rules.

4.5 Eligible Securities

Only securities traded on at least two protected Canadian marketplace are included in TSX SOR Logic. Securities listed on TSX/TSXV and not tradable elsewhere in Canada will be processed by TSX SOR as a pass-through.

SOR will query each marketplace to determine symbol eligibility & quote. If a marketplace quotes a security, then it will be assumed that marketplace trades that security.

Orders that are directed by a TSX SOR user to non-TSX marketplaces will be forwarded to that marketplace without regard to quote/eligibility. It will be up to the marketplace to reject an order in a security it does not trade.

4.6 Halts / Freezes

TSX SOR will handle Halts and Freezes. They are defined as follows:

- **Halted** – Symbol is halted for all marketplaces (Note: TSX/TSXV still accepts orders during a halt, but TMX Select does not)
- **Frozen** – Symbol is frozen just on the marketplace on which this freeze notification was received (Note: TSX/TSXV/TMX Select rejects orders during a freeze).

MSCS and other feeds will indicate a current status for the symbol. This includes, but is not limited to, the following:

- **Halted**
  - TSX SOR orders will be passed through to the TSX/TSXV
  - Directed orders will be passed through and marketplace can reject if applicable
- **Freeze**
  - Directed orders to other marketplaces will be passed through and marketplace can reject if applicable
  - If order is directed to TSX/TSXV and TSX/TSXV is frozen for that symbol, TSX SOR will reject the order.
  - If a marketplace other than TSX/TSXV is frozen for a symbol, TSX SOR will treat this as if that route is down for that symbol and TSX SOR logic will continue as normal
  - If the TSX/TSXV is frozen for a symbol, TSX SOR will treat this as if TSX/TSXV is down for that symbol and TSX SOR logic will continue as normal to other marketplaces.

4.7 MGF / Oversizing

TSX SOR will exhaust applicable MGF (minimum guaranteed fill) quantities before sending an order to an alternative marketplace (except for directed orders).

MGF will be handled as its own feature whereby the TSX SOR will over-size TSX for appropriate client orders based on MGF quantities. MGF applies only to TSX securities (not TSXV securities).

TSX SOR does not have knowledge of any information not available publicly, such as iceberg quantities and completely hidden order types (e.g. Dark Limit and Dark Mid-Peg).

4.8 Cancel / CFO

Routing logic and handling for processing of CXL/CFO requests will be consistent with TSX Customers' indicated routing logic.

For directed orders, cancel-replace operations will be passed through to the marketplace that received the order and a cancel-replace will not change a directed order to a TSX SOR order.

For TSX SOR orders, if the only open child order is the posted order to TSX/TSXV/TMX Select and a cancel-replace operation comes in, TSX SOR will operate as follows:

- **Quantity reduction only –** TSX SOR sends a CFO through to TSX/TSXV/TMX Select
- **Quantity increase** – TSX SOR follows the price rules below and sends cancel-replace through to TSX/TSXV/TMX Select or re-enter TSX SOR logic
    1. Price change that would not be through a quote from a non-TSX/TSXV marketplace (with or without quantity change) – TSX SOR sends cancel-replace through to TSX/TSXV/TMX Select
    2. Price change that would be through a quote from a non-TMX Group marketplace or a change to a market order – TSX SOR cancels the TSX/TSXV/TMX Select posted order and re-enters the TSX SOR logic

For the TSX SOR orders, if still in the middle of executing the routing algorithm when a cancel-replace is received, TSX SOR will operate as follows:

- TSX SOR cancels current operation and any non-IOC child orders and re-enters TSX SOR logic

Chapter 5 Handling of Different Order Types

5.1 Routing of Order Types

As part of connectivity efforts to non-TSX/TSXV marketplaces TSX SOR will route only order types which are eligible for “best price” routing. Orders ineligible for best price routing will be passed-through to TSX/TSXV (unless explicitly directed to another marketplace).

For TSX Customers who are not explicitly marking their orders in terms of directed vs. special, the TSX SOR will look at the order type to determine if the order is TSX SOR-eligible or not. Limit and market orders will use smart routing logic. All other order types will be considered a directed order to the TSX/TSXV.

All TSX/TSXV-eligible terms orders incompatible with other marketplaces (currently, any order that is not Market/Limit/Short) will forgo routing logic and be booked on TSX/TSXV (e.g. on-stop orders – see note below for additional information). Any orders that are not TSX/TSXV-eligible may be rejected by TSX SOR. TSX/TSXV orders that are not supported through TSX SOR (e.g. orders not listed in Table 2, such as MBF, Post-Only, Self-Trade Prevention, Dark) will be treated as regular orders. They will smart-route if sent to a routing strategy, but tags specific to the order type are ignored and not passed to booking venue. Thus, the remainder of the order not immediately executed will be booked on the booking venue as a regular order without the special tags. See table below for a summary of order types supported by TSX SOR and the routing decision associated with it.

Note: Smart routed on-stop orders that are supported by TSX will be redirected by SOR to TSX, without “smart routing”. At the present time, if the TSX/TSXV bound on-stop order is subsequently triggered, but does not result in a fill and thus becomes a conventional limit order, SOR customers may cancel and replace the order at their discretion but will not be able to use the CFO function.

Directed on-stop orders will be directed to the specified marketplace with no additional eligibility validation. Unsupported Stop orders may be subsequently rejected.

Table 2: Supported Order Types

Order Types / Feature		Alpha	Chi-X	Omega	PURE	TSX/TSXV	TMX Select	Subject to Smart Routing?	Comments
Order Types	Anonymous	X	X	X	X	X	X	Y	
	Basket				X	X	X	N	
	Price Improvement Inside Limit Order	X						Y	
	Limit	X	X	X	X	X	X	Y	
	Market	X	X	X	X	X	X	Y	
	Minimum Guaranteed Fill (MGF)					X[1]		Y	
	Short Sales	X	X	X	X	X	X	Y	Refer to section 5.3 Short Sales for details
	On-Stop	X			X	X		N	Order will be directed to TSX. Triggered on-stop orders can not be CFO'ed – they must be cancelled and re-entered.
	Settlement Terms	X			X	X		N	
Order Duration	All-or-None (AON)	X	X	X				Y	Refer to section 5.4 for details – this behaves a bit differently from normal routing
	Fill-or-Kill (FOK)	X	X	X	X	X	X	Y	
	Immediate-or-Cancel (IOC)	X	X	X	X	X	X	Y	
	Good Till Day (GTD)	X[2]			X[2]	X		Y	Booking is supported for STAMP orders on TSX/TSXVonly
	Good Till Cancelled (GTC)	X[2]		X[2]	X[2]	X		Y	Booking is supported for STAMP orders on TSX/TSXV only
	Good for the day (DAY)	X	X	X	X	X	X	Y	
Other	Mix Lot/Odd Lot Orders	X			X	X		Y	Board lot portion only will be routed. Odd lots are directed to TSX/TSXV.
	Pre Open/Extended Day	X	X		X	X	X	N	
	Jitney	X	X	X	X	X	X	Y	
	Order Protection	X	X	X		X	X	Y	Orders sent to TSX SOR use the "Route-Out" option and any other OPR instruction is ignored. See Order Protection Rule section for details.

[1] not applicable to TSXV
[2] Order type is available on marketplace, but SOR does not support booking this order type on that marketplace

5.2 Board Lots and Odd/Mixed Lots

TSX/TSXV Board Lots are a function of the previous day's closing price and are as defined in UMIR. Currently, they are: 1000 shares if <$0.10, 500 shares if >=$0.10 and <$1.00, 100 shares if >=$1.00.

Odd lot orders and odd portions from mixed lot orders will be sent directly to TSX/TSXV, as they are not subject to Best Price obligation. A mixed lot order will immediately send the odd lot portion to the TSX/TSXV and will route the board lot portion based on the best price obligation. All odd lots resting on the TSX/TSXV book are treated as AON. They are part of a separate book and do not interact with incoming board lots.

***Note:** Passive board and odd lot orders are always booked on a single venue. However, a passive mixed lot order may actually book on two different venues if TSX/TSXV is not the top ranked Booking Marketplace. In this case the odd portion of a mixed lot would book on TSX/TSXV, and the board lot portion would book on the top ranked Booking Marketplace specified by the customer.

5.3 Short Sales

A short sale is an order to sell shares that are not owned. For securities subject to the UMIR short sale price test, the sale must be made on an up or an even tick (at a price equal or greater than the most recent TSX trade price). This rule does not apply to stocks dually listed in U.S. or ETFs. For all exemptions, please see UMIR 3.1. TSX SOR supports a short-exempt flag to indicate the symbol is not subject to the short-sale tick restrictions.

TSX SOR will receive trades from all marketplaces and will be able to calculate the current permitted short sale price for any given marketplace. The TSX SOR order types will operate as before, but when examining each quote will determine if it can be accessed based on the permitted short sale price for that marketplace. As soon as an order encounters a quote that it cannot access due to short-sale restrictions, then the order type will not trade beyond that price level, and when that price level is exhausted, any remaining quantity will be sent to the Booking Marketplace as a short-sale order with the attributes of the parent order. The order may execute on that Booking Marketplace according to their short sale handling rules. Please reference each market place's documentation for specifics on how they handle short sales after an order is sent to them.

5.4 FOK (Fill and Kill), AON (All or Nothing) and Min Qty (Minimum Quantity) Orders

TSX SOR will route FOK board lot orders to a single marketplace if that marketplace offers best price for the entire quantity. Else, the order will be routed to TSX/TSXV,

unless filling of the order would result in a trade-through violation in which case the order will be rejected.

FOK mixed lot orders will be sent through to TSX/TSXV if execution of the board lot portion would not result in a trade-through violation. Else, the order will be rejected.

AON and Minimum Quantity orders are no longer supported by TSX/TSXV.
TSX SOR will attempt to route the AON/Minimum Quantity orders to a marketplace which can meet the specific attribute without violating trade-through requirements. If the best price can not be met at a venue that supports this order attribute or the order is cancelled/rejected by the venue the order will be routed to TSX/TSXV which will reject and close the order.

FOK, AON, Minimum Quantity orders may be sent on as Directed to marketplaces that support these order attributes.

5.5 Intentional Crosses

TSX SOR only supports crosses for TMX Group marketplaces, which are currently TSX, TSX Venture and TMX Select. Crosses directed to non-TMX Group marketplaces will be rejected.

On a cross, the TSX SOR will first perform an NBBO check, and if the price of the cross would be outside of (i.e., more aggressive than) the NBBO, it will then reject the cross back to the TSX Customer. Otherwise TSX SOR will forward the order to the marketplace (TSX, TSXV, or TMX Select) and pass back any execution reports to the TSX Customer. Intentional crosses will be treated like two-sided orders.

Crosses sent on a special order will either be directed to TSX/TSXV (on STAMP) or rejected (on FIX).

5.6 Minimum Guaranteed Fills (MGF)

TSX SOR will manage MGF-eligibility via the existing MGF flag tag. If the parent order size is within the MGF size limit for that security and the order is marked as MGF-eligible, then the child order(s) will interact with the MGF facility.

Chapter 6 Order Protection Rule (OPR)

TSX SOR will protect subcribers from trading through the better-priced quotes on all protected marketplaces that are accessed through the TSX SOR, with the use of a best-price compliant routing algorithm. Users that have access to all protected marketplaces can use the "TSX SOR OPR Route Out Service" as part of the TSX marketplace Order Protection Rule option. Users also have the option of using other marketplaces' Order Protection rule options by marking orders themselves and directing them to the marketplace of choice.

6.1.1 OPR Route-Out Service

The Smart Order Router Service will prevent Order Protection Rule ("OPR") violations on all protected Canadian marketplaces, but is only available to Subscribers that:

a) subscribe to TSX OPR Route Out Service (as set out in SOR Subscriber Agreement Schedule B); and
b) are in compliance with the Smart Order Router Services Agreement with TSX; and
c) have access through the TSX SOR to all marketplaces designated as protected marketplaces; and
d) submit their order flow through a TSX OPR Route Out Service order entry session; and
e) route orders using a best-price compliant routing algorithm.

For greater certainty, orders submitted through a non-best-price compliant routing algorithm (e.g. Directed orders) will not be prevented from OPR violations.

How to use it:

- **Sign-Up:** To use the OPR Route Out service as offered by TSX, subscribers will need to indicate this on their Schedule B. If subscribers do not wish to use the OPR Route-Out service, they can still use the TSX SOR to access a subset of the protected marketplaces or direct orders to marketplaces, but will not be protected as part of the OPR marketplace obligation.
- **Send Orders:** There is no change to the way orders are sent to the TSX SOR today and there is no need to mark the DAO tag on your orders (when using smart routing algorithms). SOR will automatically mark the resulting child order to each marketplace with the "DAO" marker since it has already checked all protected marketplaces. This will prevent the marketplace from checking for Best Price again.

6.1.2 Directed Orders

TSX SOR also supports all Order Protection Rule (OPR) options on all market places. See below for a summary of what order types are supported on each marketplace and how to mark your order. All orders to the SOR are marked using TSX protocol (when available). There is no need to keep track of which tags are needed for each marketplace as SOR will recognize the TSX protocol for each OPR option and translate it to the appropriate tags for each marketplace.

You can **not** use TSX SOR to send a directed order to be routed at a different marketplaces' router. The routing instruction will be ignored on such orders.

The chart below details which OPR options are supported and available at each marketplace. Any orders with an unsupported OPR option will be rejected.

Table 3: Supported OPR Options

		ORDER PROTECTION RULE OPTION		
	Default	**DAO**	**Protect by Cancel / Reject**	**Protect by Re-price**
TSX	DAO	Y	Y	Y
TMX Select	DAO	Y	N	N
Omega	Protect by Re-price	Y	Y	Y
Chi-X	Protect by Re-price	Y	N	Y
Alpha	DAO	Y	N	N
Pure	DAO	Y	N	N

How to use it:

Send a directed order to each marketplace using the Exchange-Admin tag to indicate which market to direct the order to and using tags below to specify the desired SOR option.

Table 4: Marking Directed OPR orders

OPR Option	**Order Protection Tag(s)**	
	FIX	**STAMP**
DAO	HandlInst(21) = 1	HandlInst(596) = 1
Protect by Cancel / Reject	HandlInst(21) = 5	HandlInst(596) = 5
Protect by Re-price	HandlInst(21) = 6	HandlInst(596) = 6

Example 1 – Direct Order to Omega to use their Protect by Cancel / Reject option:

The SOR subscriber will mark the order with Exchange-Admin tag position 5 = “O” to direct this order to Omega, and HandlInst tag = 5 to protect by cancel / reject. SOR will translate this instruction into the appropriate tags (Protection(6820) = Y, ProtectionPriceImprovement(6821) = N) before sending the order to Omega.

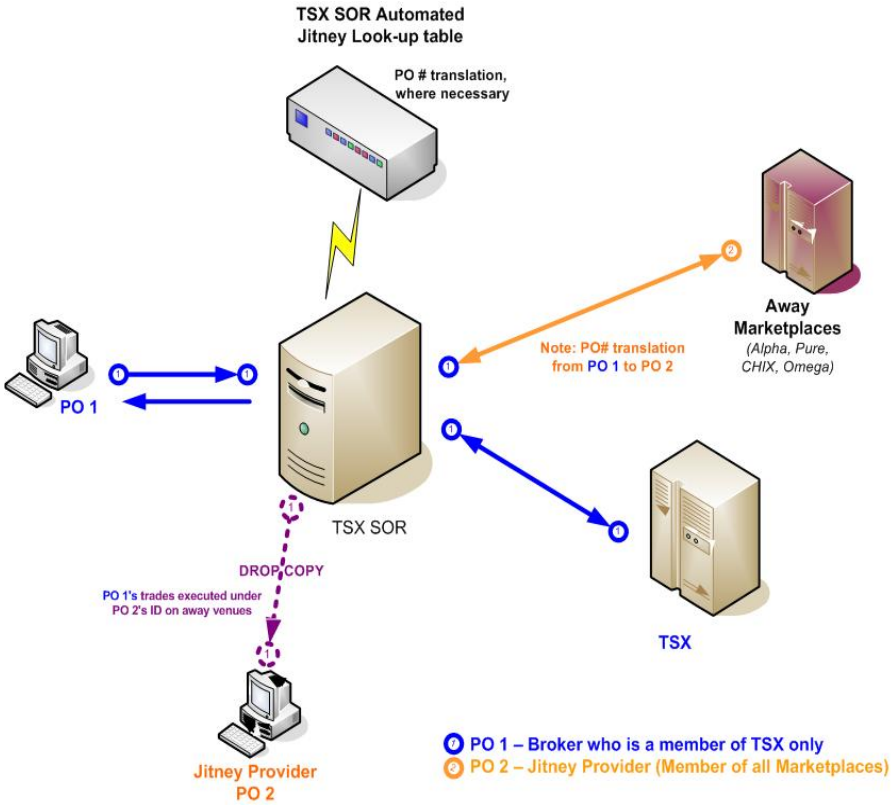
Example 2 – Direct Order to Pure to use their Protect by Cancel / Reject option:

The SOR subscriber will mark the order with Exchange-Admin tag position 5 = “P” to direct this order to Pure, and HandlInst tag = 5 to protect by cancel / reject. However, since Pure does not have a protect by cancel / reject option, SOR will reject this order.

Chapter 7 Automated Jitney

The Automated Jitney service is an add-on option to the TSX Smart Order Router. It enables TSX SOR customers to execute orders on non-TSX marketplaces for trade through compliance by automatically 'giving up' to Jitney Provider. TSX SOR will use a Jitney Look-up table, which is configured for each Jitney Subscriber, to determine which marketplaces the subscriber is a member of, and which marketplaces they need to access through their Jitney Provider. If accessing a marketplace through a Jitney Provider, all orders going to that marketplace will have the Jitney Provider's broker number and trader ID on it.

7.1 How it works



Step 1: Jitney subscriber ("PO 1") enters an order for smart routing.

Step 2: TSX SOR determines:

i. marketplace(s) to be routed to based on routing logic; and

ii. Whether the PO 1 is a member of that marketplace. If not, SOR will give up that order to their Jitney Provider ("PO 2").

Step 3: Child orders are sent as:

i. Jitney child orders to marketplaces of which PO 1 is not a member. Order will be sent with PO 2's broker number and trader ID; and/or

ii. Regular child orders to marketplaces of which PO 1 is a member. Order will be sent with PO 1's broker number and trader ID

Step 4: Executions are sent:

i. Execution reports sent back to PO 1 retain PO 1's broker # and trader ID

ii. Copy of all jitney executions are provided to Jitney Provider PO 2 via FIX Drop Copy

7.2 Jitney Mapping Table Configuration

TSX will facilitate the set-up of the Jitney Mapping Table for each Jitney Subscriber. The mapping will consist of the Jitney Subscriber broker number and trader ID, and which Jitney Provider broker number and trader ID to map to for jitney orders.

Table 5: Jitney Mapping Table

Jitney Subscriber Broker ID	Jitney Subscriber Trader ID	Jitney Provider Broker ID	Jitney Provider Trader ID	Default	Attributed Option
Broker Number of Jitney subscriber	Trader ID of Jitney Subscriber that sent the order	Broker Number of Jitney provider	Trader ID of Jitney Provider that is valid at that marketplace ("trader id")	Y if this is the default Trader ID for the Jitney Subscriber / provider pair	Y if this order needs to be attributed to Jitney provider even if marked anonymous N is the default
003	*User033*	*002*	*User022*	*Y*	*Y*
003	*User034*	*002*	*User024*	*N*	*N*

Example:

A Jitney Subscriber has a broker ID = 003 and is member-entitled for TSX and Alpha only. They have subscribed to the ATS jitney service using Jitney Provider broker ID = 002 and trader ID = User022, who has access to all marketplaces. They send an order with TSX trader ID = User033.

- If TSX has the best price, no translation is needed and orders are sent with TSXUserID = User033. No translation required.
- If Alpha has the best price, the order is sent with TSXUserID = User033. No translation required.
- If Chi-X has the best price, the order is sent with Jitney Provider trader ID User022 – translation required.
- If Pure has the best price, the order is sent with Jitney Provider trader ID User022 – translation required.

- If Omega has the best price, the order is sent with Jitney Provider trader ID User022 – translation required.
- Note that the trader ID is the same for each marketplace.

7.3 Drop Copy

Each Jitney Provider has the option of receiving a drop copy of all the executions that were jitney'ed using their broker number using FIX protocol. This drop copy can be configured by session bundle level. All jitney executions will be captured through the drop copy in FIX protocol, even if the order was entered using STAMP protocol. The fields that are on the drop copy include:

Table 6: FIX Drop Copy Fields for Execution

Field Name	Tag	Sample Value	Description
BeginString	8	FIX.4.2	The beginning of new message and protocol version. It is always the first field in a message and always unencrypted. Part of the TSXFIXMessageHeader.
BodyLength	9	0266	The Message length, in bytes, forward to the CheckSum field. It is always the second field in a message and always unencrypted. Part of the TSXFIXHeader.
MsgType	35	8	The type of message being sent. ALWAYS THIRD FIELD IN MESSAGE. (Always unencrypted). "8" = Execution Report
OnBehalfOfCompID	115	ALPH	This identifies the venue
OnBehalfOfSubID	115	00362031	
TargetSubID	57	00362031	The identification of a specific sender. Part of the TSXFIXHeader
SenderCompID	49	TSXSOR	The identification of the sending Firm. Part of the TSXFIXHeader.
TargetCompID	56	00362031	The identification value of the receiving Firm. Part of the TSXFIXMessageHeader
SendingTime	52	20100618-18:03:40	The time of the message transmission. For a retransmitted message, the value of TransactTime is the time of the retransmission, not the transmission time of the original message. SessionRejectReason – the reason for a session. Part of the TSXFIXMessageHeader
MsgSeqNum	34	4	The sequence number of the message. Part of TSXFIXHeader.
OrderID	37	1	A number assigned to the order by the trading system
ClOrdID	11	SFIX384	A unique identifier assigned by the Member Firm to an order. This is the ClOrdID value when customer sends the order into SOR
OrdStatus	39	2	0 = New; 1 = Partially filled; 2 = Filled; 4 = Cancelled; 9 = Suspended
ExecTransType	20	0	The type of transaction sent: 0 = New; 1 = Cancel; 2 = Correct; 3 = Status
ExecType	150	2	The type of Execution Report: 1 = Partial Fill; 2 = Fill; 3 = DoneForDay
OrderQty	38	100	The volume of an order or the total volume for undisclosed Iceberg orders. This is always the same as LastShares (32).
CumQty	14	100	The cumulative traded volume of an order. This is always the same as LastShares (32).
LeavesQty	151	0	Remaining unfilled quantity of order. This is always 0.
Symbol	55	AAPL	The security/issue symbol
Side	54	1	Side is the order action and must be specified by one of the following values:

Field Name	Tag	Sample Value	Description
			1 = Buy; 2 = Sell; 5 = Sell Short; 6 = Sell Short Exempt
AvgPx	6	140.11	The average price of all fills for an order
Price	44	140.11	Required price for partial or complete fills as the order price
ExecID	17	511	This will be the venue's ExecID if provided. Otherwise, SOR will generate an ID.
LastShares	32	100	Quantity of shares on the last trade for an order
LastPx	31	140.11	Required for partial or complete fills as the last traded price
TradeDate	75	20100618	Date of execution
TransactTime	60	20100618-18:03:40	The time of execution/order creation. YYYYMMDD-HH:MM:SS.sss (year, month, day, hour, minute, second, milliseconds)
TSXJitney	6757	010	An order is marked as being executed on behalf of another broker:, N = No ;default 1*3Digit = TSXBrokerNumber This is the broker number of the Jitney subscriber.
TSXBrokerNumber	6774	123	An Exchange-assigned three-digit private PO number identifying a Member Firm, even for Anonymous orders This is the broker number of the Jitney provider.
TSXUserID	6751	01230001	The trading systems user ID for a trader. This is the user ID of the Jitney subscriber.
TSXAnonymous	6761	Y	Flag to indicate if the order is anonymous: N = No ;default Y = Yes
NoContraBrokers	382	1	The number of contra brokers this was executed against.
ContraBroker	375	001	The broker with whom the trade occurred
TSXAccountType	6750	CL	Type of trading account, which can be one of the following values: NC (NonClient) ; default at TSX and TSXV CL (Client) ST (Equities Specialist) IN (Inventory) PT (Professional Trader) MP (ME pro order on TSX) OF (Options firm account) OT (Options market maker)
TSXSOROrderID1	7710	B20100624000230227	SOR order assigned internally Comes from venue's Tag 37 (orderID) EXCEPT for TSX, which does not send OrderID (Tag 17)
TSXSOROrderID2	7711	TS20100706000000095:999999:000000	marketplaces assigned ExecID Comes from venue's Tag 17 (execID)
Account	1		Identifies the trading account i. FieldIdentifier = 1 Account = 1*15AlphaNumeric ; TSX and TSXV, no default This will only be sent back if the Jitney subscriber sent it in the first place. Otherwise, it won't be sent.
CheckSum	10	114	Standard message trailer

7.4 Special Considerations

7.4.1 Directed Orders

The Automated Jitney functionality is meant to meet regulatory best-price obligations. As such, it is not meant to be used to direct orders to venues that subscribers are not a member of. Any directed orders to marketplaces that you are not a member of will be rejected.

For example, if the Jitney Subscriber not a member of Pure, but are a Jitney Subscriber, any order smart-routed to Pure as a result of a routing strategy will be jitney'ed. If and order is directed to Pure, it will be rejected.

7.4.2 Anonymous Orders

By default, any order marked as anonymous will remain anonymous, even it is being jitney'ed. However, there is an option, called the "Attributed Option", for Jitney Providers to choose to put their broker number on all jitney'ed executions, even if it is marked anonymous. If the Attributed Option is turned on (marked "Yes"), all jitney'ed executions will show the Jitney Provider's broker number on it, even if it was marked anonymous. All non-jitney executions will continue to remain anonymous. Jitney subscribers should confirm with their Jitney Providers whether they want to make all jitney orders attributed.

7.4.3 Double Jitney

The TSX SOR Automated Jitney Service will **not** jitney any orders that have already been jitney'ed at least once. It will execute what can be at member-entitled marketplaces, and cancel the remaining quantity that needs to execute at jitney-entitled marketplaces, and to prevent trade-throughs.

Any order sent to the TSX SOR that already has the jitney tag populated will not execute at jitney-entitled marketplaces, but will continue to execute at member-entitled marketplaces. Any quantity that would've executed at a member-entitled marketplace, but would cause a trade through at a jitney-entitled marketplace (which the double-jitney order can not access), will be cancelled. Thus, Automated Jitney subscribers are always protected from trade throughs.

For example, the Jitney Subscriber is a member of TSX and not a member of Pure. They send an order that already has the jitney tag populated (already jitney'ed), and there is immediately executable quantity at TSX and Pure. The order will execute at TSX and the remainder will be cancelled since it can not execute at Pure as a double-jitney order.

Appendix A FIX Order Entry Changes

FIX enhancements for TSX SOR subscribers only

The tags described in this document is specific to the TSX SOR (Smart Order Router) and should be used by SOR Clients in conjunction with the latest TSX FIX Specification.

Please contact vendor_services@tsx.com for the latest version of the FIX Specification.

FIX Message Changes
Section 4.1 – New Order – Single
ADD

TSX-ContentAdd	=	[ExchangeAdmin]
TSXV-ContentAdd	=	[ExchangeAdmin]

Section 4.1 – Execution Report – ExecType="1" or "2"
ADD

TSX-ContentAdd	=	[ExchangeAdmin]
TSXV-ContentAdd	=	[ExchangeAdmin]

Data Dictionary Changes

Expand the Exchange Admin usage by two, using Position 5 for inbound SOR Custom Order Types and Position 6 for Outbound message ATS Identifiers.

TSXExchangeAdmin – an assigned marker to transmit information.
FieldIdentifier = 6780 TSXExchangeAdmin = 0*35AlphaNumeric
The TSXExchangeAdmin tag has 35 possible markers of which 7 are currently defined. Any marker with a value of zero (0) should be ignored by the vendors. Positions 5 and 6 are applicable only to orders sent to the TSX Smart Order Router (SOR).

The following table defines how this tag is used. Currently there are 7 positions used with 28 more available.

Position	Marker Description	Marker Value
0	Trade Source	'T' - TSX Continuous Market 'X' - TSXV 'S' - TMX Select
1	Order Classification	'A' - Active 'P' - Passive

2	Trading Session	'O' - Opening 'P' - Post Open 'E' - Last Sale Trading Session
3	Responsible RT/Oddlot Trader for Stock	'Y' - UserId is the RT/Oddlot Trader for the stock and is the buyer and/or the seller 'N' - UserId is not the RT/Oddlot Trader of the stock
4	ATX Intent Leg	'Y' – Originated from an Intent 'N' – Not originated from and Intent
5	Inbound Routing Instructions	“N” - TSX/TSX-V only – (SOR Software pass-through only - No routing) “S” - SOR Software - Slice & Spray “I” - SOR Software - Iterative Sweep “X” - Directed TSX “V” - Directed TSX-V “L” - Directed TMX Select “P” - Directed Pure “C” - Directed Chi-X “O” - Directed Omega “A” - Directed Alpha
6	Routing Confirmation	“X” - TSX “V” - TSX-V “L” - TMX Select “P” - Pure “C” - Chi-X “O” - Omega “A” - Alpha
7 to 35		Not Yet Defined

Appendix B STAMP Order Entry Changes

STAMP
STAMP enhancements for TSX SOR subscribers only

The messages and tags described in this document are specific to the TSX SOR (Smart Order Router) and should be used by SOR Clients in conjunction with the latest STAMP Specification.

Please contact vendor_services@tsx.com for the latest version of the STAMP Specification.

STAMP Message Changes
Section 5.1 – New Order
ADD

TSX-ContentAdd	=	[ExchangeAdmin]
TSXV-ContentAdd	=	[ExchangeAdmin]

Section 5.3 – Order/Cancel Confirmation Report
ADD

TSX-ContentAdd	=	[ExchangeAdmin]
TSXV-ContentAdd	=	[ExchangeAdmin]

Section 5.8 – Fill Report
ADD

TSX-ContentAdd	=	[ExchangeAdmin]
TSXV-ContentAdd	=	[ExchangeAdmin]

Data Dictionary Changes

Expand the ExchangeAdmin usage by two, using Position 5 for inbound SOR Custom Order Types and Position 6 for Outbound message ATS Identifiers.

Exchange-Admin: An assigned marker to transmit information to the broadcast feed and order entry sessions..
FieldIdentifier = 380 ; TSX, TSXV, and TMXS Exchange-Admin = 0*36AlphaNumeric
The Exchange-Admin tag has 36 possible markers of which 8 are currently defined. Any one of these markers that are described as “Exchange Use Only” should be ignored by the vendors. Any marker with a value of zero (0) should also be ignored by the vendors. Position 5 and 6 are applicable only to orders sent to the TSX Smart Order Router (SOR).

The following table defines how this tag is used. There are 7 positions used with 29 more available.

Position	Marker Description	Marker Value
0	Trade Source	'T' - TSX 'X' - TSXV 'S' - TMXS
1	Order Classification	'A' - Active 'P' - Passive
2	Trading Session	'O' - Opening (TSX and TSXV) 'P' - Post Open 'E' - Last Sale Trading Session (TSX and TSXV)
3	Responsible RT/Oddlot Trader for Stock	'Y' - UserId is the RT/Oddlot Trader for the stock and is the buyer and/or the seller (TSX and TXSV) 'N' - UserId is not the RT/Oddlot Trader of the stock (TSX and TSXV) '0' - Position 3 should be ignored (TMXS)
4	Reserved	
5	Inbound Routing Instructions	'N' (SOR Software pass-through only - No routing) 'S' SOR Software - Slice & Spray 'I' SOR Software - Iterative Sweep 'X' Directed TSX 'V' Directed TSXV 'L' Directed TMX Select 'P' Directed Pure 'C' Directed Chi-X 'O' Directed Omega 'A' Directed Alpha
6	Routing Confirmation	'X' TSX 'V' TSX-V 'L' TMX Select 'P' Pure 'C' Chi-X 'O' Omega 'A' Alpha
7	Execution State	'A' Delayed Active
8 to 35	Not Yet Defined	

Appendix C Definitions

- **Anonymous order** refers to an order where the broker ID is displayed as “001” instead of the actual broker ID to maintain anonymity on the order
- **Away Marketplace** refers to any marketplace other than the Booking Marketplace
- **Booking Marketplace** refers to the marketplace ranked at the top of the passive ranking table
- **Broker ID** refers to the unique broker number assigned to each broker/dealer.
- **Directed order** refers to an order that bypasses smart routing and is sent directly to the specified marketplace.
- **Entitled** for a marketplace means that the marketplace is in the routing table and will be considered in routing decisions. This is independent of connectivity. For the Automated Jitney service, there needs to be a distinction between being entitled for a marketplace as a member versus being entitled for a marketplace as a Jitney Subscriber. Thus, 2 additional terms are defined:
    - **Member-Entitled** refers to being able to access a marketplace as a member using own broker ID and trader ID. No translation is required.
    - **Jitney-Entitled** refers to being able to access a marketplace via the Automated Jitney service using a Jitney Provider’s broker ID and trader ID. Translation is required.
- **Jitney-Entitled** see Entitled
- **Jitney Mapping Table** refers to the table that identifies the relationship between Jitney Subscriber and Jitney Provider by broker number and trader id.
- **Jitney Provider** refers to a broker / dealer that has access to all marketplaces via SOR and provides their broker number and access to Jitney Subscribers to access marketplaces.
- **Jitney route** refers to a Jitney Subscriber’s access to a marketplace by using their Jitney Provider’s broker ID.
- **Jitney Subscriber** refers to a broker / dealer that subscribes to the TSX SOR Automated Jitney service and uses a Jitney Provider to access and execute on marketplaces that they are not entitled to under the Jitney Provider’s broker number and trader id.
- **Jitney tag** refers to the tag on order and execution messages that holds the broker number of the broker / dealer that this order / execution was done on behalf of.
- **Member-Entitled** see Entitled
- **SOR User ID** refers to the unique identifier assigned to each set of SOR bundles.
- **Trader ID** refers to the unique ID assigned to each trader. E.g. for the TSX, the STAMP tag is called TSX UserId, Tag 62.
- **TMX Gateway** refers to the common order entry gateway shared by all TMX Group marketplaces (currently TSX, TSX Venture and TMX Select)
- **Special order** refers to an order where the destination is decided via the smart order routing strategy

Appendix D Version History

Version	Date	Changes
1.32	Jan 2010	
2.0	Aug 19, 2010	Added Automated Jitney
2.1	Sept 29, 2010	Formatting changes Added detail on Automated Jitney
2.2	Dec 8, 2010	Updated short sale logic and passive Booking Marketplace
3.0	Dec 30, 2010	Added section on Order Protection Rule (OPR) Updated chart on supported order types, Automated Jitney, order entry and management, and contact information Added details on Cancel on Disconnect / Cancel on Command
3.1	Mar 9, 2011	Added details on order types not supported by TSX SOR, including dark orders and Post-Only and Self-Trade Prevention and 3.6 Action Source section
3.2	Mar 15, 2011	Updated 5.1 Routing of Order Types formatting with clarification of how on-stops, OPR and odd lots are handled.
3.3	May 6, 2011	Updated Table 2: Supported Order Types for MBF orders (removed) and GTC and GTD orders Updated note in Table 2: Supported Order Types for AON orders
4.0	July 12, 2011	Added TMX Select as a marketplace throughout document Clarified 5.5 Crosses logic Updated Appendix A and B for Exchange-Admin tags to include TMX Select
4.1	Jan 10, 2012	Added detail to Section 3.8 - Cancel on Disconnect / Cancel on Command and Section 1.1.4 – TSX On-Book Dark Access.
4.2	July 1, 2012	Removed Section 1.1.4 – TSX On-Book Dark Access – no longer applicable Updated Sections 4.1.1 Slice and Spray, 4.2.1 Slice and Spray, 4.3 Immediate Or Cancel (IOC), 4.7 MGF / Oversizing to update logic of Slice & Spray Strategy from removing knowledge of iceberg orders (as mandated by NI21-101 changes)
4.3	August 1, 2012	Modified Section 2.1 Configuration and Section 2.3 Default Market Priority, Chapter 4 Routing Logic to indicate that the only Booking Marketplaces supported are TSX/TSXV or TMX Select. Changes are effective September 1, 2012.

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