

# SISS Workshop

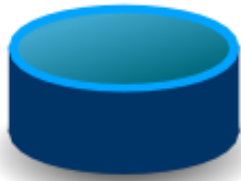
## GeoServer in Production – SISS Exemplar

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**Technical Team Lead**  
**22 November 2011**

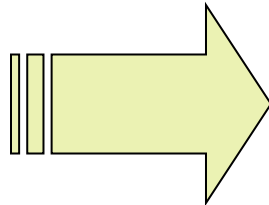
# Highlights

- Process overview
- Configuring a WFS
  - Data mapping
  - Interface to the data
  - WFS configuration

# Goal – Interoperable Data Delivery



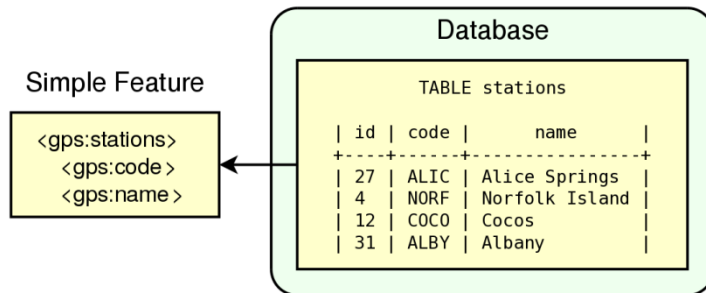
Existing  
database



```
- <er:MineralOccurrence gml:id="er.mineraloccurrence.S0000001">
  <gml:name codeSpace="http://www.ietf.org/rfc/rfc2616">http://services-
  test.auscope.org/resource/feature/gswa/mineraloccurrence/S0000001</gml:name>
  <gml:name codeSpace="http://www.dmp.wa.gov.au/371.aspx">PIECES OF EIGHT - ADMIRAL HILL</gml:name>
- <gsmi:observationMethod>
  <gsmi:CGI_TermValue>
    <gsmi:value codeSpace="http://urn.opengis.net/">urn:ogc:def:nil:OGC::missing</gsmi:value>
  </gsmi:CGI_TermValue>
  </gsmi:observationMethod>
  <gsmi:purpose>instance</gsmi:purpose>
  <gsmi:occurrence xlink:href="http://services-test.auscope.org/resource/feature/gswa/mappedfeature/S0000001" />
- <er:classification>
  <er:MineralDepositModel>
    <er:mineralDepositGroup codeSpace="http://www.dmp.wa.gov.au/371.aspx">Vein and hydrothermal -
    undivided</er:mineralDepositGroup>
  </er:MineralDepositModel>
  </er:classification>
- <er:commodityDescription>
  <er:Commodity gml:id="er.commodity.S0000001.121">
    <gml:name codeSpace="http://www.ietf.org/rfc/rfc2616">http://services-
    test.auscope.org/resource/feature/gswa/commodity/S0000001/121</gml:name>
    <gml:name codeSpace="http://www.dmp.wa.gov.au/371.aspx">Gold (Au)</gml:name>
    <er:commodityGroup codeSpace="http://www.dmp.wa.gov.au/371.aspx">Precious metal</er:commodityGroup>
    <er:commodityName
      codeSpace="urn:cgi:classifierScheme:GA:commodity">urn:cgi:classifier:GA:commodity:Au</er:commodityName>
    <er:commodityRank>1</er:commodityRank>
    <er:source xlink:href="http://services-test.auscope.org/resource/feature/gswa/mineraloccurrence/S0000001" />
  </er:Commodity>
  </er:commodityDescription>
- <er:oreAmount>
  <er:Resource>
    <er:calculationMethod>Unknown</er:calculationMethod>
  - <er:date>
    - <gml:TimeInstant>
      <gml:timePosition>2005-07-13 00:00:00.0</gml:timePosition>
    </gml:TimeInstant>
    </er:date>
    <er:sourceReference xlink:href="http://www.opengis.net/def/nil/OGC/0/unknown" />
  - <er:ore>
```

XML Document

# Simple vs. Complex features in GeoServer



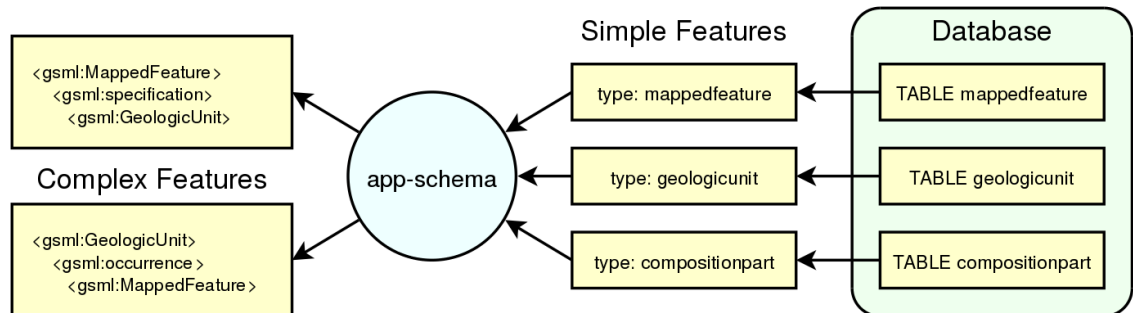
Simple features

SF Level 0

VS.

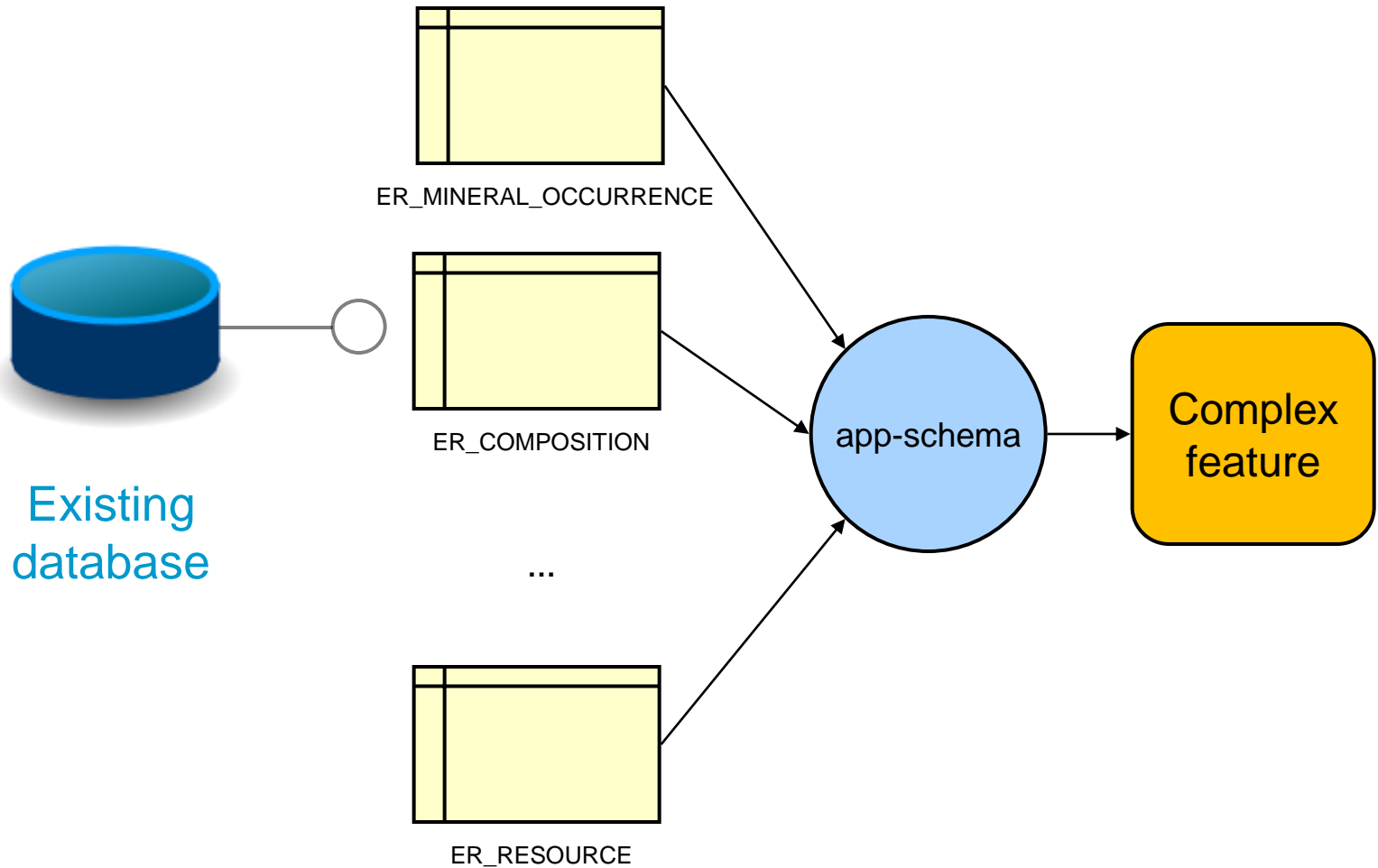
Complex features

SF Level 1





# Preserving Original Database Schema

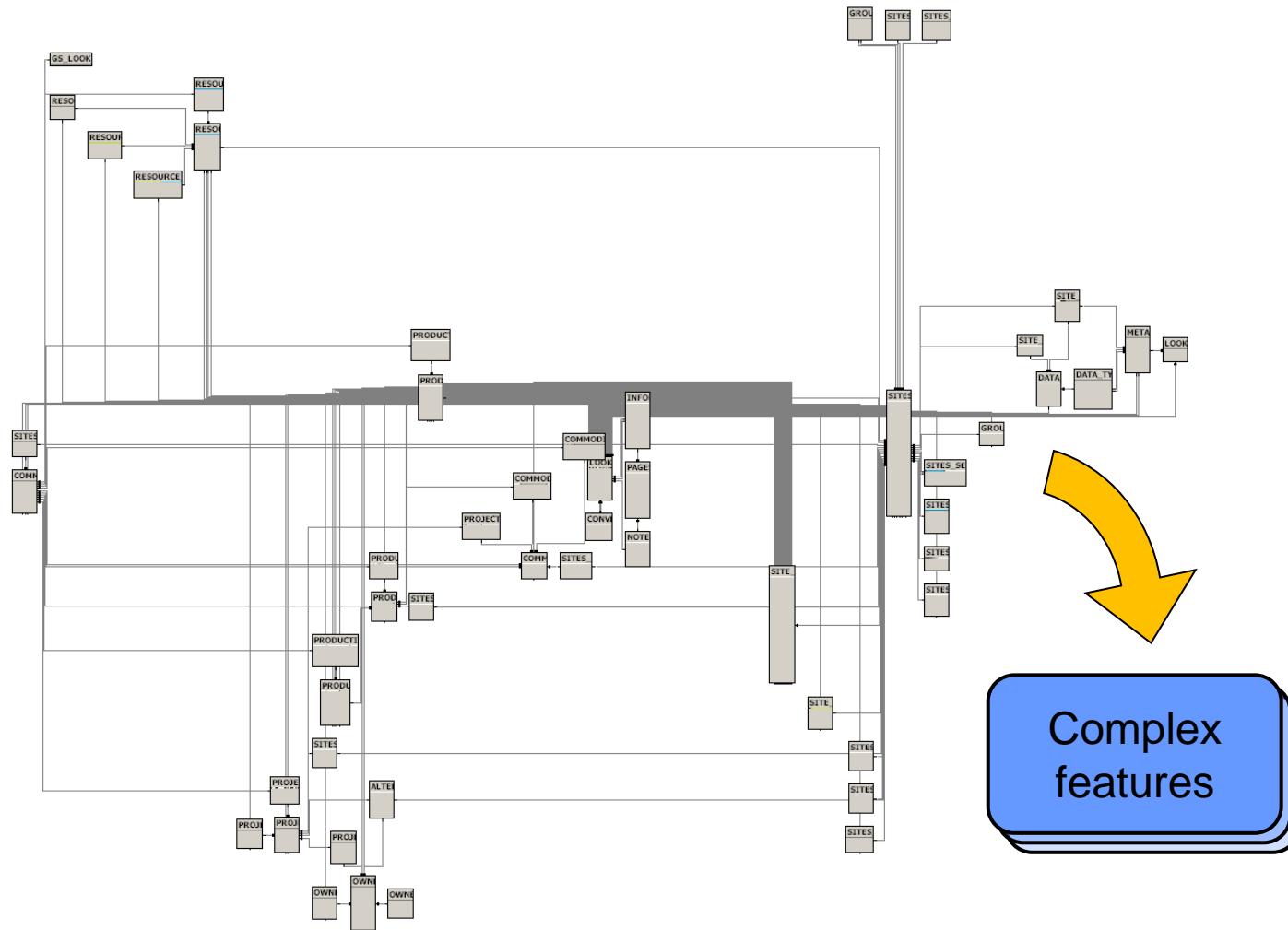


# Data Mapping Process

- **Data requirements**
  - Requires domain and database knowledge
- **Logical data mapping**
  - Yields a data mapping document (Excel spreadsheet)
- **Data facade implementation**
  - Involves SQL programming
  - Conflict resolution
- **Physical data mapping**
  - GeoServer configuration



# Data Mapping



# Logical Mapping

## Spreadsheet data mapping template

The screenshot shows a Microsoft Excel spreadsheet titled 'Microsoft Excel - GSWA\_Mapping\_v11.xls'. The spreadsheet is used for mapping properties to database fields. The columns are labeled A through G, and the rows are numbered 1 through 10. The data is as follows:

Property	Mandatory	Present Minedex	Encoded or N/A	DB Field	Comments	Developer's Remarks
gml:description	N	N				
gml:name	N	Y		COMMODITIES.NAME	SITES_COMMODITIES.COMG_ID =	
gml:name (for gml:identifier)	Y	Y		[SITES.SITE_CODE].[COMMODITIES.COMM_ID]	urn:cgi:feature:GSWA:Commodity:[SITE_CODE].[COMM_ID]  where [SITE_CODE].[COMM_ID] is a unique pair of all SITE_CODE and COMM_ID values extracted from: SITES_COMMODITIES	PRODUCT_COMMODITIES has no links with SITES table, so can't obtain SITE_CODE.  RANKING field is only present in
er:commodityGroup	N	Y		SITES_COMMODITY_GROUPS.COMG_ID	COMMODITY_GROUPS.NAME Where COMMODITY_GROUP.COMG_ID = SITES_COMMODITY_GROUPS.COMG_ID	
er:commodityName	Y	Y		COMMODITIES.NAME	SITES_COMMODITIES.COMG_ID = COMMODITIES.COMG_ID GSWA values need to be mapped to	
er:commodityImportance	N	N				
er:commodityRank	N	Y		SITES_COMMODITIES.RANKING		
er:source	Y	Y		SITES.SITE_CODE	xlink to	





# ER\_COMMODITY view #1

```
CREATE OR REPLACE FORCE VIEW "NTGS"."VW_ER_COMMODITY"
AS
WITH F AS
(
    SELECT
        c."Deposit_Id", c."Commodity_Id",
        'http://www.minerals.nt.gov.au/resource/feature/ntgs/commodity/' || c."Deposit_Id" || '/' || c."Commodity_Id" AS GML_NAME,
        'http://www.ietf.org/rfc/rfc2616' AS GML_NAME_CODESPACE,
        'http://www.minerals.nt.gov.au/resource/feature/ntgs/mineraloccurrence/' || c."Deposit_Id" AS MINOCC_FEATURE_LINK
    FROM NTGS."Tbl_Commodity_Summary" c
    UNION ALL
    SELECT
        c."Deposit_Id", c."Commodity_Id",
        c."Commodity" AS GML_NAME,
        'http://www.minerals.nt.gov.au/ntgs' AS GML_NAME_CODESPACE,
        NULL AS MINOCC_FEATURE_LINK
    FROM NTGS."Tbl_Commodity_Summary" c
)
SELECT
    'er.commodity.' || c."Deposit_Id" || '.' || c."Commodity_Id" AS GML_ID,
    F.GML_NAME, F.GML_NAME_CODESPACE,
    urn.ga_urn AS COMMODITYNAME,
    'urn:cgi:classiferScheme:GA:commodity' AS COMMODITYNAME_CODESPACE,
    COALESCE(gd."Mineral_Categories", 'urn:ogc:def:nil:OGC::missing') AS COMMODITYGROUP,
    'http://www.minerals.nt.gov.au/ntgs' AS COMMODITYGROUP_CODESPACE,
    COALESCE(LOWER(c."Major_Minor"), 'major') AS COMMODITYIMPORTANCE,
    'http://www.minerals.nt.gov.au/resource/feature/ntgs/mineraloccurrence/' || c."Deposit_Id" AS SOURCE_URN,
    F.MINOCC_FEATURE_LINK
FROM NTGS."Tbl_Commodity_Summary" c
INNER JOIN F ON F."Deposit_Id" = C."Deposit_Id" AND F."Commodity_Id" = c."Commodity_Id"
LEFT OUTER JOIN NTGS."Tbl_General_Data" gd ON gd."Deposit_Id" = c."Deposit_Id"
LEFT OUTER JOIN NTGS.TBL_COMMODITY_URN urn ON urn.commodity = c."Commodity"
ORDER BY C."Deposit_Id", c."Commodity_Id";
```

1

DATA  
REQUIREMENTS

2

LOGICAL  
MAPPING

3

DATA FACADE  
IMPLEMENTATION

4

PHYSICAL  
MAPPING

# ER\_COMMODITY view #2

```

CREATE VIEW [dbo].[VW_ER_COMMODITY]
AS
SELECT
    'er.commodity:' + unpvt.SITE_CODE + '!' + CAST(unpvt.COMM_ID AS VARCHAR(10)) AS GML_ID,
    unpvt.GML_NAME,
    CASE
        WHEN unpvt.GML_NAME_SRC = 'GML_NAME_1' THEN GML_NAME_CODESPACE_1
        ELSE GML_NAME_CODESPACE_2
    END AS GML_NAME_CODESPACE,
    'urn:cgi:classifier:GA:commodity:' + COALESCE(ga.GA_TERM, 'UN') AS COMMODITYNAME,
    'urn:cgi:classifierScheme:GA:commodity' AS COMMODITYNAME_CODESPACE,
    unpvt.COMMODITYGROUP AS COMMODITYGROUP,
    unpvt.RANKING AS COMMODITYRANK,
    'http://services-test.auscope.org/resource/feature/gswa/mineraloccurrence/' + unpvt.SITE_CODE AS SOURCE_URI,
    CASE
        WHEN unpvt.GML_NAME_SRC = 'GML_NAME_1' THEN MINOCC_FEATURE_LINK_1
        ELSE MINOCC_FEATURE_LINK_2
    END AS MINOCC_FEATURE_LINK
FROM
    (
        SELECT
            F.SITE_CODE,
            F.COMM_ID,
            CONVERT(VARCHAR(255), 'http://services-test.auscope.org/resource/feature/gswa/commodity/' + F.SITE_CODE + '/' + CAST(F.COMM_ID AS VARCHAR(10))) AS GML_NAME_1,
            CONVERT(VARCHAR(50), 'http://www.ietf.org/rfc/rfc2616') AS GML_NAME_CODESPACE_1,
            'http://services-test.auscope.org/resource/feature/gswa/mineraloccurrence/' + F.SITE_CODE AS MINOCC_FEATURE_LINK_1,
            CONVERT(VARCHAR(255), c.NAME) AS GML_NAME_2,
            CONVERT(VARCHAR(50), 'http://www.dmp.wa.gov.au/371.aspx') AS GML_NAME_CODESPACE_2,
            NULL AS MINOCC_FEATURE_LINK_2,
            F.RANKING,
            cg.NAME AS COMMODITYGROUP
        FROM
            (
                SELECT SITE_CODE, COMM_ID, MIN(RANKING) AS RANKING
                FROM
                    (
                        SELECT sc.SITE_CODE, sc.COMM_ID, sc.RANKING
                        FROM XMLDEV.MINEDEX.dbo.SITES_COMMODITIES sc
                        GROUP BY sc.SITE_CODE, sc.COMM_ID, sc.RANKING
                        UNION
                        SELECT re.SITE_CODE, rc.COMM_ID, NULL AS RANKING
                        FROM XMLDEV.MINEDEX.dbo.RESOURCE_COMMODITIES rc
                        INNER JOIN XMLDEV.MINEDEX.dbo.RESOURCE_ESTIMATES re ON re.RESE_ID = rc.RESE_ID
                        GROUP BY re.SITE_CODE, rc.COMM_ID
                        UNION
                        SELECT ps.SITE_CODE, psc.COMM_ID, NULL AS RANKING
                        FROM XMLDEV.MINEDEX.dbo.PRODUCTION_SITE_COMMODITIES psc
                        INNER JOIN XMLDEV.MINEDEX.dbo.PRODUCTION_SITES ps ON ps.PROS_ID = psc.PROS_ID
                        GROUP BY ps.SITE_CODE, psc.COMM_ID
                    ) T
                INNER JOIN dbo.VW_ER_MINERALOCCURRENCE mo ON mo.SITE_ID = T.SITE_CODE
                GROUP BY SITE_CODE, COMM_ID
            ) F
            INNER JOIN XMLDEV.MINEDEX.dbo.COMMODITIES c ON c.COMM_ID = F.COMM_ID
            LEFT OUTER JOIN XMLDEV.MINEDEX.dbo.COMMODITY_GROUPS cg ON cg.COMG_ID = c.DEFAULT_COMG_ID
        ) AS pvt
    UNPIVOT (GML_NAME FOR GML_NAME_SRC IN (pvt.GML_NAME_1, pvt.GML_NAME_2)) AS unpvt
    LEFT OUTER JOIN XMLDEV.MINEDEX.dbo.GS_LOOKUP_COMMODITY_GA_TERMS ga ON ga.COMM_ID = unpvt.COMM_ID;

```

1

DATA  
REQUIREMENTS

2

LOGICAL  
MAPPING

3

DATA FACADE  
IMPLEMENTATION

4

PHYSICAL  
MAPPING



# Physical Data Mapping in GeoServer

- Physical data mapping process relates to an actual configuration of GeoServer
- Complexity of the physical mapping depends on the complexity of the information model used
- Leads to the final testing and validation phase according to specific use cases



# Other Aspects

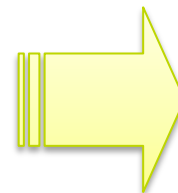
- Feature chaining
  - Nested properties
  - Multi-valued properties
- Polymorphism
- Specialised information model profiles
  - Inline or byReference encoding of feature properties
- Performance considerations
- Configurability
  - Property interpolation
  - JNDI Connection Pool
- Resolution of persistent identifiers
- Data integrity tests for data stores

# Data Integrity Tests

- Basic consistency checks
- Integrity of feature types relationships
  - Important when using features chained attributes
- Orphaned records search
- Etc.

# EarthResourceML Data Integrity Test Report

	Description	Result
1	Nil values in er:Commodity/gml.name	Passed
2	Nil values in er:Mine/gml.name	Passed
3	Nil values in er:MineralOccurrence/gml.name	Passed
4	Nil values in er:MiningActivity/gml.name	Passed
5	Nil values in er:MningFeatureOccurrence/gml.name	Passed
6	Nil values in gsml:MappedFeature/gml.name	Passed
7	Links in er:Commodity/er.source	10928 violation(s)
8	Links in er:Mine/er.occurrence	Passed
9	Links in er:MineralOccurrence/gsml.occurrence	Passed
10	Links in er:MiningActivity/er.occurrence	Passed
11	Links in er:MiningActivity/er.associatedMine	Passed
12	Links in er:MiningActivity/er.deposit	Passed
13	Links in er:MiningFeatureOccurrence/er.specification	Passed
14	Links in er:CommodityMeasure/er.commodityOfInterest	Passed
15	Links in er:Mine/er.relatedMine	Passed
16	Links in gsml:MappedFeature/gsml.specification	Passed
17	Links in er:Product/er.sourceCommodity	Passed
18	Orphaned er:Product records	4007 violation(s)
19	Orphaned er:EarthResourceMaterial records	18 violation(s)
20	Orphaned er:MineralDepositModel records	Passed
21	Orphaned er:MineralOccurrence/er.expression records	11 violation(s)
22	Orphaned er:MineralOccurrence/er.form records	15 violation(s)
23	Orphaned er:MineralOccurrence/er.planarOrientation records	Passed
24	Orphaned er:MineralOccurrence/er.shape records	1 violation(s)
25	Orphaned er:Reserve records	76 violation(s)
26	Orphaned er:Resource records	181 violation(s)
27	Orphaned er:CommodityMeasure records	Passed
28	Orphaned er:Resource records	492 violation(s)



	Description	Result
1	Nil values in er:Commodity/gml.name	Passed
2	Nil values in er:Mine/gml.name	Passed
3	Nil values in er:MineralOccurrence/gml.name	Passed
4	Nil values in er:MiningActivity/gml.name	Passed
5	Nil values in er:MningFeatureOccurrence/gml.name	Passed
6	Nil values in gsml:MappedFeature/gml.name	Passed
7	Links in er:Commodity/er.source	Passed
8	Links in er:Mine/er.occurrence	Passed
9	Links in er:MineralOccurrence/gsml.occurrence	Passed
10	Links in er:MiningActivity/er.occurrence	Passed
11	Links in er:MiningActivity/er.associatedMine	Passed
12	Links in er:MiningActivity/er.deposit	Passed
13	Links in er:MiningFeatureOccurrence/er.specification	Passed
14	Links in er:CommodityMeasure/er.commodityOfInterest	Passed
15	Links in er:Mine/er.relatedMine	Passed
16	Links in gsml:MappedFeature/gsml.specification	Passed
17	Links in er:Product/er.sourceCommodity	Passed
18	Orphaned er:Product records	Passed
19	Orphaned er:EarthResourceMaterial records	Passed
20	Orphaned er:MineralDepositModel records	Passed
21	Orphaned er:MineralOccurrence/er.expression records	Passed
22	Orphaned er:MineralOccurrence/er.form records	Passed
23	Orphaned er:MineralOccurrence/er.planarOrientation records	Passed
24	Orphaned er:MineralOccurrence/er.shape records	Passed
25	Orphaned er:Reserve records	Passed
26	Orphaned er:Resource records	Passed
27	Orphaned er:CommodityMeasure records	Passed
28	Orphaned er:Resource records	Passed



# Data Integrity Test Implementation

```
CREATE PROCEDURE [dbo].[DataIntegrityTest]
AS
BEGIN
    SELECT
        'Nil values in er:Commodity/gml:name' AS [Description],
        ISNULL(CAST(NULLIF(COUNT(1), 0) AS VARCHAR(10)) + ' violation(s)', 'Passed') AS [Result]
    FROM dbo.ER_COMMODITY a
    WHERE a.GML_NAME IS NULL OR a.GML_NAME LIKE 'urn:ogc:def:nil:%' OR a.GML_NAME LIKE 'http://www.opengis.net/def:nil/%'
    UNION ALL
    /* Omitted for simplicity... */
    UNION ALL
    SELECT
        'Links in er:Mine/er:occurrence',
        ISNULL(CAST(NULLIF(COUNT(1), 0) AS VARCHAR(10)) + ' violation(s)', 'Passed')
    FROM dbo.ER_MINE a
        LEFT OUTER JOIN dbo.ER_MININGFEATUREOCCURRENCE b ON b.GML_NAME = a.OCCURRENCE_URI
    WHERE b.GML_ID IS NULL
    UNION ALL
    SELECT
        'Links in er:MineralOccurrence/gsml:occurrence',
        ISNULL(CAST(NULLIF(COUNT(1), 0) AS VARCHAR(10)) + ' violation(s)', 'Passed')
    FROM dbo.ER_MINERALOCCURRENCE a
        LEFT OUTER JOIN dbo.GSML_MAPPEDFEATURE b ON b.GML_NAME = a.OCCURRENCE_URI
    WHERE b.GML_ID IS NULL
    UNION ALL
    /* Omitted for simplicity... */
END
```

# Useful Resources

- **Property Interpolation**

- [https://www.seegrid.csiro.au/wiki/bin/view/Siss/GeoserverInProduction#Property\\_Interpolation](https://www.seegrid.csiro.au/wiki/bin/view/Siss/GeoserverInProduction#Property_Interpolation)

- **JNDI Connection Pool**

- [https://www.seegrid.csiro.au/wiki/bin/view/Siss/GeoserverInProduction#JNDI\\_Connection\\_Pool](https://www.seegrid.csiro.au/wiki/bin/view/Siss/GeoserverInProduction#JNDI_Connection_Pool)

- **Materialising views**

- Materialisation routines and refresh policy
- Indices
- [https://www.seegrid.csiro.au/wiki/bin/view/Siss/GeoserverInProduction#Materialised\\_Views](https://www.seegrid.csiro.au/wiki/bin/view/Siss/GeoserverInProduction#Materialised_Views)

- **Data integrity test sample \***

- [https://www.seegrid.csiro.au/wiki/bin/view/Siss/GeoserverInProduction#Data\\_Integrity\\_Test\\_Sample](https://www.seegrid.csiro.au/wiki/bin/view/Siss/GeoserverInProduction#Data_Integrity_Test_Sample)

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**Thank you**

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