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PARIS 2017

THE FUTURE OF BUSINESS REPORTING

The Future of XBRL Calculations and Formula

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The future of XBRL Calculations and formula

- Calculation limitations
- Calculations v2 *(working title)*
- Text-based Formula
- Detaching Formula from XML

Financial statements are a network of calculations

	May 31, 2016 (1)	November 30, 2015 (1)
ASSETS		
Lennar Homebuilding:		
Cash and cash equivalents	$ 601,192	893,408
Restricted cash	5,713	13,505
Receivables, net	45,000	74,538
Inventories:		
Finished homes and construction in progress	4,269,767	3,957,167
Land and land under development	5,245,422	4,724,578
Consolidated inventory not owned	134,514	58,851
Total inventories	9,649,703	8,740,596
Investments in unconsolidated entities	785,883	741,551
Other assets	646,555	609,222
	11,734,046	11,072,820
Rialto	1,171,987	1,505,500
Lennar Financial Services	1,423,679	1,425,837
Lennar Multifamily	518,089	415,352
Total assets	$ 14,847,801	14,419,509

Supported

Supported

Not supported

Dimensional aggregation

(In thousands)		Total Equity	Stockholders' Equity: Class A Common Stock	Class B Common Stock	Additional Paid - in Capital	Treasury Stock	Accumulated Other Comprehensive Income	Retained Earnings	Noncontrolling Interests
Balance at November 30, 2014	$	5,251,302	17,424	3,298	2,239,574	(93,440)	130	2,660,034	424,282
Net earnings (including net earnings attributable to noncontrolling interests)		301,501	—	—	—	—	—	297,979	3,522
Employee stock and directors plans		9,350	5	—	1,440	7,905	—	—	—
Tax benefit from employee stock plans and vesting of restricted stock		113	—	—	113	—	—	—	—
Amortization of restricted stock		20,611	—	—	20,611	—	—	—	—
Cash dividends		(16,418)	—	—	—	—	—	(16,418)	—
Receipts related to noncontrolling interests		1,367	—	—	—	—	—	—	1,367
Payments related to noncontrolling interests		(78,937)	—	—	—	—	—	—	(78,937)
Non-cash deconsolidations, net		(13,253)	—	—	—	—	—	—	(13,253)
Other comprehensive income, net of tax		83	—	—	—	—	83	—	—
Balance at May 31, 2015	$	5,475,719	17,429	3,298	2,261,738	(85,535)	213	2,941,595	336,981

Opening balance

Change in period

Closing balance

(In thousands)	Total Equity
Balance at November 30, 2014	$ 5,251,302
Net earnings (including net earnings attributable to noncontrolling interests)	301,501
Employee stock and directors plans	9,350
Tax benefit from employee stock plans and vesting of restricted stock	113
Amortization of restricted stock	20,611
Cash dividends	(16,418
Receipts related to noncontrolling interests	1,367
Payments related to noncontrolling interests	(78,937
Non-cash deconsolidations, net	(13,253
Other comprehensive income, net of tax	83
Balance at May 31, 2015	$ 5,475,719

Not supported

Cross-period calculation (roll forward)

"but Formula can do all that stuff!"

Formula can **validate** all that stuff

… but it doesn't help understand and visualise the relationships

Calculations v2

XBRL Calculations give us one "pattern" of calculations:

Summation between facts with **different concepts**
but the **same period**
and the **same dimensions**

What other patterns do we need?

Calculation patterns

1. Dimensional aggregation
2. Roll-forward

Cash flows from financing activities:			
Net borrowings under unsecured revolving credit facility	$	375,000	450,000
Net (repayments) borrowings under warehouse facilities		(230,206)	189,632
Proceeds from senior notes		499,024	750,625
Debt issuance costs		(3,796)	(6,510)
Redemption of senior notes		(250,000)	(500,000)
Conversions and exchanges on convertible senior notes		(233,893)	—
Principal payments on Rialto notes payable including structured notes		(2,999)	(20,940)
Proceeds from other borrowings		15,657	69,741
Principal payments on other borrowings		(103,189)	(206,901)
Receipts related to noncontrolling interests		167	1,367
Payments related to noncontrolling interests		(73,195)	(78,937)
Excess tax benefits from share-based awards		7,039	113
Common stock:			
Issuances		594	9,412
Repurchases		(971)	(972)
Dividends		(17,191)	(16,418)
Net cash (used in) provided by financing activities		(17,959)	640,212
Net decrease in cash and cash equivalents		(342,968)	(361,657)
Cash and cash equivalents at beginning of period		1,158,445	1,281,814
Cash and cash equivalents at end of period	$	815,477	920,157

Net borrowings under unsecured revolving credit facility	$	375,000	450,000
Net (repayments) borrowings un		(230,206)	189,632
Proceeds from senior notes		499,024	750,625
Debt issuance costs		(3,796)	(6,510)
Redemption of senior notes		(250,000)	(500,000)
Conversions and exchanges on c		(233,893)	—
Principal payments on Rialto no		(2,999)	(20,940)
Proceeds from other borrowings		15,657	69,741
Principal payments on other bor		(103,189)	(206,901)
Receipts related to noncontrollin		167	1,367
Payments related to noncontrolli		(73,195)	(78,937)
Excess tax benefits from share-b		7,039	113
Common stock:			

Attributes

Repayments of Debt

Tag	us-gaap:RepaymentsOfDebt
Fact	2,999,000
Axis	Segments [Axis] - us-gaap:StatementBusinessSegmentsAxis
Member	Rialto Investments [Member] - len:RialtoInvestmentsMember
Period	6 months ending 5/31/2016
Measure	USD
Scale	Thousands

Calculation patterns

1. Dimensional aggregation
2. Roll-forward
3. Calculation involving differently dimensionalised primary items

… or is this just a combination of summation item + an implicit dimensional aggregation?

Calculation, validation and extensions

	Notes	**2014 HK$ million**	2015 HK$ million
Non-current assets			
Property and equipment	15	**11,431.4**	8,325.3
Land use rights	17	**2,728.9**	2,771.0
Intangible assets	18	**14.2**	20.5
Art eorks and diamonds	19	**281.3**	289.2
Interest in an associate	20	**45.1**	19.1
Interest in a joint venture	21	**101.2**	93.8
Available-for-sale investments in equity securities	22	**608.4**	1,703.9
Deposits made on acquisitions	23	**173.0**	426.7
Extensions: Amount due from a fellow subsidiary	24	**-**	63.7
Extensions: Amount due from an associate	25	**88.4**	88.4
Extensions: Amount due from a joint venture	26	**14.3**	14.3
Extensions: Amount due from an investee company	27	**75.0**	93.0
Pledged bank deposits	28	**525.9**	633.7
		16,087.1	14,542.6

Calculation, validation and extensions

Amount due from a fellow subsidiary	24	-	63.7
Amount due from an associate	25	**88.4**	88.4
Amount due from a joint venture	26	**14.3**	14.3
Amount due from an investee company	27	**75.0**	93.0

Nearest (most useful) parent:

"Amounts due from related parties, non-current"

Nearest *reported* parent:

"Non-current assets"

By tying **calculations** to **validation**, we lose useful semantic information from the relationships.

Calculation, validation and extensions

- Calculations should support inference?

  A = B + C
  C = D + E
  Report: B + D + E

- Or accept that calculations are for documentation not validation?

Calculations v2

- Need has been emphasised by ESD-TF
- Specification WG to refine requirements and develop solution

Get involved!

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THE FUTURE OF BUSINESS REPORTING

The Future of XBRL Formula

XBRL Formula

- XBRL Formula is very powerful
  - Ability to embed business rules in an XBRL Taxonomy is extremely valuable
- XBRL Formula is very complex
- XBRL Formula is hard to use

…and not just because it's complex

Formula syntax

```
<variable:factVariable
  bindAsSequence="false"
  xlink:label="variable1"
  xlink:type="resource"/>
<cf:conceptDataType strict="false" xlink:label="filter1" xlink:type="resource">
    <cf:type>
        <cf:qname>lei:LEIItemType</cf:qname>
    </cf:type>
</cf:conceptDataType>
<variable:variableFilterArc
  complement="false"
  cover="true"
  xlink:arcrole="http://xbrl.org/arcrole/2008/variable-filter"
  xlink:from="variable1"
  xlink:to="filter1"
  xlink:type="arc"/>
```

Tools will make this easy, right?

Formula syntax

Formula Linkbase

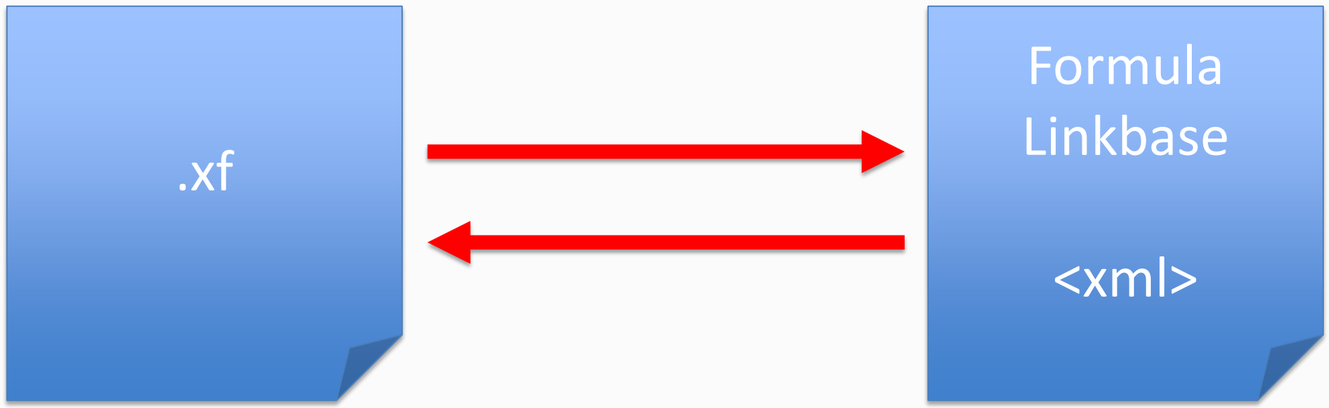
```
<variable:factVariable
  bindAsSequence="false"
  xlink:label="variable1"
  xlink:type="resource"/>
<cf:conceptDataType strict="false" xlink:label="filter1" xlink:type="resource">
    <cf:type>
        <cf:qname>lei:LEIItemType</cf:qname>
    </cf:type>
</cf:conceptDataType>
<variable:variableFilterArc
  complement="false"
  cover="true"
  xlink:arcrole="http://xbrl.org/arcrole/2008/variable-filter"
  xlink:from="variable1"
  xlink:to="filter1"
  xlink:type="arc"/>
```

XF

```
variable $v {
   concept-data-type non-strict lei:LEIItemType;
};
```

XF features

Same functionality as XBRL Formula Linkbase



XF Example – LEI Taxonomy

```
namespace lei-fn = "http://www.xbrl.org/taxonomy/int/lei//VERSION//functions";
namespace lei = "http://www.xbrl.org/taxonomy/int/lei//VERSION/";

assertion lei-checksum-fact-value {
   unsatisfied-message (en) "
      The value '{ $v }' is not a valid Legal Entity Identifier (invalid checksum)
    ";
   variable $v {
      concept-data-type non-strict lei:LEIItemType;
   };
   test {lei-fn:validate-checksum($v)};
};
```

XF Example – LEI Taxonomy

```
function lei-fn:validate-checksum(s as xs:string) as xs:boolean {
  return {
    xs:integer(
      string-join(
        (for $c in string-to-codepoints($s) return xs:string(if ($c <= 57) then $c - 48 else $c - 55)),
        ''
      )
    ) mod 97  = 1
  };
};
```

XBRL Formula & XPath

```
xs:integer(
  string-join(
    (for $c in string-to-codepoints($s) return xs:string(if ($c <= 57) then $c - 48 else $c - 55)),
    ''
  )
) mod 97  = 1
```

XPath (**XML Path Language**) is a query language for selecting nodes from an XML document. In addition, XPath may be used to compute values (e.g., strings, numbers, or Boolean values) from the content of an XML document. XPath was defined by the World Wide Web Consortium (W3C).[1]

XBRL Formula & XPath

```
return {
    /xbrli:xbrl/xbrli:context[ id = 'c37']
}
```

Impossible to evaluate without an XML document

This is **not** OIM-compatible

XBRL Formula & XPath

- Need to break the tie between XBRL Formula evaluation and XML documents
- XPath remains a reasonable choice for the expression language
- Restricted subset:
  - No node navigation
  - No context nodes

The future of XBRL Formula

We know what needs doing

Get involved and help make it happen