



Event Frames – A novel approach to enable life cycle management

Presented by: Warren Armstrong



Anglo American Platinum (AMPLATS)

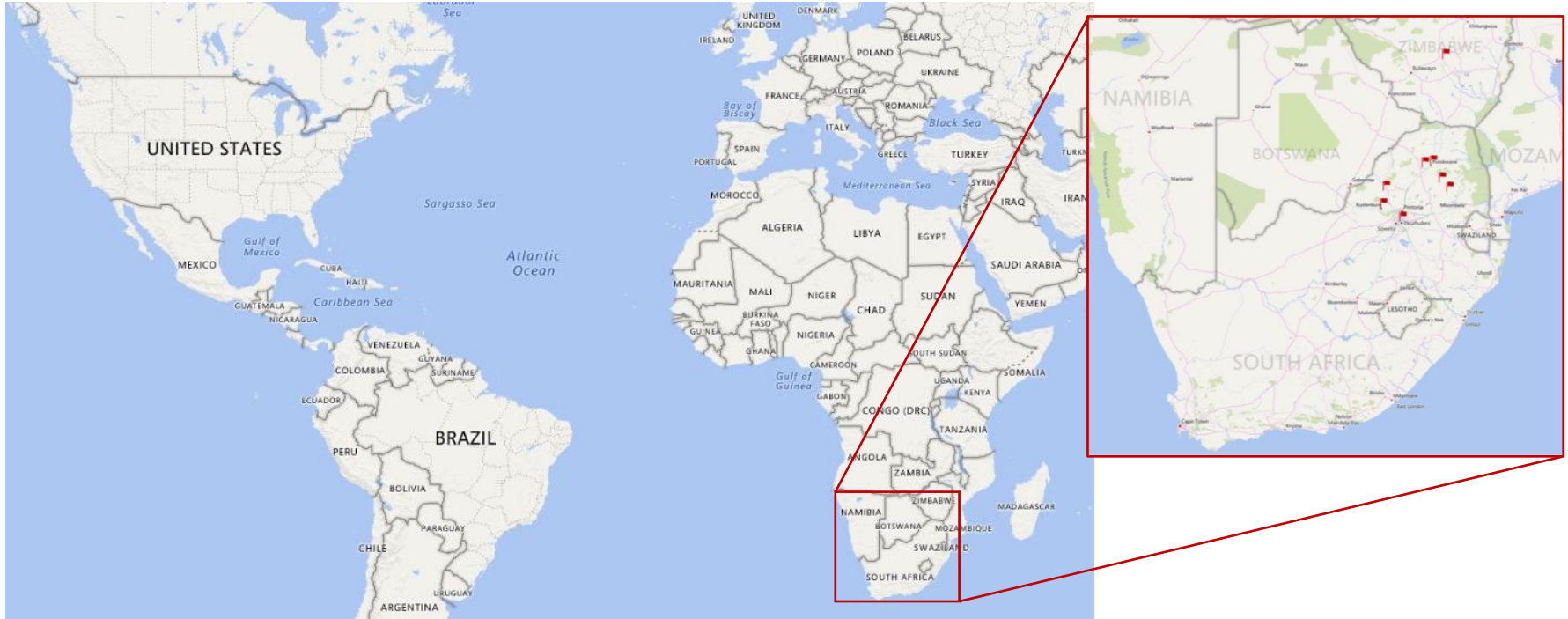
World's leading primary producer of Precious Group Metals
Supplying ~37% of the world's newly refined Platinum.

Process Division:

- 3 Mines
- 15 Concentrators*
- 3 Smelters
- 1 Converter
- 2 Refineries
- 9 geographic operational areas



Johannesburg, South Africa



Background

For 1gm of Platinum

Amplats mines **2671 kg** of rock

Mills **913 kg** of ore

To 80% less than **75 microns (mm)**
or **0.075 mm**

2017 tonnages

29.7 million milled

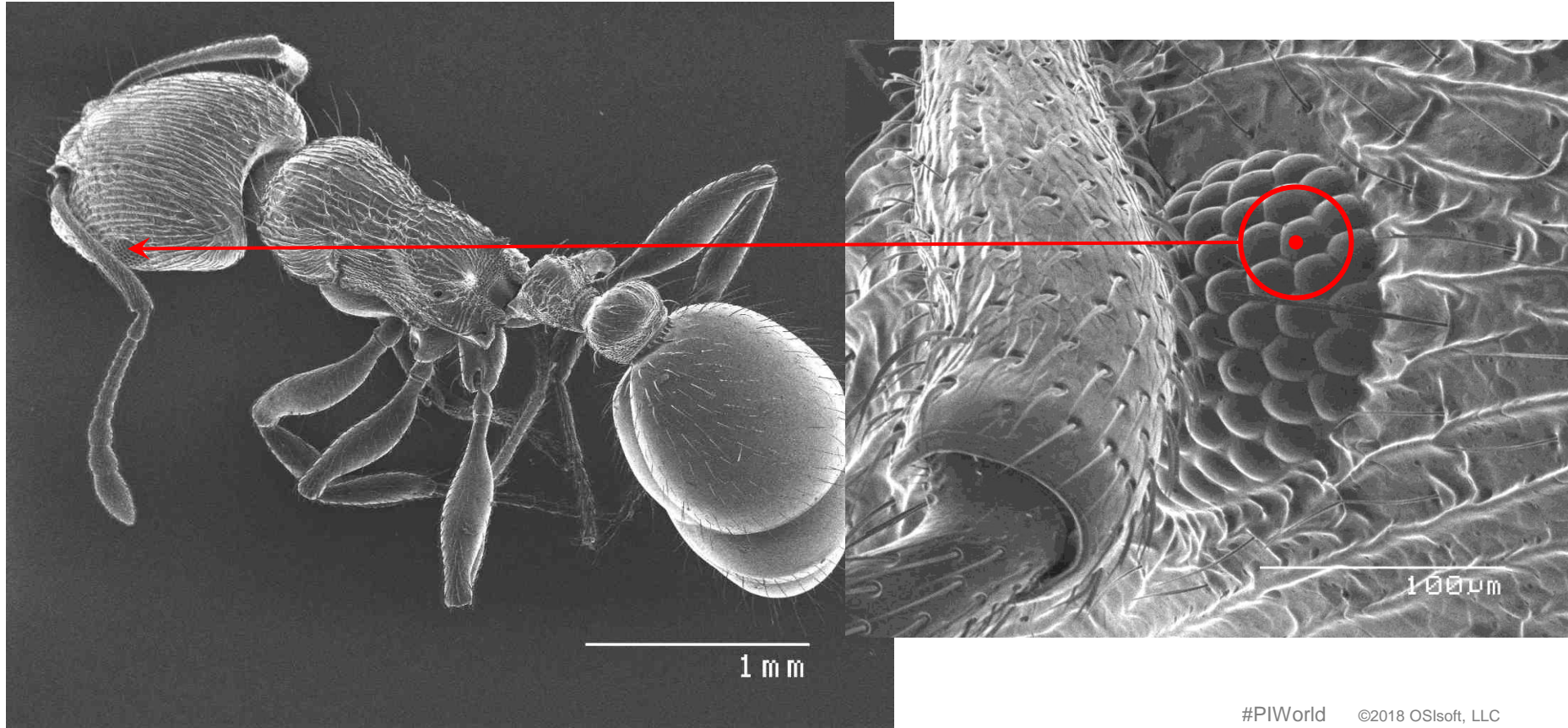
78 Platinum

Why so fine?

UG2 Platinum Group Metal mineral size!

Typically 5 microns

So how fine is bug dust?



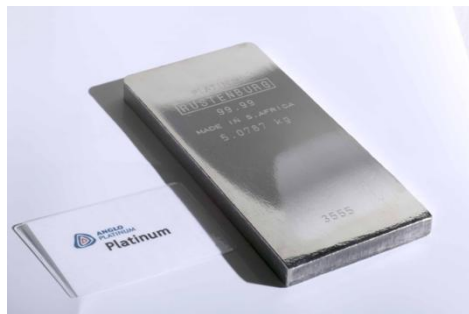
Value Chain



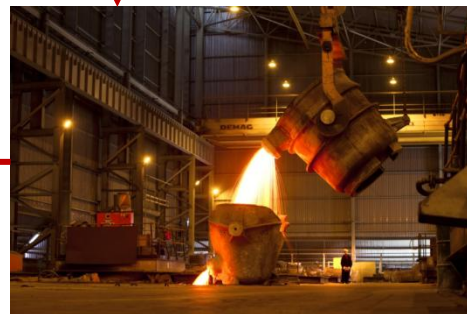
Ore
3.2 g/t



Concentrate
125 g/t



Refineries
99.9200 %



Smelters
2700 g/t

life cycle tracking

EventFrames?



Business Challenge

“How many ingots are cast into a specific mould”

“How many ingots must be pulled from moulds today?”

“How many ingots are on specification”

“How many moulds are available for casting?”

“What is the average mould fill?”

...

Up-to-date ingot and equipment life cycle information was needed

All the product goes through this step

Business Challenge

- Details stored in Excel, process is manual
- Performance and planning metrics were time consuming to generate, especially when cross-month comparisons are needed
- The unique process meant there is no perfect fit application
- More custom applications?
- Another data store?

Linear product Life and action points



Mould ready

Cast and cool

Remove
lid

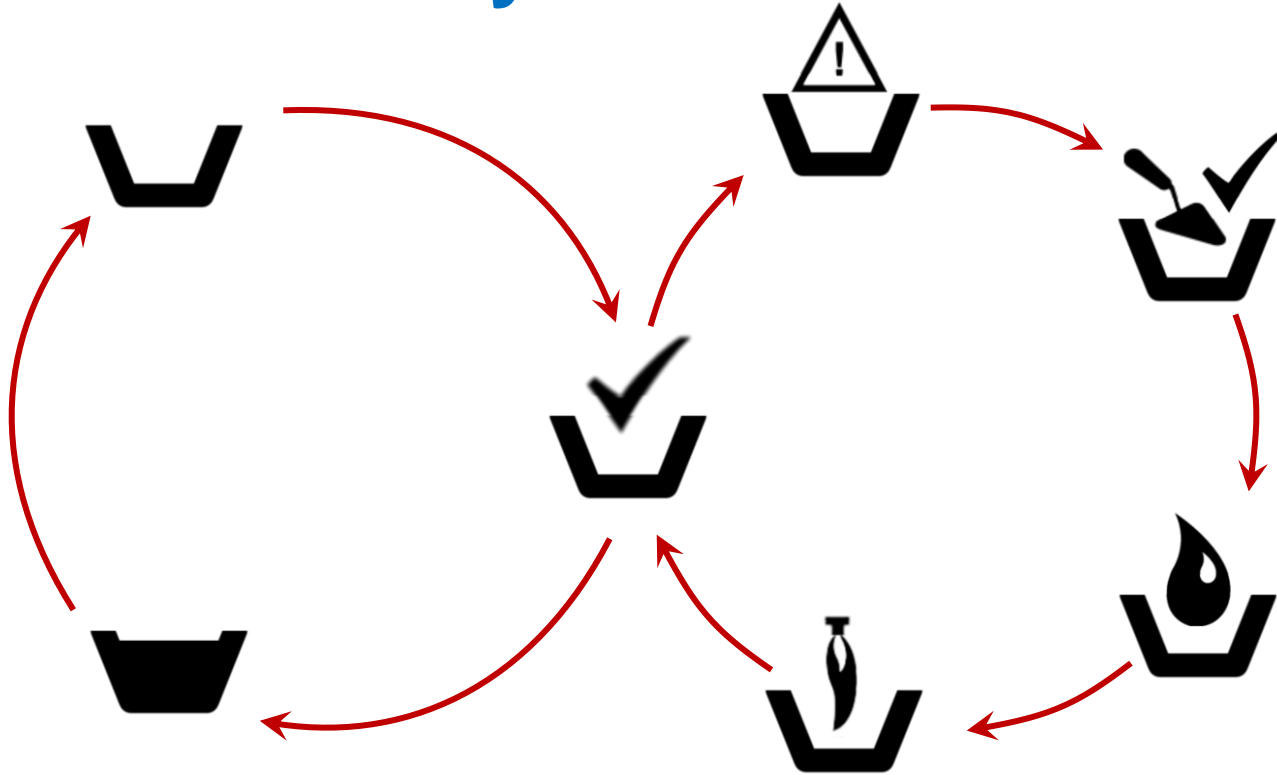
Cool in
mould

Lift

Cool/wait

Crush

Equipment Life-cycle



Design, requirements match

- Each of the life cycle step has a start and end time
- Each step is associated with equipment
- An ingot goes into a mould cast by a ladle, or an ingot is in process area at a time

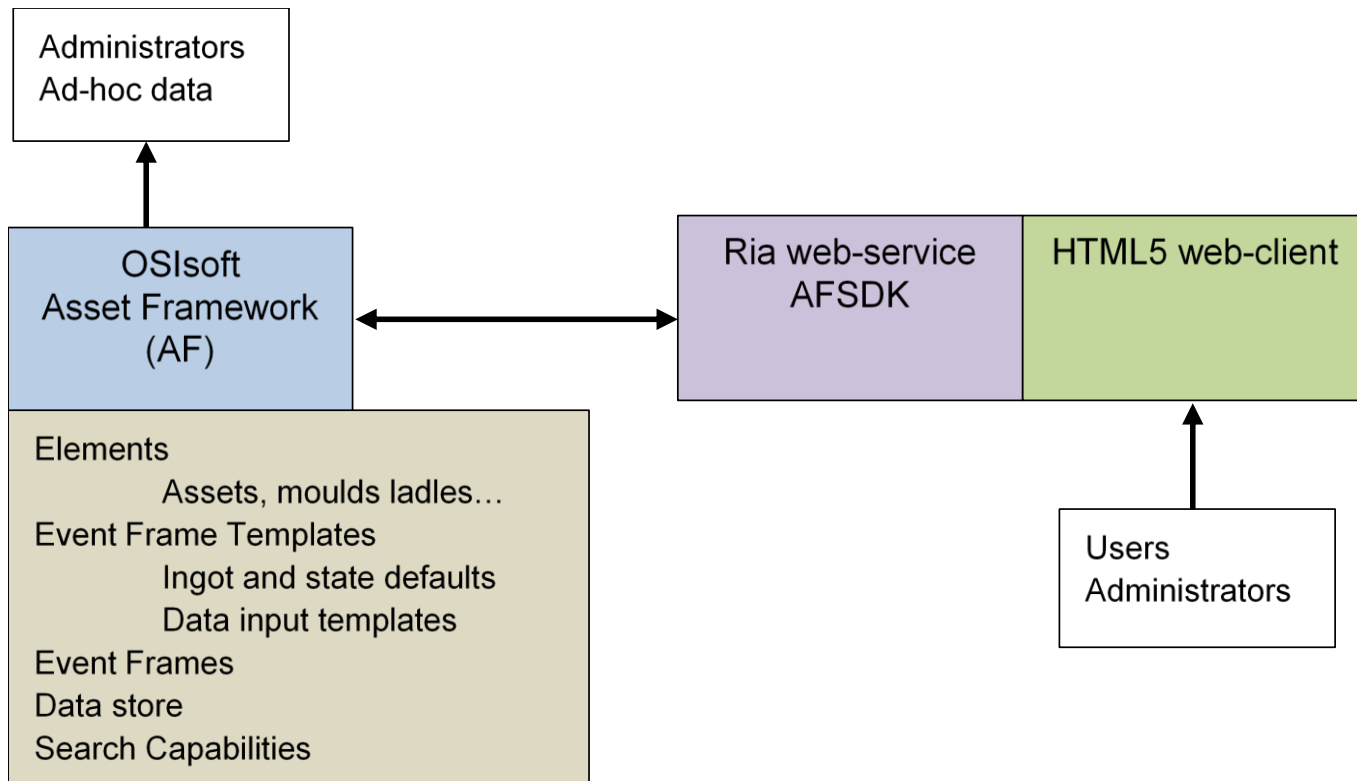
EventFrames

Use native Parent child relationships and References to
Equipment Elements

Implementation

- EventFrames and the Asset Framework do the heavy lifting
 - Calculations on templates
 - Defaults on templates
 - Stores data
- Need a User to:
 - Enter Data
 - Create event frames to follow business logic with equipment references
 - Show summary information

Architecture



Results

- An EventFrame search with simple aggregation can answer the questions below
- For a production batch
 - What were the process inputs: materials, energy
 - What was the product quality and quantity
 - What mould\ is the batch in
 - What ladles were used
- For a mould or ladle
 - How many ingots (or tonnes) were cast between repairs
 - How many patch repairs before a complete rebuild
 - How long between casts

Mould View

Date: 2018 Jan 11 - Thu Hours Due: 12

5 55 PM

Moulds

101	14,94	701	19	1301	17,96	1901	8,72	2501	12,86	3101	
102	18,42	702		1302	18,44	1902	12,68	2502	13,16	3102	
103	12,96	703	18,4	1303		1903	12,96	2503	12	3103	11
201	13,38	801	17,05	1401		2001	15,36	2601		3201	18,5
202	16,14	802	16,4	1402	15	2002	20,5	2602	11,6	3202	
203		803		1403		2003	15	2603	17,7	3203	9,2
301		901		1501	14,7	2101	15,34	2701	11,2	3301	16
302		902		1502	16,2	2102	17,02	2702	4	3302	20
303	none	903		1503	16	2103	17,72	2703	20	3303	
401		1001	14,86	1601	11,1	2201		2801	22,7	3401	16,62
402	13	1002	14,91	1602		2202		2802	12,1	3402	11
403	14	1003		1603	12,1	2203	38	2803	14	3403	10
501	18	1101	8	1701	20	2301	9,9	2901	20	3501	
502	16	1102	17	1702	12,7	2302	15	2902		3502	
503	15,3	1103		1703		2303	16,9	2903	18,42	3503	
601	11	1201	14	1801	17,5	2401	16	3001	19,6	3601	
602	15	1202		1802	18,76	2402	13,51	3002		3602	15,92
603	14	1203	13	1803	8,7	2403	14,4	3003	16,14	3603	17,02

Summaries

Image	Name	Count
	Mould Ok	103
	Mould available	29
	Mould in use	77
	Mould damaged	0
	Mould on maintenance	0
	Mould to cure	0
	Mould burner on	0
	Mould burner tripped	1


Image	Name	Count	Weight
	Ingot in mould with lid on	76	1154.91
	Ingot in mould - cooling	1	18.76
	Total	78	1173.67

Image	Name	Count	Weight
	Lids to Lift	75	1116.91
	Ingot to Pull	2	56.76
	Broken\ no hangers	0	0.00
	Revert	0	0.00
	Total	77	1173.67

Mould with Business logic

Summaries

Mould View



Mould Name
Mould 1402

Mould Set
14

State
Ingot in mould with lid on

Display Text
15

Mould State Name
Mould Ok

Ingot State Name
Ingot in mould with lid on

Ingot Number
Ingot Number

Ingot Quality
On





Ingot Mass
15

Revert
false

Broken
false

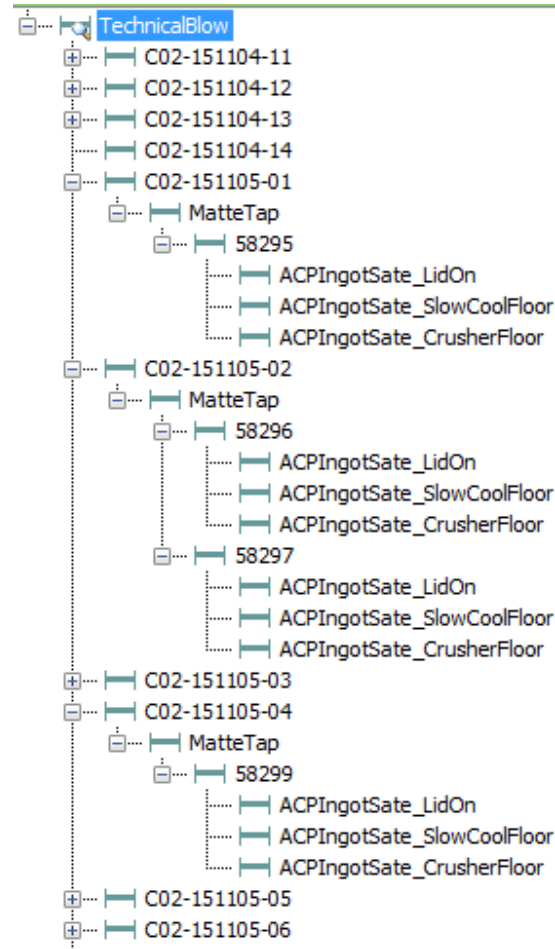
Number of Ingots
1

Ingot Quick Actions

-  Lift Lid
-  Pull Ingot
-  Mark Ingot - Revert
-  Mark Ingot - Broken

Ingot Details Editing

- Edit Ingot State
- Edit Ingot Details
- Edit Technical Blow



State Configuration

☒ Ingot State List ▾

Extended Properties	
Name	Value
IngotLog.IconName	Mould-with-Ingot
IngotLog.PlannedTimeTolerance	0
IngotLog.StateOrder	1
IngotLog.thisStateName	ingot.CoolInMould



Order	Planned time	Description
0	86400	Ingot in mould with lid on



Order	Planned time	Description
1	432000	Ingot in mould - cooling



Order	Planned time	Description
2	86400	Ingot on slow cool floor



Order	Planned time	Description
3	1	Ingot on crusher floor



Order	Planned time	Description
4	0	Ingot crushed



INGOTLOG.HTMLCLIENT

Impact

- Live information for a manual process
- Utilising existing functionality
 - Saved ~400hr of initial development time
 - Simplified implementation and on going maintenance
 - Implementation could focus on business logic and user experience
- No New data stores

Ingot life cycle management



Anglo American Platinum

Our company exists to make a real difference for everyone whose lives we touch. We mine the materials that make modern life possible, in ways that are safer, smarter and more responsible.



CHALLENGE

Up-to-date ingot and equipment life cycle information was needed

- Ingot details stored in Excel sheets
- Information flow was slow
- Unique process
- Reduce customisation

SOLUTION

EventFrames will do the heavy lifting. Build a User interface with business logic only

- EventFrames, data store, Configuration, defaults, calculations
- Elements, configuration
- Leverage; parent-child relationships, complex referencing and flexible search

RESULTS

Web application build to enter data and manage operational logic.

- Existing functionality saved ~400hr of development time
- Plant data kept in one system
- Existing tools: less to implement and less to maintain

Event Frames – A novel approach to enable life cycle management



Warren Armstrong

Warren.Armstrong@AngloAmerican.com

Control Technology Specialist

Anglo American Platinum

Questions

Please wait for the **microphone** before asking your questions

State your **name & company**



Please remember to...

Complete the Online Survey for this session

A promotional graphic for the OSIsoft Users Conference 2017 app. It features a smartphone displaying the app's interface, which includes a search bar, a list of sessions, and a 'Transform Your World' banner. To the right of the phone, there is a large red diagonal banner that reads 'UPDATED VERSION COMING SOON'. Below this, there are buttons for downloading the app from the App Store and Google Play, and a link to the HTML version. The background is dark blue with white text and icons.

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