Integrated Trading and Clearing (ITaC) Working Group Session

3 June 2015

JSE

Agenda

- High-level trading and clearing daily lifecycle
- High-level functions and messages of the trading gateways
- Questions
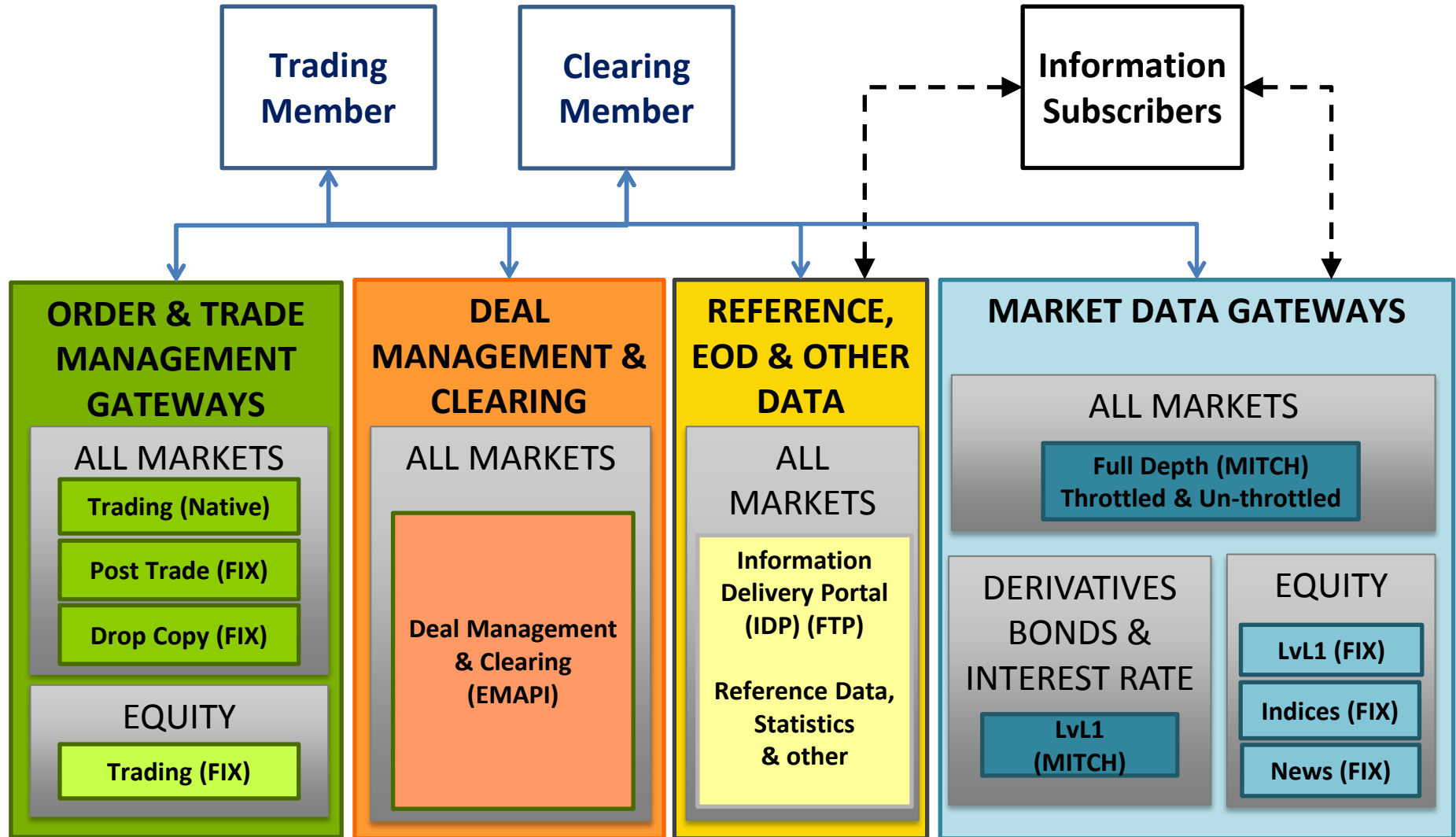
2015 Working Group (WG) Schedule

- Proposed 2015 WG Schedule

| Date	Time	Status
Tues, 12 May 2015	11h00 – 13h00 SAST	Complete
Mon, 18 May 2015	10h00 – 12h00 SAST	Complete
Thurs, 28 May 2015	10h00 – 12h00 SAST	Combined into 3 June
Wed, 3 June 2015	10h00 – 12h00 SAST	In Progress
Wed, 1 July 2015	10h00 – 12h00 SAST	
Wed, 8 July 2015	10h00 – 12h00 SAST	
Wed, 15 July 2015	10h00 – 12h00 SAST	
Wed, 5 Aug 2015	10h00 – 12h00 SAST	
Mon, 21 Sept 2015	10h00 – 12h00 SAST	**Likely to add more dates**
Mon, 19 Oct 2015	10h00 – 12h00 SAST	
Wed, 18 Nov 2015	10h00 – 12h00 SAST	

Trading, Clearing and Information Systems
All Markets – High-level

JSE

Trading Member

Clearing Member

Information Subscribers

ORDER & TRADE MANAGEMENT GATEWAYS

ALL MARKETS
- Trading (Native)
- Post Trade (FIX)
- Drop Copy (FIX)

EQUITY
- Trading (FIX)

DEAL MANAGEMENT & CLEARING

ALL MARKETS

Deal Management & Clearing (EMAPI)

REFERENCE, EOD & OTHER DATA

ALL MARKETS

Information Delivery Portal (IDP) (FTP)

Reference Data, Statistics & other

MARKET DATA GATEWAYS

ALL MARKETS

Full Depth (MITCH) Throttled & Un-throttled

DERIVATIVES BONDS & INTEREST RATE

LvL1 (MITCH)

EQUITY
- LvL1 (FIX)
- Indices (FIX)
- News (FIX)

NOTE: Interest Rate and Commodity Derivatives form part of the future roadmap and will follow post Project 1
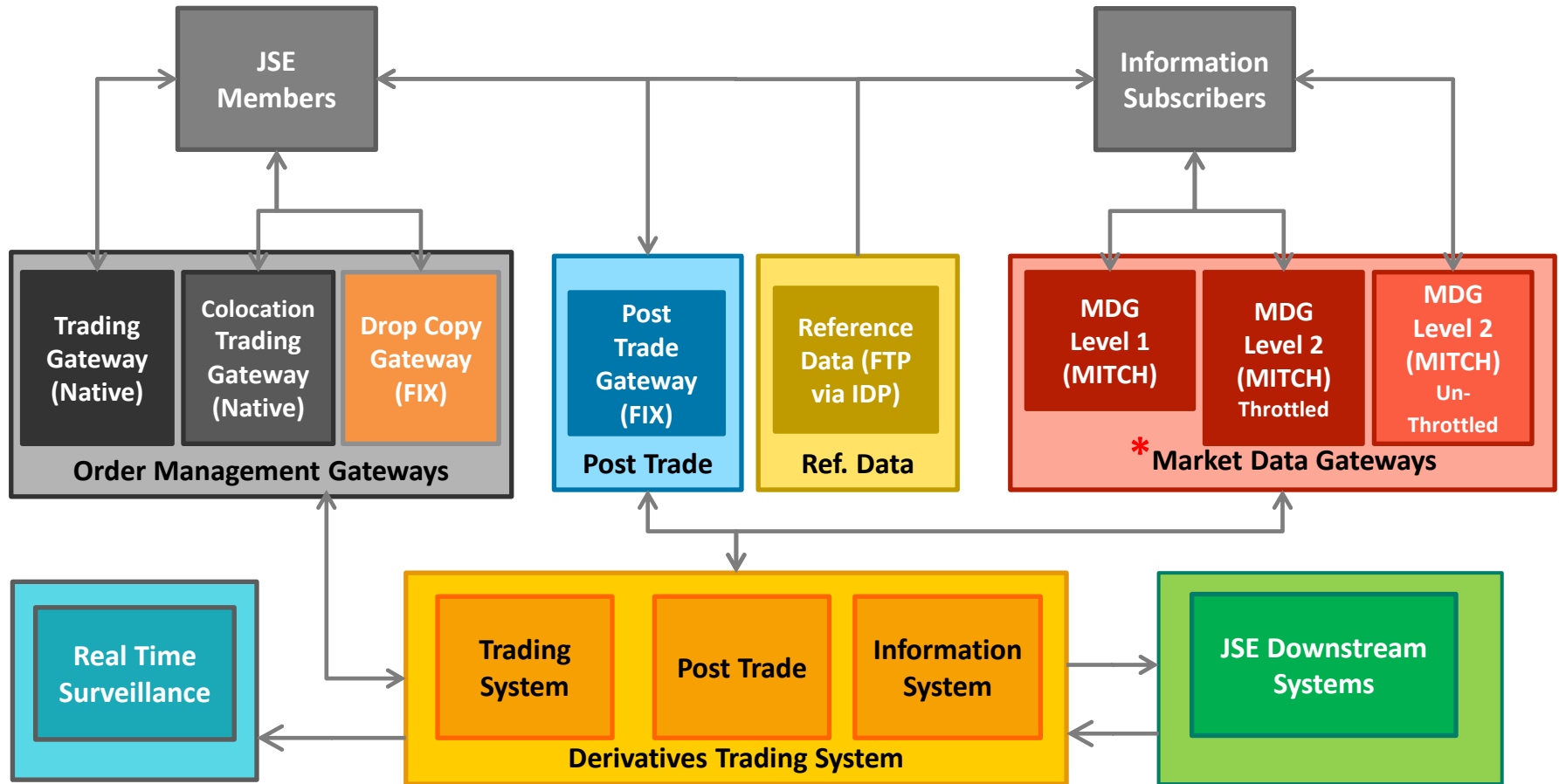
Trading and Information System
Current Equity Market
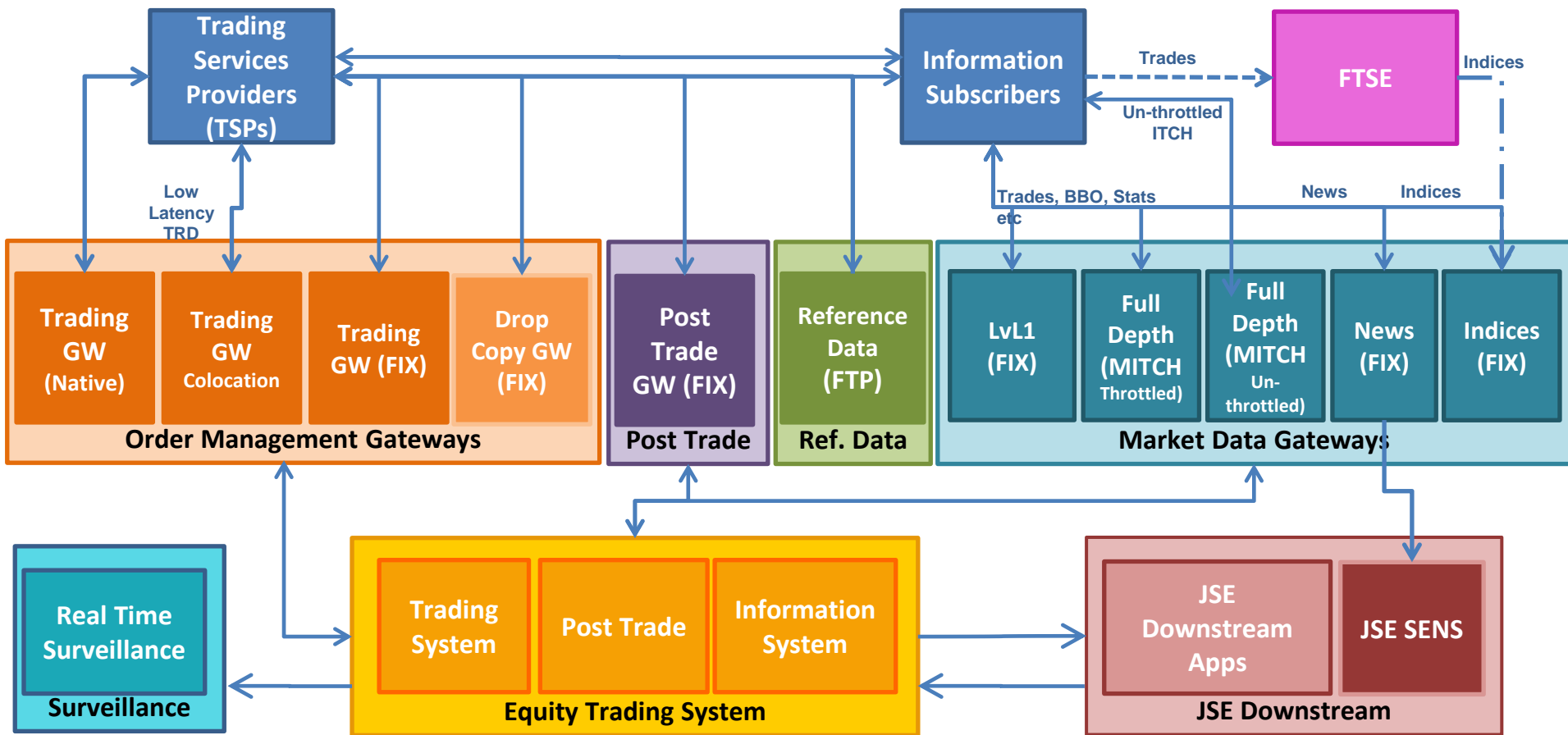
Trading and Information Systems
High Level Proposed Derivatives Solution

- There will be a set of Market Data Gateways for Equity Derivatives and a set of Gateways for Currency Derivatives
- Additional market data gateways will be introduced at a later stage for Commodity Derivatives.
- Interest Rate market data will be disseminated via the same gateways as Currency Derivatives

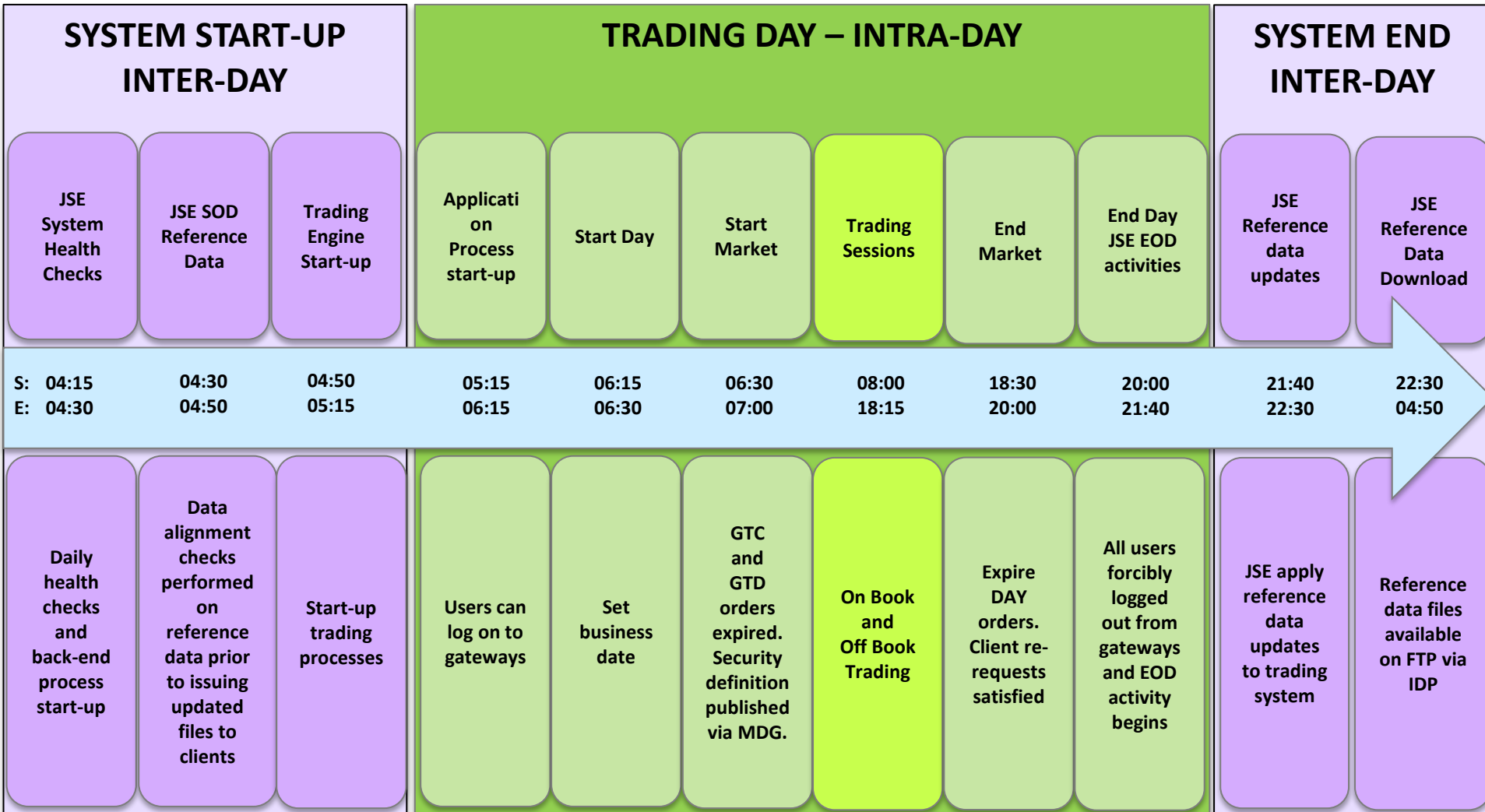# Interfaces for Post Trade Functions
High Level Proposed Solution
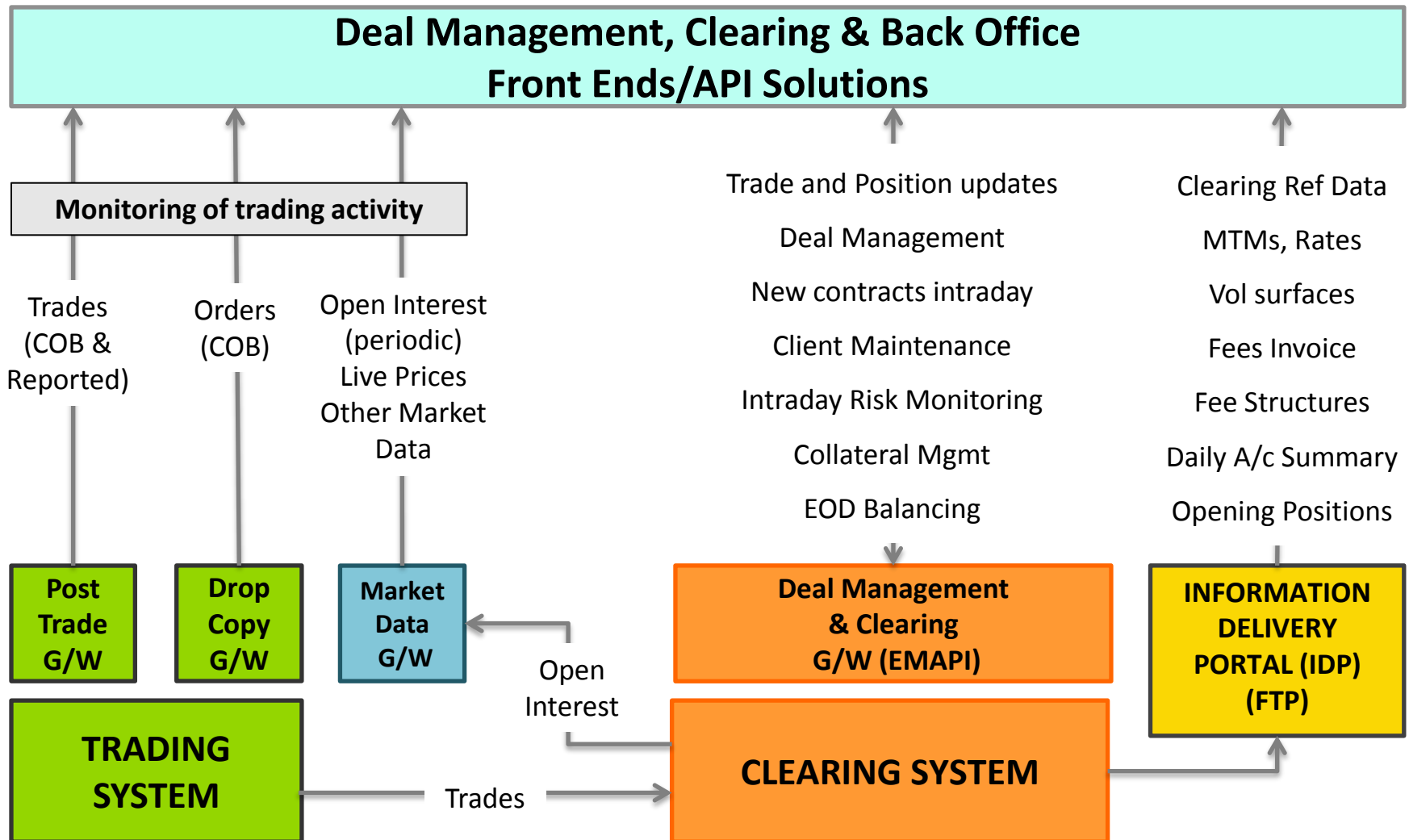
High-level Daily Lifecycle Walkthrough of Trading and Clearing

High-level Timeline
Daily Lifecycle - Trading

JSE

SYSTEM START-UP INTER-DAY			TRADING DAY – INTRA-DAY						SYSTEM END INTER-DAY	
JSE System Health Checks	JSE SOD Reference Data	Trading Engine Start-up	Application Process start-up	Start Day	Start Market	Trading Sessions	End Market	End Day JSE EOD activities	JSE Reference data updates	JSE Reference Data Download
S: 04:15 **E:** 04:30	04:30 04:50	04:50 05:15	05:15 06:15	06:15 06:30	06:30 07:00	08:00 18:15	18:30 20:00	20:00 21:40	21:40 22:30	22:30 04:50
Daily health checks and back-end process start-up	Data alignment checks performed on reference data prior to issuing updated files to clients	Start-up trading processes	Users can log on to gateways	Set business date	GTC and GTD orders expired. Security definition published via MDG.	On Book and Off Book Trading	Expire DAY orders. Client re-requests satisfied	All users forcibly logged out from gateways and EOD activity begins	JSE apply reference data updates to trading system	Reference data files available on FTP via IDP

Daily Clearing Lifecycle
Clearing Intraday

- Real-Time Clearing Interface functions
  - Clearing system will receive matched trades from the Trading system during the course of the trading day as orders are executed or trades are reported
  - Trades will be automatically entered into the account reflected on the Trade (and House suspense account if incorrect)
  - Trades are published to members (trading and clearing) as they are processed by the Clearing System
  - Deal Management activities
    - Allocations
    - Assigns (also known as Give-Up/Take-Up)
    - Tripartite allocation
    - Deal sub-account modification
    - Allocation error correction
    - Principal correction

Daily Clearing Lifecycle

Clearing Intraday

- Real-Time Clearing Interface functions (cont.)
    - Position updates on accounts are published to members (trading and clearing)
    - Trading Members load and maintain clients and member sub account information
    - Clearing Members receive confirmed member and client account and sub account information
    - Tripartite agreements between a client and two trading members will be loaded by the JSE on JSE internal systems upon receipt of a request from a trading member. This will enable tripartite trades and deal management activities to take place
    - Intraday reference data updates relevant for deal management and clearing activities published

Daily Clearing Lifecycle
Clearing Intraday

- Real-Time Clearing Interface functions (cont.)
  - Collateral Management
    - Substitutions – substitute one security for another
    - Security withdrawals – release securities by posting cash
    - Cash withdrawals - release cash by pledging securities
    - Top-ups – pledge additional securities if value of securities already pledged falls below a specified threshold as market prices change
    - Cash and securities withdrawals will be processed in batch runs at 09h00 and 14h00 (times to be confirmed and proposed process still to be finalised)
  - Intraday Risk Monitoring
    - Members set and maintain manage exposure limits as required (ad-hoc)
    - Clearing engine recalculates exposures throughout the day
      - Initial Margin per account is recalculated and published with each position update
      - Variation Margin per account per position is calculated and published at regular intervals
    - As exposures are recalculated they are compared to the pre-set limits
      - Alerts are published if exposures near or breach limits

Daily Clearing Lifecycle

Clearing Intraday

- Data published via the Information Delivery Portal (IDP)
  - Benchmark Rates will be available as per current times (11h00)
    - e.g. JIBAR rates, Interest on Margin rates, Rand Overnight Deposit rates
  - Early valuation prices for the Equity Derivatives and Currency Derivatives markets will be available as per current time (15h00)

Daily Clearing Lifecycle
Clearing EOD Overview

- JSE Clear calculates margins and fees and sends results to the Clearing Members

- Clearing Members replicate the margin and fees calculations and balance back to JSE Clear

- JSE Clear calculates securities collateral and requests this from Strate

- Strate pledges collateral to JSE Clear (after CSDPs have committed to the pledges)

- JSE Clear calculates the ZAR cash amounts and generates the payment instructions to the Settlement Banks (which will be processed via the Reserve Bank SAMOS system the next day)

- Account Summary and collateral breakdown reports will be available via IDP

Daily Clearing Lifecycle
EOD Process
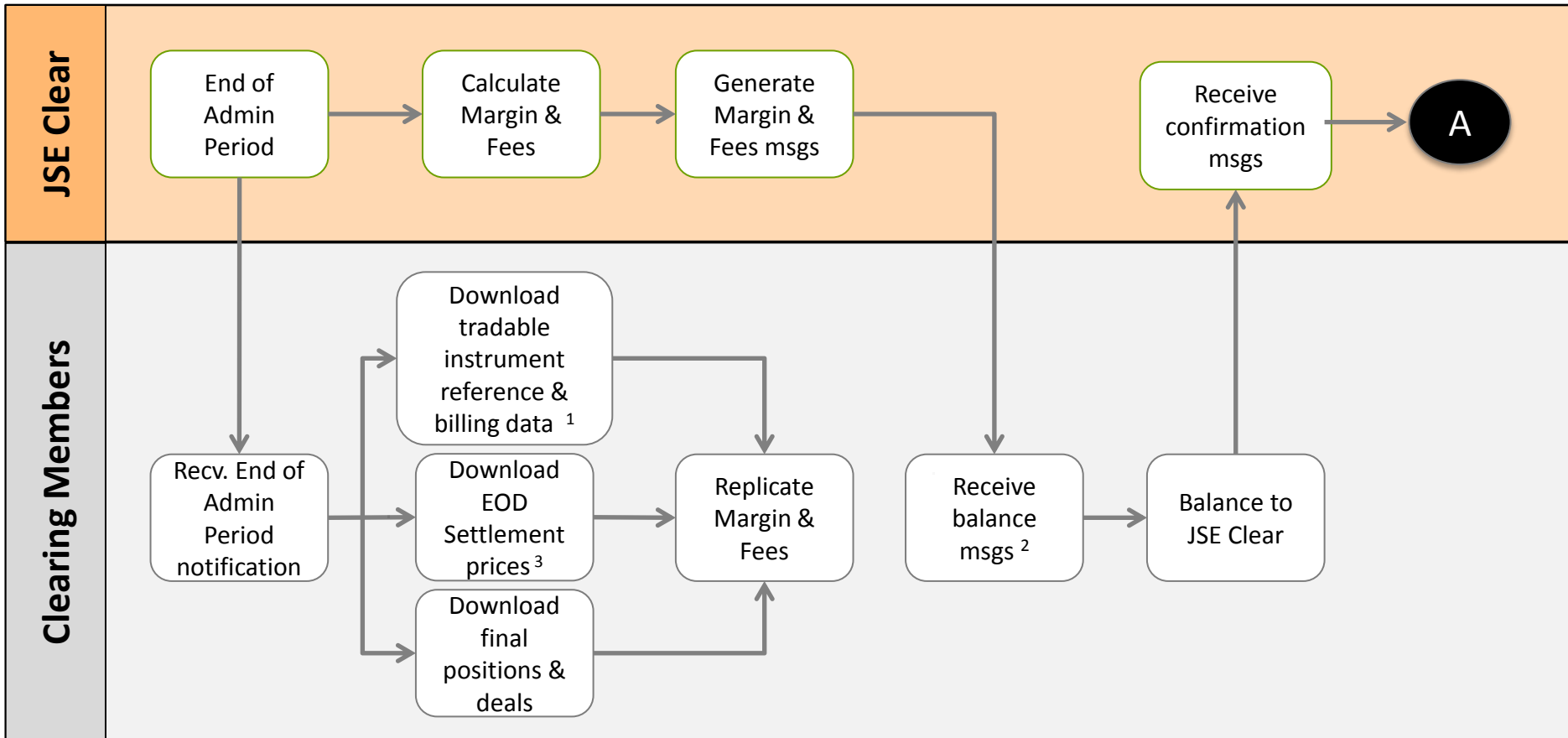
Notes:

1. Tradable instrument reference data will include margin parameters
2. Balance messages include: margin, funding interest, dividend payments & fees (down to Trading Member level)
3. Settlement prices available via the IDP FTP interface and published on Market Data Gateways during Post Close Session

Daily Clearing Lifecycle
EOD Process

JSE Clear

A → Calculation of securities collateral

Receive pledged securities → B

Strate

Receive collateral requests → Determine securities pledges

Generate securities pledges

CSDPs

Receive un-confirmed pledges → Auto-commit to pledges
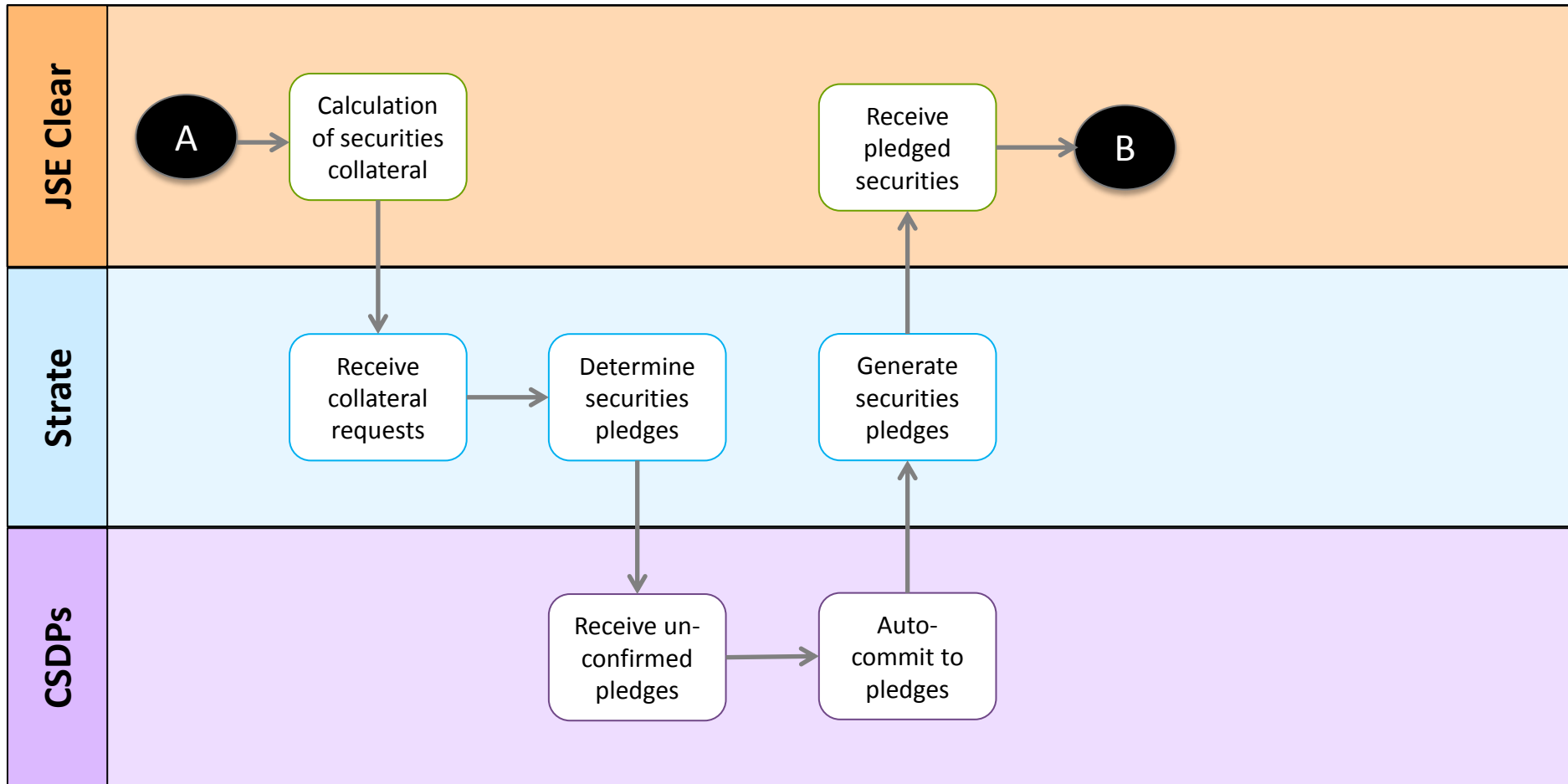
Notes:
A detailed view of client breakdown of collateral will be available via EMAPI

Daily Clearing Lifecycle
EOD Process
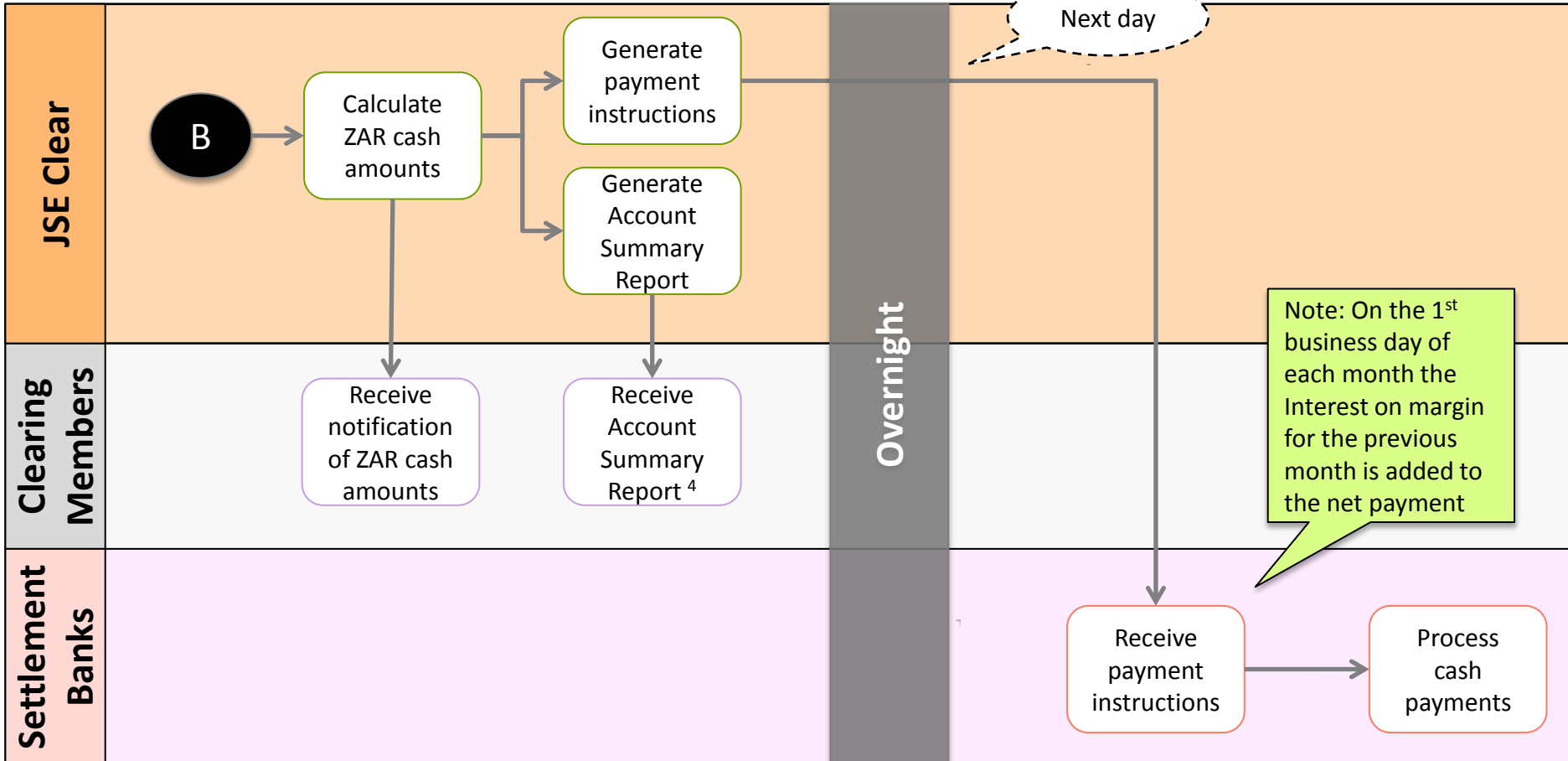
Notes:

4. The Account Summary report will include IM, VM, Securities collateral, ZAR cash, Fees, Funding Interest & Dividend payments shown at the Trading Member level – examples on later slide

Daily Clearing Lifecycle
Account Summary Report

Clearing Member Account Summary

CM Code: XXXCC
CM Name: Clearing Member 1

Member Code	Initial Margin Movement Cash ZAR	Initial Margin Movement Securities ZAR	Member IM Cash ZAR Today	Member IM Securities ZAR Today	Client IM Cash ZAR Today	Client IM Securities ZAR Today	Total Member Variation Margin ZAR Today	Total Client Variation Margin ZAR Today	Total Member Additional Margin ZAR Today	Total Client Additional Margin ZAR Today	Booking Fees ZAR	Funding Interest ZAR	Dividend Payment	Total Cash	Total IM for member B/F ZAR	Total IM for member C/F ZAR
ABCD	500 000.00	500 000.00	500 000.00	700 000.00	6 700 000.00	1 100 000.00	435 366.00	523 453.00	200 000.00	800 000.00	1 103.50	500.00	400.00	2 460 822.50	8 000 000.00	9 000 000.00
EFGH	-350 000.00	-150 000.00	-50 000.00	-10 000.00	-300 000.00	-140 000.00	120 586.00	188 926.00	100 000.00	900 000.00	2 500.00	0.00	0.00	962 012.00	7 500 000.00	7 000 000.00
Total	150 000.00	350 000.00	450 000.00	690 000.00	6 400 000.00	960 000.00	555 952.00	712 379.00	300 000.00	1 700 000.00	3 603.50	500.00	400.00	3 422 834.50	15 500 000.00	16 000 000.00

Net Booking fees	VAT payable @14%	Total Cash on IM	Total Securities on IM	Total additional Margin	Total Varation Margin	Total Dividend payment	Total Funding Interest	Total Intraday call Cash	Total Intraday call securities
3 603.50	504.49	9 250 000.00	6 250 000.00	2 000 000.00	1 268 331.00	400.00	500.00	0.00	0.00

Payment of 3 422 834.50 to JSE

IM balance Cash B/F	Interest rate on Cash Collateral	IM balance Cash C/F	Overall IM Balance
9 250 000.00	5.53%	0.00	0.00

Daily Clearing Lifecycle
EOD downloads in preparation for next day

- Following the EOD balancing and collateral processes, members will be able to download the following data via IDP in preparation for the next day:

  - Members' own data:
    - Member reference data
    - Client reference data
    - Final EOD positions download (these are the opening positions for the next day)
    - Deal updates generated to affect the position changes associated with portfolio transfers and/or corporate actions

  - Clearing data accessible by all members, including:
    - Member reference data (Counterparty codes)
    - Clearing reference data e.g. Initial Margin Requirements (IMRs)
    - Volatility surfaces

Clearing Lifecycle

Interest on Margin Process

- The Clearing system will calculate the interest on cash collateral on a daily basis at EOD

- The full report will be published on the last business day of the month as part of EOD

- Clearing Members to balance back to JSE Clear on interest on margin at EOD

- The interest payable will be incorporated into the Payment Clearing House (PCH) payments on the first business day of the next month

High-level Functions and Messages of the Trading Gateways

Trading, Clearing and Information Systems
All Markets – High-level

JSE

Trading Member

Clearing Member

Information Subscribers

ORDER & TRADE MANAGEMENT GATEWAYS

ALL MARKETS
- Trading (Native)
- Post Trade (FIX)
- Drop Copy (FIX)

EQUITY
- Trading (FIX)

DEAL MANAGEMENT & CLEARING

ALL MARKETS
Deal Management & Clearing (EMAPI)

REFERENCE, EOD & OTHER DATA

ALL MARKETS
Information Delivery Portal (IDP) (FTP)

Reference Data, Statistics & other

MARKET DATA GATEWAYS

ALL MARKETS
Full Depth (MITCH) Throttled & Un-throttled

DERIVATIVES BONDS & INTEREST RATE
LvL1 (MITCH)

EQUITY
- LvL1 (FIX)
- Indices (FIX)
- News (FIX)

NOTE: Interest Rate and Commodity Derivatives form part of the future roadmap and will follow post Project 1

Functional Overview
Trading and Market Data

Order Management functionality via the trading API includes:

Activity	Equity	Equity Deriv.	Currency Deriv.	Description
Trading Gateway (Native)	Y	Y	Y	Order Management of new and existing orders or order cancels with immediate confirmation of On Book (automated) trades and publishing of Execution Reports. Trade Cancellations and Market Operations announcements.
Trading Gateway (FIX)	Y	N	N	
Drop Copy Gateway (FIX)	Y	Y	Y	Allow for the receipt of additional copies of the Execution Reports generated by the system, 'Çopy To' functionality. This interface may also be used by clients to download the current status of all their active orders in the event of a failure.
Post Trade Gateway (FIX)	Y	Y	Y	Enables member firms to submit and manage Off Book trade reports and receive real-time information on On Book executed trades. This interface may also be used by clients to download all their confirmed trades in the event of a failure.
Market Data Gateways (MITCH)	Y	Y	Y	Provides real-time market data of instruments traded on the JSE such as price, volume, closing prices auction information, instrument status etc. A Level 1 and Level 2 (full market depth) service will be available.
Reference Data (FTP)	Y	Y	Y	Static trading reference data for the Trading System will be made available on a daily basis via the JSE IDP (FTP) service.

Functional Summary
Trading Connectivity – Native Trading Gateway

- Two components exist within the Native Trading Gateway
    - **Real Time Gateway** – used for all order submission, management and receipt of all real-time acknowledgements and system generated messages
    - **Recovery Gateway** – used to recover from a disconnect or failure
    - Same IP Address, different ports
- Application messages missed due to a disconnect are not sent upon re-establishing connectivity
- Connection must be established to the Real Time Gateway before connecting to the Recovery Gateway
- Connectivity will be terminated by the server if a logout messages is not sent after the Transmission Complete message

Functional Summary
Trading Connectivity – Native Trading Gateway

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- **There are no changes to the Equity Market Gateway Standard Messages**

- The Derivatives Native Gateway will use the Enriched Messages and will contain all relevant fields needed for Derivatives trading

- Each message is unique per gateway type

The Equity Native Gateway messages can not be submitted on the Derivatives Native Gateway and vice versa

Functional Summary
Trading Connectivity – Native Trading Gateway Message Summary

Message	Message Type	Equity Gateway	Derivatives Gateway
Client Initiated			
New Order	D	Y	Y
Quote	S	X	Y
Order Cancel Request	F	Y	Y
Order Mass Cancel Request	q	Y	Y
Order Cancel/Replace Request	G	Y	Y
Quote Request	a	X	Y
Quote Request Reject	b	X	Y
RFQ Quote	d	X	Y
Quote Response	f	X	Y

Message	Message Type	Equity Gateway	Derivatives Gateway
Other Application Messages			
Business Reject	j	Y	Y
News	Z	Y	Y

Message	Message Type	Equity Gateway	Derivatives Gateway
Server Initiated			
Execution Report	8	Y	Y
Order Cancel Reject	9	Y	Y
Order Mass Cancel Report	r	Y	Y
Quote Request	a	X	Y
Quote Request Reject	b	X	Y
Quote Status Report	c	X	Y
RFQ Quote	d	X	Y
Quote Ack	e	X	Y
Quote Response	f	X	Y
RFQ Execution Report	g	X	Y

Functional Summary

Native Trading Gateway – Message Header

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- Native messages are fixed-width and their length will be defined in bytes
- Each native message will start with a message header as follows:

Field	Offset	Length	Description
Start of Message	0	1	Indicates the start of the message.
Message Length	1	2	Length of the message from the Message Type field onwards.
Message Type	3	1	Message Type in ASCII
Administrative/Application Message details	*4*	*Message dependant*	

Functional Summary

Native Trading Gateway – Administrative Messages

- **Administrative messages** are common across all Native Trading Gateways and consist of
  - Client-Initiated or
  - Server-Initiated
- Logon (A)
  - used by the client to login to the server
- Logon Response (B)
  - Used by the server to accept or reject a login request
- Logout (5)
  - Used by the client or server to terminate a session
- Heartbeat (0)
  - Used by the client and server to exercise the communication line during periods of inactivity and verify that the interfaces at each end are available

Functional Summary

Native Trading Gateway – Administrative Messages

- Missed Message Request (M) ➡
  - Used by the client to recover missed messages through the Recovery Channel
- Missed Message Request Ack (N) ⬅
  - Used by the server to accept or reject a request for missed messages
- Transmission Complete (P) ⬅
  - Used by the server to indicate that the transmission of missed messages is complete
- System Status (n) ⬅
  - This message will be disseminated in the recovery channel to indicate Service Non Availability of a partition (due to order cache outage)

Functional Summary

Native Trading Gateway – Application Messages (Client Initiated)

- Application messages will have **different fields within each message** across the Standard and Enriched Native Trading Gateways, however the message types remain the same

- New Order (D)

  - Allows the client to submit a new order

- Order Cancel Request (F)

  - Allows the client to cancel an Open or Parked order

- Order Cancel/Replace Request (G)

  - Allows the client to cancel an Open or Parked order

- Order Mass Cancel Request (q)

  - Allows the client to mass cancel orders
    - The mass cancel may apply to the orders of the logged in interface user or to all orders of the firm

Functional Summary
Native Trading Gateway – Application Messages (Client Initiated)

- Quote (S)
  - Allows the client to submit or update a quote
- Quote Request (a)
  - Allows the client to submit a private RFQ
- Quote Request Reject (b)
  - Allows client to reject a private RFQ request
- RFQ Quote (d)
  - Allows client to submit a quote in response to a private RFQ
- Quote Response (f)
  - Allows a client to submit an indication of whether the terms in the RFQ Quote from a market maker is accepted or not

Functional Summary

Native Trading Gateway – Application Messages (Server Initiated)

JS≡

- Execution Report (8)
  - Indicates one of the following on an order submitted for an instrument:
    - Order accepted or rejected
    - Order executed
    - Order expired
    - Order cancelled
    - Order cancel/replaced (modified)
    - Trade cancelled
    - Trade corrected
    - Order Suspended
    - Order Restated
    - Order Triggered

Functional Summary

Native Trading Gateway – Application Messages (Server Initiated)

- Order Cancel Reject (9)
  - Indicates that an order cancel request or order cancel/ replace request has been rejected

- Order Mass Cancel Report (r)
  - Indicates whether an order mass cancel request has been accepted or rejected

- Quote Request (a)
  - Indicates that a Quote Request has been placed for private negotiation

- Quote Request Reject (b)
  - Indicates that a Quote Request has been accepted or a Quote Response has been rejected

Functional Summary

Native Trading Gateway – Application Messages (Server Initiated)

- Quote Status Report (c)
    - Indicates that a Quote Request has been accepted or rejected
- RFQ Quote (d)
    - Indicate that a RFQ Quote has been placed by a market maker in response to a private RFQ
- Quote Ack (e)
    - Indicate that a RFQ Quote has been accepted or rejected
- Quote Response (f)
    - Indicates that a Quote Request Reject has been accepted or rejected
- RFQ Execution Report (g)
    - Indicates that a RFQ Quote placed in response to a private RFQ has been executed with a quote from the private RFQ requestor

Functional Summary

Trading Connectivity – Drop Copy and Post Trade Gateway

- Drop Copy and Post Trade Gateway make use of the FIX Protocol (FIX 5.0 SP2)

- Administrative messages are the same for both the Drop Copy and Post Trade Gateways

- Each message will begin with a Header and will end with a Trailer

Functional Summary
Drop Copy and Post Trade Gateway – Administrative messages

- **Administrative messages** may be initiated by the client or the server
- Logon (A)
  - Allows the client and server to establish a FIX session
- Logout (5)
  - Allows the client and server to terminate a FIX session
- Heartbeat (0)
  - Used by the client and server to exercise the communication line during periods of inactivity and verify that the interfaces at each end are available
- Test Request (1)
  - Allows the client or server to request a response from the other party if inactivity is detected

Functional Summary

Drop Copy and Post Trade Gateway – Administrative messages

- Resend Request (2)
  - Allows for the recovery of messages lost during a malfunction of the communications layers
- Reject (3)
  - Used to reject a message that does not comply with FIXT
- Sequence Reset (4)
  - Allows the client or server to increase the expected incoming sequence number of the other party
- Business Message Reject (j)

  - Indicates that an application message could not be processed

Functional Summary

Drop Copy and Post Trade Gateway – Application messages

- Order Mass Status Request (AF) *Drop Copy*

  - Allows the client to request the status of all active orders for a particular Trader and Trader Group combination

- Trade Capture Report Request (AD) *Post Trade*

  - Allows the client to query/request for a set of Trade Capture Reports from the server

- Trade Capture Report Request Ack (AQ) *Post Trade*

  - Acknowledges the receipt of a Trade Capture Report Request message from the client

Functional Summary

Drop Copy and Post Trade Gateway – Copy Functionality

- Trading Members have the ability to receive all order and trade related activity through a Drop Copy or Post Trade connection

- 'Copy To' functionality is facilitated via the Drop Copy Gateway in the form of Execution Reports

- Real-time trade information will be sent down the Post Trade Gateway in the form of Trade Capture Reports (TCRs)

- Trading Members can view all of their order and trade activity as and when it occurs on a different gateway to the Native Trading Gateway

Functional Summary

Drop Copy and Post Trade Gateway – Copy Functionality

- Members will be able to provide their clearing member with a live copy of their orders (drop copy gateway) and trades in order for the Clearing Member to perform real-time monitoring and risk management

- This will require separate enablements requested by the clearing member in consultation with their trading member

A session will be dedicated to detail this functionality and process

Questions?

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