Client Documentation

PRIME2 Concepts

24 Iúil 2018

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Introduction

Ordnance Survey Ireland (OSi), the national mapping agency, has developed a standardised, authoritative digital referencing framework that enables the consistent referencing and integration of national data related to location. This framework, known as **PRIME2**, provides the means for GIS data users to accurately integrate and use multiple data sources to provide for better analysis and decision making, optimising resources and delivering efficiencies. **PRIME2** also acts as the primary database for OSi geospatial data, and is the source from which OSi will output its many products.

The **PRIME2** data model provides Ireland with a best practise authoritative spatial data infrastructure for the consistent and accurate referencing and integration of national data related to location. This new data platform is aligned to the **Department for Public Expenditure and Reform's eGovernment Strategy 2012-2015** and enables the amalgamation of multiple national datasets, providing for better analysis, more informed decision making, and greater efficiencies in both the public and private sector.

The five Strategic Objectives of the Public Service **ICT Strategy 2012-2015** are:

1. **Build to Share:** Creating shared services to support integration across the wider Public Service to drive efficiency, standardisation, consolidation, reduction in duplication and control cost.
2. **Digital First:** Digitisation of key transactional services and the increased use of ICT to deliver improved efficiency within Public Bodies and provide new digital services to citizens, businesses and public servants.
3. **Data as an Enabler:** Facilitate increased lawful data sharing and innovative use of data across all Public Bodies to enable the delivery of integrated services, improve decision making and improve openness and transparency between Government and the public.
4. **Improve Governance:** Ensure that the ICT strategy is aligned, directed and monitored across Public Bodies to support the specific goals and objectives at a whole-of-government level and with an emphasis on shared commitment.
5. **Increase Capability:** Ensure the necessary skills and resources are available to meet the current and future ICT needs of the Public Service.

Background to PRIME2

Everything happens somewhere. Each activity, incident or event, including the majority of our State and business information is related to a particular geographic location. The true value of any information is enhanced when it is combined, integrated or overlaid with other relevant information. We get an even better understanding of this combined data by relating it to a common location or geography.

The ability to integrate various digital data sources for this purpose is dependent on the data format and data standard of the source information. Data that is stored and managed in a non-consistent format which does not adhere to industry standards will be difficult to integrate. Costly data re-engineering may be required to transform or move the source data to a common standard before it can be effectively combined with other data.

When using spatial data for analytical purposes, the use of a common reference system ensures quality and consistency in the resulting analysis. In essence, we must all refer to the same geographic location or feature on the ground, be it a building, communications mast, or underground utility service.

Spatial Data Infrastructures (SDIs) provide not only a standardised co-ordinate referencing system but also provide a standardised digital mapping reference system. This mapping system enables geographic objects, such as buildings, land parcels, roads, and utility infrastructure, etc. to be uniquely identified and referenced. The unique referencing of an object is achieved by providing that object with a **G**lobally **U**nique **ID**entification code, known as a GUID.

A New Spatial Data Infrastructure for Ireland

OSi has developed a standardised spatial data referencing platform for Ireland. This object-oriented digital mapping data model, **PRIME2**, has been developed to industry and international best practice. This innovative development is one of OSi's key roles as outlined in the eGovernment Strategy 2012 – 2015 and provides for the maintenance and development of the underlying physical infrastructure of the State.

PRIME2 Concepts:

The following are some of the key concepts of the new OSi **PRIME2** data model:

Object-Oriented

PRIME2 is described as an "object-oriented digital mapping data model". But what do we mean by "**object**"?

In the real world, all things have a unique identity, and can also be part of a collection of things that may, when taken as a whole, have a different unique identity. For example, one house is unique; that house can be a constituent part of a terrace of houses, which in turn can be part of a street, which is also part of a major route network. Logically, we understand the uniqueness – and the connection between – the house, terrace, street, and route. **PRIME2** reflects this real-world reality, and allows us to manipulate data in terms both of its uniqueness and its connectedness.

Standards-Based

The data model has been designed and developed to industry data standards. The data model itself is an Open Geospatial Consortium (OGC) Simple Feature Model consistent with the ISO 19115 Metadata standard. The road network has been modelled according to the Geographic Data Files (GDF) data standard and in addition, the building data utilises ISO CityGML standards (up to Level of Detail 2).

Unique Object Referencing

Within the **PRIME2** data model, all mapped objects have a unique identifying code (GUID) and data relating to that object is maintained during the complete object life cycle. For example each building, land parcel, section of road, section of path, or section of river has its own GUID against which additional information or attribution can be stored and managed within a digital mapping database.

Seamless & Scale Independent

The **PRIME2** data model is a seamless digital database for the entire country. It does not contain the concept of individual map sheets, so **PRIME2** treats all mapping features as continuous objects, unbroken by map edges. Also, the **PRIME2** data model is map-scale independent, in that all data has the same characteristics regardless of its capture scale. For example the M7 motorway is stored and managed as a single set of grouped objects that continue across traditional map edges, and across different map-scale categories.

Network Connectivity

Figure 1 shows the **PRIME2** data model concept of network connectivity. With the concept of a seamless database, all roads, rail and rivers have been modelled as connected set of segments with associated object centre lines. This provides users with the advantage of being able to query data based on the connectivity of the various network themes.

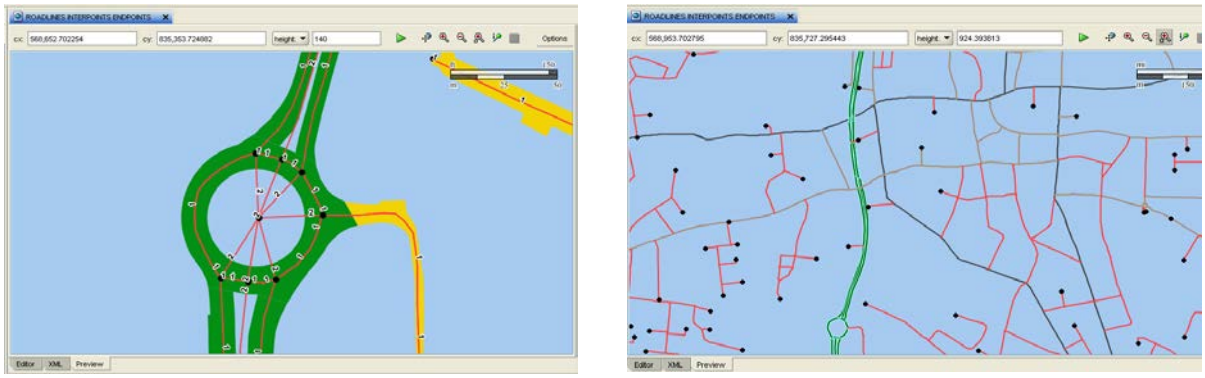


Figure 1: **PRIME2** Data Model Network Connectivity

3D Data Management

The **PRIME2** data model has been designed to store and manage 3-Dimensional (3D) information such as multi-story / multi-occupancy buildings, street infrastructure, underground car parks and subterranean utility services. Figure 2 (below) shows the concept of 3D building modelling according to the adopted ISO CityGML Level of Detail 2 standard. As of yet, there is no 3D data in **PRIME2**

Figure 2: **PRIME2** 3D Data Modelling

Skin-of-the-Earth Objects

The Skin-of-the-Earth concept is fundamental to **PRIME2**. The idea is that a seamless, topologically consistent blanket of polygons covers the entire surface of Ireland. There are no holes or gaps and no overlaps (but see the section on Z-Order Priority, p6 below).

There are precisely five Skin-of-the-Earth objects - polygons that constitute the blanket**.**

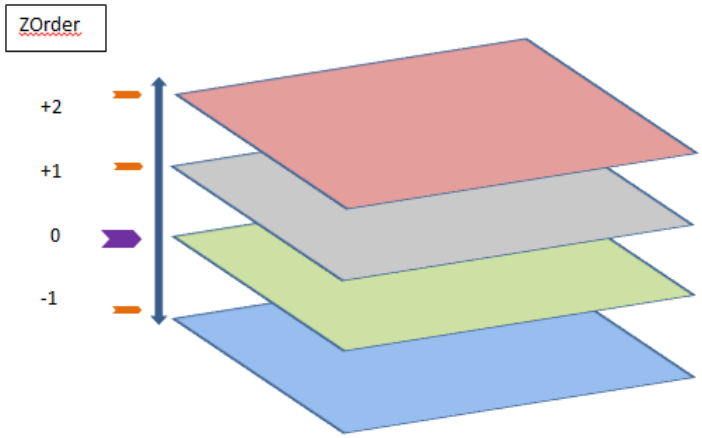
- **Way** - Way objects represent all drivable and walkable roads and paths. All Ways from Motorway to Tenth Class have polygon geometry. The Skin-of-the-Earth requirements apply only to Ways polygon representation. Some Ways objects also have line geometries and are used for Network connectivity. (see Way geometry representation, p13)
- **Water** - Water objects describe all water bodies currently captured by OSi. These include flowing and non-flowing, natural and man-made water bodies, such as River, Stream, Canal, Lake, Pond, Drain and Reservoir. As with Way objects, Water polygon objects are subject to the Skin-of-the-Earth requirements, and Water line geometry must maintain connectivity of surface water.
- **Vegetation** - Vegetation objects represent all real-world vegetative ground cover such as Field Pasture, Forestry, Marsh, etc. The only type of geometry applicable to Vegetation Objects is polygon geometry.
- **Artificial** - Artificial objects represent man-made ground cover such as Concrete, Tarmacadam, Gravel, Sloping Masonry and Rail Bed. Note that a garden is regarded as an Artificial Object. It also includes Runways, Ramps, etc. where these are not a part of a Way Object. One particular form of Artificial Object is called BuiltEnvironment - this forms the Skin-of-the-Earth underlay for all Buildings (and for some other superimposed objects). The only type of geometry applicable to Artificial Objects is polygon geometry.
- **Exposed** - Exposed Objects represent non-vegetative ground cover, which may be natural - such as Sand, Shingle, Mud and Outcrop - or due to man's activity, such as Quarries and Mines. The only type of geometry applicable to Exposed Objects is polygon geometry.

Z-Order Priority

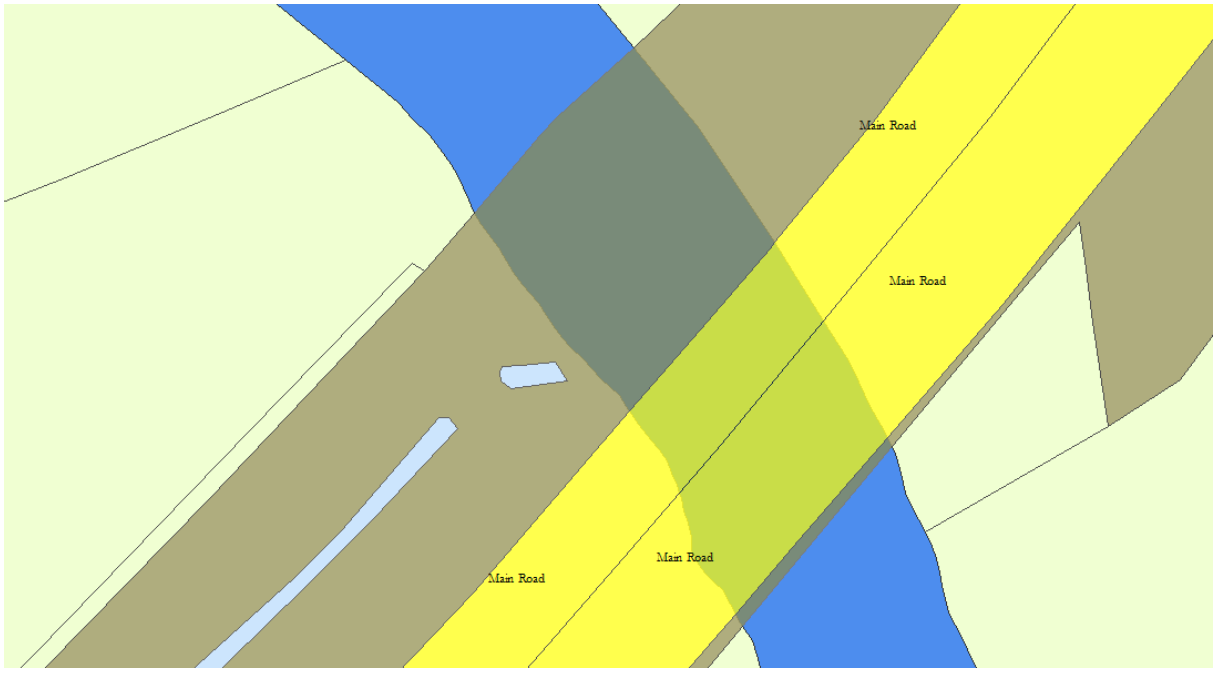
Exceptions are allowed to the ‘no overlap’ rule, where objects overlap in the real world, for example where a road crosses a river. Both the road and the river are unbroken objects, therefore the **PRIME2** model allows them to overlap. A Z-Order property can be specified for each classified object to indicate the vertical order of the cross-over objects. SoE objects that do overlap must not have the same Z-Order value.

Relative Height

The Z-Order attribute on a Skin-of-the-Earth object allows for the representation of the relative vertical positions where objects overlap



The water segment below the way & artificial segments has a Z-Order of -1:



Superimposed Objects

A Superimposed Object is an object that sits on top of the Skin-of-the-Earth blanket.

- **Building** – A permanent roofed construction, currently or formerly intended for shelter. A building will have a building point and building polygon geometry, and if it is an addressable building it will also have a reference to the Geodirectory building ID (GeoId). The building object will be linked to the access Way network. A residential building that is not on a permanent foundation (e.g. a mobile home) will be shown as a building point only, without a polygon. It will also have an address point, and be linked to the access Way network.

  A building under construction is included as a building, if it is apparent that, on completion, it will meet the definition for a building. A structure that is identifiable as having once been a building but which no longer has a roof is included as a building (with its function coded as derelict).
- **Building unit** – an Individual addressable unit within an addressable building. A building may therefore contain one or more addressable units.
- **Building Group –** A group of connected buildings that share a Distinctive Name.
- **Structure -** Structure objects represent a wide variety of real world objects, e.g. bridge, tunnel, pole, pylon, tank, pier, monument and standing stone.

  Perhaps less obviously, Structures include earthworks, both ancient - such as ring forts - and modern - such as road or railway embankments. The Form "Landform" is given to these type of Structures.
- **Division -** A Division is an erected or natural barrier between two areas, which may also act as a delimiter.
    - A division must have a minimum height of 0.3m OR:
    - Is a virtual barrier, or "open wall", representing the open side of a building or the outer extent of a canopy.

- **Service line –** A service line is a conduit conveying a utility - such as electricity, gas, oil, water or sewage, from a main distribution facility or to a main collection facility.

Network Objects

Networks consist of a set of specified points, linked together by lines. A Network in **PRIME2** relates to a set of Water, Way or Rail objects. Following European standards, a Network is derived from centreline data. A NetworkSegment refers to a line geometry that joins one network point to the next.

Water

For WaterNetworkSegments, segments of centrelines are captured for all surface rivers, streams, canals and in some cases, lakes. The segments together form a continuous sequence from source point to sink point or entry to the sea and are topologically contained within the water body.

Network segmentation points are required at specific change-points along the network and mark the start and end of segments. These WaterPoint objects, by their Form & Function values, tell us whether the WaterPoint represents a Lake Inflow point, a point where two streams meet, a point where a single stream becomes a stream, a point at which there is a waterfall, weir, sink point or issue point, etc. Usually, ponds are isolated Water Objects that are not part of the water network.

The Water Network will be segmented into WaterNetworkSegments where it is joined by tributaries, lake entry points or other logical points such as bridges etc.
Note that where a stream has no polygon geometry (a narrow stream represented by a single line) its line geometry represents both the real world stream and the WaterNetworkSegment. For other, larger Water objects, the WaterNetworkSegment line is purely representational.

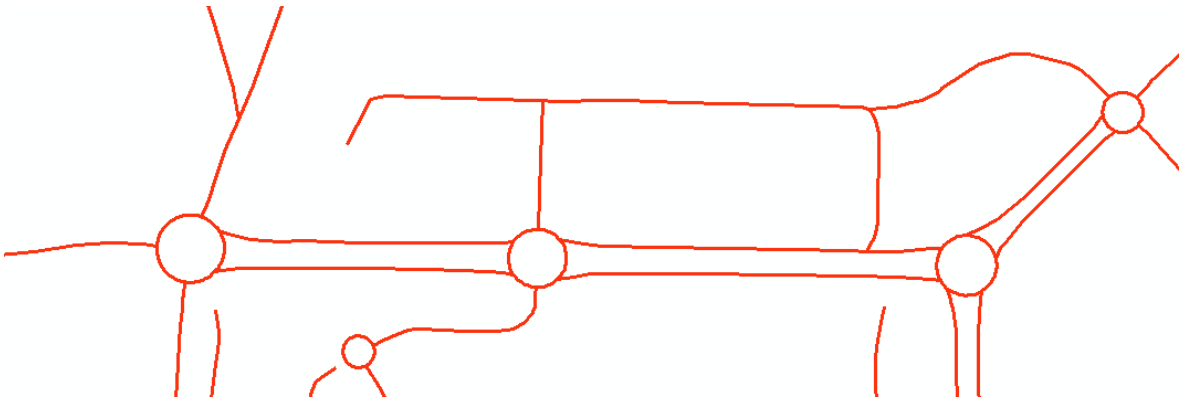
Way

A “**Way**” is a generic term to describe all roads, streets, paths, trails, and footpaths.

All Ways from "Main Road" down to "Eighth Class (Managed)" are represented by polylines, which are connected to points. The Form value of the WayPoint indicates whether the point relates to a crossroads, roundabout, end of road, etc. In addition to line geometry, a NetworkSegment also has a Direction property to indicate the flow of traffic or water, as applicable. The **PRIME2** network is a connected set of geometric links and nodes, not a full routable network, as we do not capture turn restrictions or speed limits. Ways from “Sixth Class” to “Tenth Class” are represented by polygons only – no line or point geometry.

GDF1

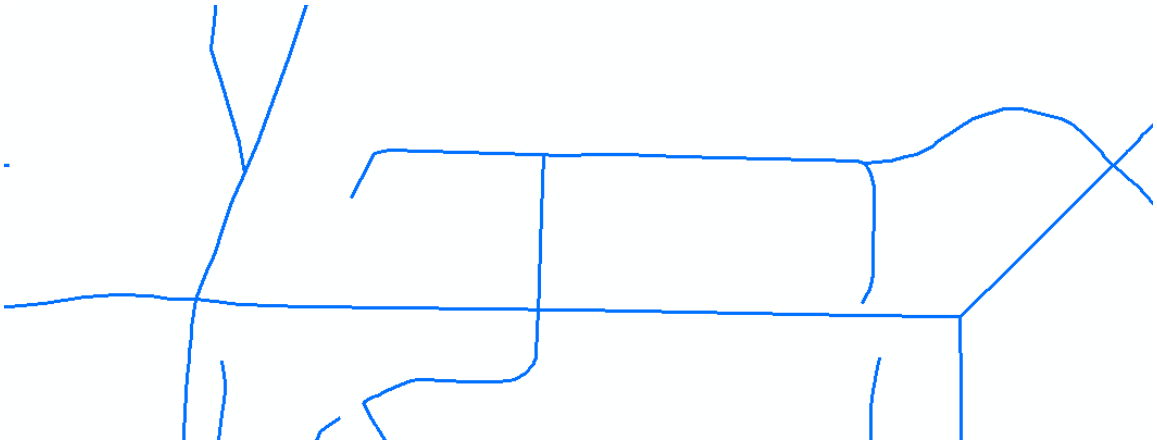
A **GDF1** is a notional line indicating the true centreline of a Way or, in the case of a dual carriageway or motorway, the true centreline of each carriageway. It is described as a "WayNetworkSegment".



Compare this GDF1 diagram (above) to the next diagram below (representing a GDF2 network); they both represent the same actual Way network.

GDF2

To meet varying product output requirements and, in line with European standards, a second WayNetworkSegment is captured - **GDF2**. This applies to the same set of road classes and in most cases it is exactly the same as GDF1, that is, it is a centreline representation. However, being a simplified version designed for small scale representations, dual carriageways and roundabouts are represented more simply, and there is a deviation from the strict centreline representation for these objects.



GDF1 & GDF2 Way Modelling

A **GDF2** is a notional line indicating the true centreline of a Way except where:

- in the case of a dual carriageway or motorway, it indicates the central median between opposing carriageways and;
- In the case of a roundabout, it deviates from following the centreline around the roundabout and instead, proceeds to a roundabout way point at the centre of the roundabout where it connects with the centrelines of other Ways feeding into the roundabout. In essence, roundabouts are only represented at GDF1 level.

For every GDF1 line there will be a corresponding Way polygon, and the GDF1 network is topologically contained within the corresponding Way polygon 'network'. However, while the majority of the GDF2 network is exactly the same as the GDF1 network, it deviates for motorways, dual and roundabouts as outlined above.

Way geometry representation

Function	Polygon	Polyline
Main Road	Y	Y
First Class	Y	Y
Second Class	Y	Y
Third Class	Y	Y
Third Class (Access only)	Y	Y
Fourth Class	Y	Y
Fifth Class	Y	Y
Sixth Class (Managed)	Y	Y
Sixth Class	Y	N
Seventh Class (Managed)	Y	Y
Seventh Class	Y	N
Eighth Class (Managed)	Y	Y
Eighth Class	Y	N
Ninth Class	Y	N
Tenth Class	Y	N

Rail

For RailNetworkSegments, as for WayNetworkSegment, both a GDF1 and GDF2 representation is used. A GDF1 is required for all railways. GDF2 is required for Standard (mainline) railways only. The segmentation points (RailPoints) have Form & Function values such as switch points, end of GDF1, end of GDF2, turntable, etc.

The GDF1 represents the centreline of the railway. The GDF2 is the same as the GDF1 except that in an area where there are two or more lines travelling in parallel a single GDF2 line is used to represent all the parallel lines. This is very useful in the approaches to rail stations, where there may be a considerable number of such lines.

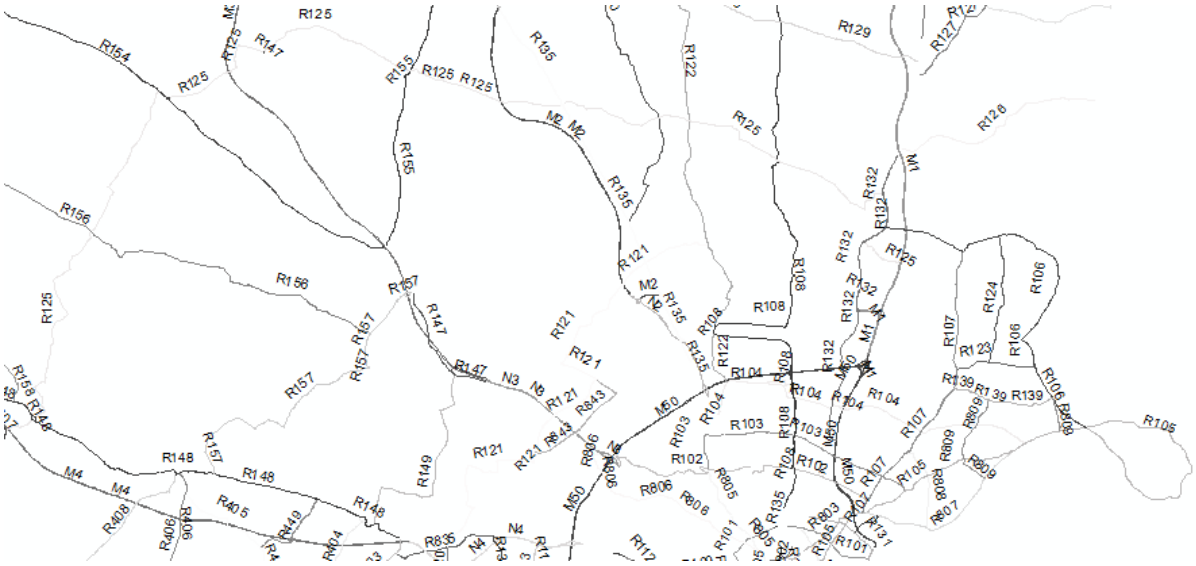
PRIME2 does not represent the actual real world metal rail tracks. This means that the RailNetworkSegment does more work than other NetworkSegments - although the lines and points are notional, they carry full responsibility for representing the railway. Additional properties such as Status, Z-Order and RailType apply to RailNetworkSegments.

Grouped Objects

Grouped objects are objects that share common attribution. These grouped objects do not have their own geometry; the groups link the existing geometry of all the objects in that group.

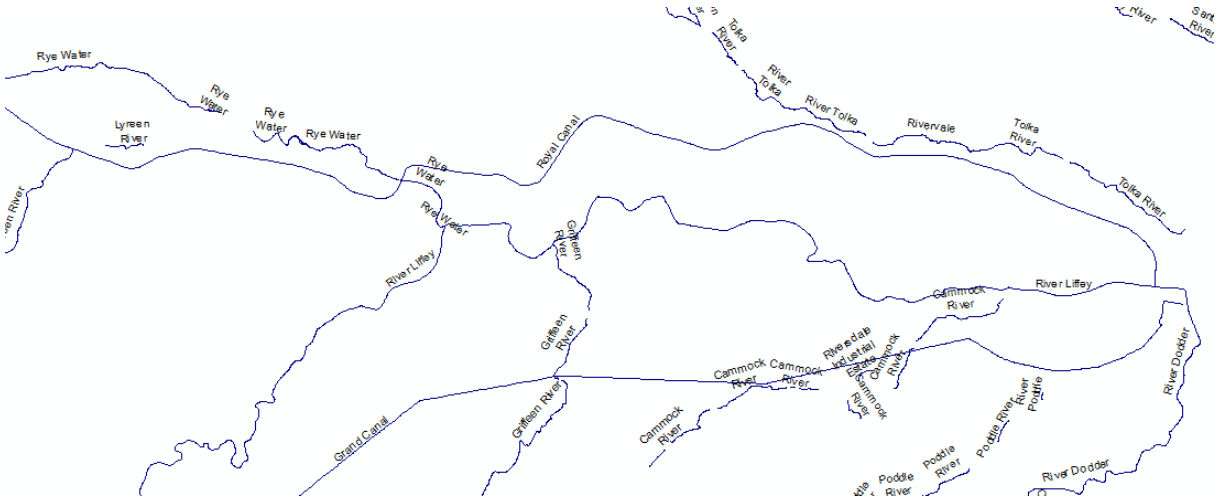
Named Way

These objects contain no geometry. The NAMED_WAY is linked to the way segment via the NAMED_WAY_GROUP_MEMBERS table:



Named Water

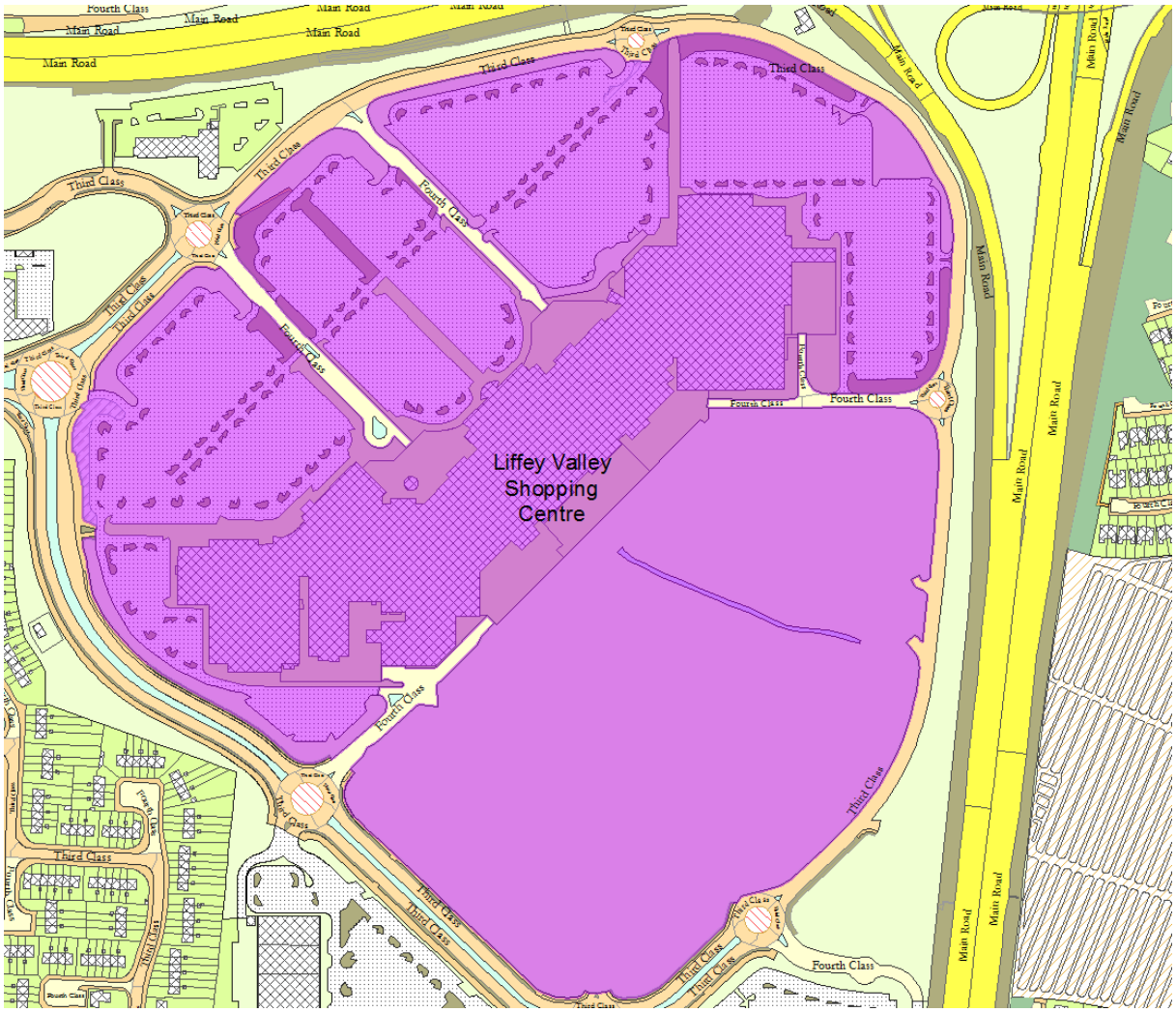
These objects contain no geometry. The NAMED_WATER is linked to the water segment via the NAMED_WATER_GROUP_MEMBERS table:



Sites & Locales

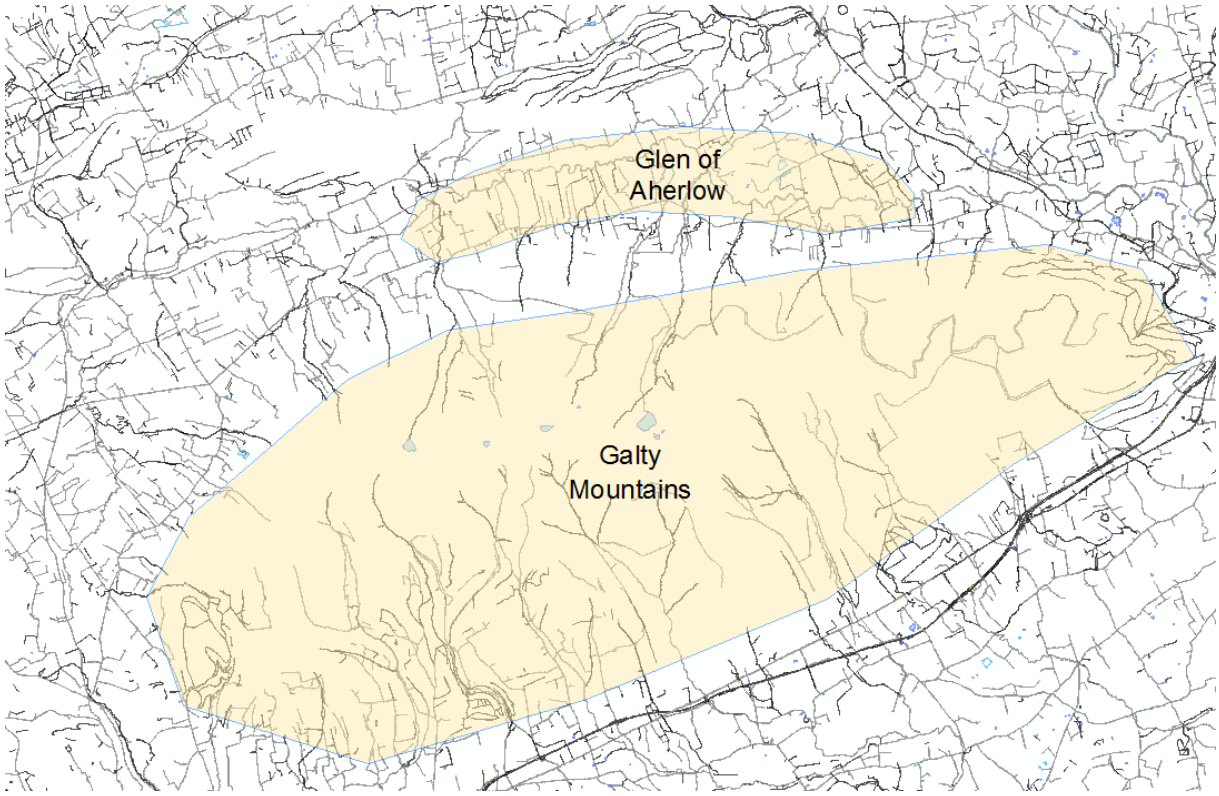
Sites

A Site object in **PRIME2** represents, **as one object**, a geographical area containing one or more objects that are related in some way, such as a Shopping Centre, Hospital, University, Golf Course etc. A Site is created in order to model the fact that the building, paths, car parks, etc., belong together by virtue of shared site location and properties. Note also that a Site object is not a Skin-of-the-Earth object; it is superimposed upon the skin of the earth. The Site polygon (below, in purple) singularly represents a shopping centre, which has buildings, canopies, parking areas, ways, etc. within its area.



Locales

Locales are polygon objects with fuzzy boundaries where the geographic entity is undefined or subject to interpretation i.e. Mountain Range, Bay or Town:



Object Life Cycle

In OSi's view, the world is full of features that have identity, location and other additional attribution. It is this concept of 'real world features' that is central to the development of the **PRIME2** data model. To provide a framework that will support this process, **PRIME2** has introduced the concept of uniquely identifiable persistent features, and the concept of feature life cycles that best match real world change. This will make it possible for OSi to reflect the changes observed and surveyed in the real world in the features that are maintained in the **PRIME2** digital world. Customers can then use this information to maintain their local data holdings and their business data.

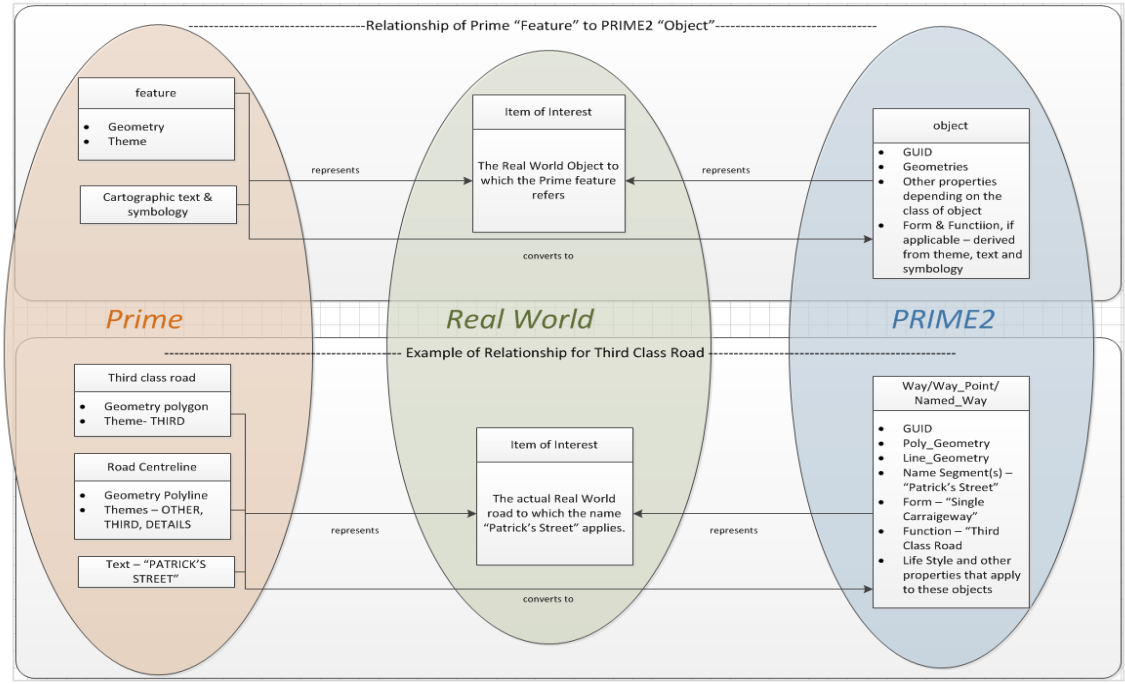
Recorded changes to real world objects are reflected in changes to the features stored in the **PRIME2** data model. For this to be consistent, the OSi **PRIME2** data capture specifications need to differentiate between which real world changes that constitute a change to an existing **PRIME2** feature, and those changes that cause a new feature to be created. The life cycle rules ensure that users are provided with a consistent representation of changes in the real world based on the capture specification. It should be noted that due to the periodic way in which data is captured and updated, other recordable changes may have occurred to the real world objects between survey dates, and these intermediary changes will not be recorded in the data.

The life cycle of each feature matches, wherever possible, the life cycle of the real world object that it represents. For example a new building will become a new **PRIME2** feature with a new identity that will persist even when the building is changed until such time as it is demolished. This approach ensures that **PRIME2** data matches as closely as possible the real world that it represents.

Life cycle rules are used to determine when a feature still exists in an altered form, and when it is completely replaced based on the specific feature type and the scenario. These rules include a certain degree of subjectivity that is unavoidable, but if they are applied consistently by OSi and are understood by customers, then the value of the data is greatly enhanced.

The attribute metadata can record a specific status from the following list:
Derelict, Dismantled, Disused, In Ruin, In Use, Proposed, Site Of, Under Construction

Feature to Object



In Prime the main way to model items of interest in the Real World was through a "Feature", defined by a scale-dependent, single geometry and enriched with a theme or themes to indicate what the geometry represented. To aid human interpretation of features, cartographic text and symbology were used extensively. In **PRIME2** the items of interest in the Real World are the same, but they are now represented entirely as **Objects**.

Objects have many properties - only a small set of properties are listed in the diagram above, for simplicity. The properties applicable to a particular object vary depending on the type or class of the object. Properties are like attributes (familiar in Prime) in that they record detail. An object's geometry is one of its many properties, and many objects support multiple types of geometry. Cartographic detail from Prime has been cleverly employed in populating properties in **PRIME2**, adding to its intelligence and helping **PRIME2** become a full GIS database.

It is important to note the separate white boxes in the Prime oval. In Prime, a centreline or a piece of text appears to be related to a road by virtue of its proximity, but this is merely an appearance. As modelled in the database, there is no relationship. This is a critical difference between Prime and **PRIME2**. The relatedness in **PRIME2** is fundamental to expanding potential uses - the intelligence now lives within the data, rather than being dependent upon visual interpretation.

Properties

Some properties are common to many objects. The following are common properties:

- Global Unique IDentifiers (GUIDs)
- Form and Function
- Distinctive Name
- Address
- Geometry
- Status
- Z-Order

With the exception of GUIDs, all of the above are Life Cycle properties. They can change.

GUID

When any new object is created - say the object is a newly captured building - the system generates a GUID that is unique to that building and that persists throughout the lifetime of the building. If the building subsequently undergoes a change, such as a change of use, or a change of shape (where, perhaps, the building is extended), the building object maintains its identity through the GUID. Only if the building ceases to exist would the object and the GUID be removed from the live database - an archived version of the object would be maintained. All objects have a mandatory GUID property. In the database each GUID is composed of a 36-bit hexadecimal string with the following structure: 8-4-4-4-12.

Form & Function

All OSiClassified Objects are classified by their Form and Function properties. These properties represent, as closely as possible, the real world physical form and function of the objects to which they apply.

All OSiClassified Objects have a mandatory, non-null, Form value - for example a Division object must be either a fence, hedge, wall, bank, etc. in accordance with the specification for Division; a Structure object must be either a pylon, ruin, landform, etc. in accordance with the Specification for Structures.

OSiClassified objects have a mandatory Function value but this value may be null for some objects in accordance with the Specification for the particular object. The Function

value must be valid when combined with the Form value for an object. For example a Division with Function "Inner Wall" is only valid when the Form is "Wall".

Where **PRIME2** data has been derived from other existing OSi databases, Form and Function values will have been allocated to objects, based on data re-engineering specifications.

Distinctive Name

Many objects provide properties to facilitate recording distinctive names. Where these properties apply, both Irish and English names may be captured. For most objects the capture of distinctive names is optional, however, in the case of NamedWay and NamedWater objects, at least one of EnglishName or IrishName must be captured.

Address

All SuperImposed objects have Address properties. The Address properties vary according to the object. Addressable Building and BuildingUnit objects carry a mandatory property, GeoID. Building, BuildingUnit and Structure objects have a mandatory property, WaySegValue, which holds the GUID of the serving Way object. The data model has built-in extra capacity for additional address properties that may be used in the future, such as a property to allow for the holding of Eircodes.

Geometry

Being a spatial database, geometry is an important property, pinpointing the particular **location and shape** of objects. Point, line and polygon geometries can be used to represent the spatial shape and position of an object. Two further geometry types, LOD1 and LOD2 may come into use as a mechanism for 3D representation.

Most objects will have at least one geometry property. Named objects do not have any geometry properties, as their function is to group related objects. The objects making up the group have their own geometries.

Many objects have more than one geometry property. For example a building has both Point and Polygon Geometry. The Point indicates the existence of a building at the (x, y) location - this may be all that is required for certain applications (including, perhaps, small-scale maps). The Polygon allows for capture of the extent of the building and will generally be required for large-scale applications. Way objects have Polygon geometry representing the

extent of the Way segment, and Ways that are classified as "Eighth Class Managed)" up to "Main Road", also have Line Geometry.

Any object that has geometries has, in addition to Life Cycle properties, two mandatory metadata properties relating to the capture of each geometry type - CaptureMethod and CaptureResolution.

Status

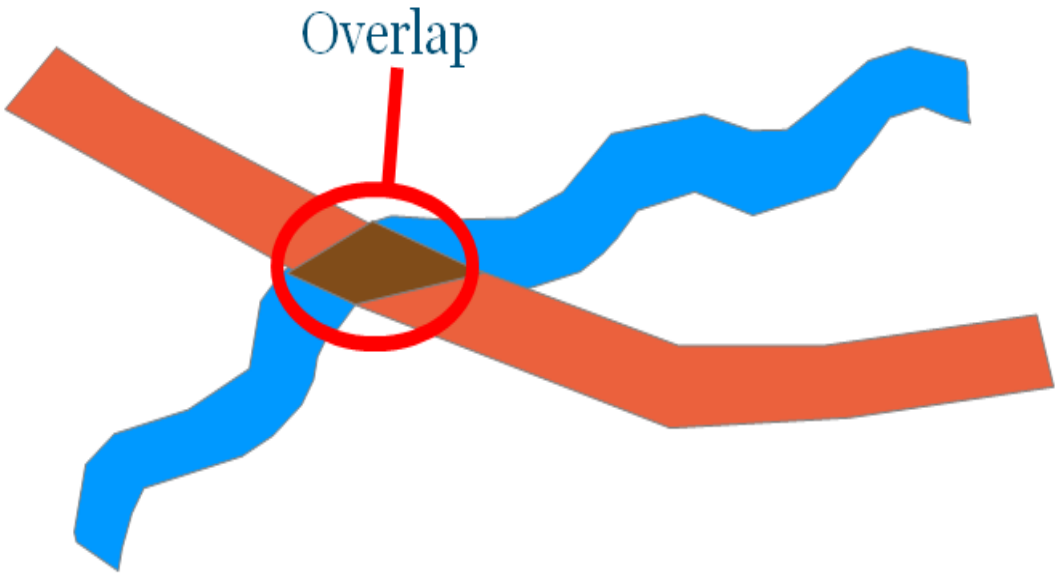
All SuperImposed, Skin-of-the-Earth and RailNetworkSegment objects have a Status property, which is a Life Cycle property. This property is to facilitate object management. The initial Status values in **PRIME2** will default to "In Use". The possible values of Status are:

- Derelict
- Dismantled
- Disused
- In Ruin
- In Use
- Proposed
- Site Of
- Under Construction

Combining Status values with Life Cycle metadata, it will be possible to follow the progress of, say, a building, over time from being Under Construction through In Use, through Disused, to Derelict. Unless it is a significant building, it is unlikely to warrant maintenance of a "Site of" location after the building ceases to exist. When its existence ceases, the object is archived and deleted.

Z-Order

PRIME2 is concerned mainly with surface data only. Where it is desirable for completeness or consistency to hold data relating to objects above or below surface level, Z-Order is used to indicate relative vertical positioning. All OSiClassified and RailNetworkSegment objects have a Z-Order property. At surface level, Z-Order is set to equal zero, with an increment of 1 for each level of objects above zero and a decrement of 1 for each level of objects below zero.



Assume two surface-level objects, Red and Blue overlap as illustrated. To reflect the real world situation of the overlap correctly, one of the objects will have Z-Order = 0, whilst the other will have Z-Order = +1 or -1, depending on whether it is above or below. If we assume that Blue is below Red, then Blue is segmented to the extent of the overlap and Z-Order for this segment is -1. Red does not need to be segmented as Z-Order is zero along its length.

Grouping

Grouping objects are objects whose purpose is to form a group of objects on the basis of some shared quality or qualities. NamedWay and NamedWater objects are grouping objects, in that they group certain objects on the basis of shared names.

The purpose of Named objects is to group together segments that share a Distinctive Name - this means that the Distinctive Name is recorded once only and can be applied to many objects.

Segmentation

What is Segmentation?

The process of identifying any object, naturally involves a process of separating it out from other things. In the **PRIME2** data model this process, segmentation, is specified.

Segmentation impacts upon line and polygon geometries and operates at a number of levels within **PRIME2**. In general and in brief, these five levels are:

1. The Skin-of-the-Earth concept suggests that the surface of the earth is made up of (or segmented into) five classes of polygons.
2. Different objects are distinguished or segmented from each other by virtue of having different properties.
3. Polygons and lines are segmented from each other where there are stipulated dividing objects, for example, a polygon representing a Field Pasture object is split into two Field Pasture objects along a dividing fence.
4. Above or below the Skin-of-the-Earth there may be other Skin-of-the-Earth objects, for example in the case of bridges and tunnels - we may think of this as segmentation based on vertical positioning.
5. Segmentation that is required for data management purposes or in order to comply with European or other data standards

Where an existing object is divided into two or more segments, each segment becomes an object in its own right complete with its own GUID and Life Cycle properties.

In data capture, the general rule is that one real world object should be represented by one OSiObject in **PRIME2**. However, this is modified by the segmentation rules.

Taking the case of Water objects, we may understand the levels of segmentation as follows:

Level 1: Real world waterbodies are represented by the Water object class. Water objects are distinguished from non-water objects.

Level 2: The Form property of a Water object includes separate values that distinguish between Lakes, Ponds, Rivers, Canals, Mill Races, Streams, etc. Separate Water objects must represent each form of Water object. The representation of a stream entering and exiting a lake therefore gives rise to 3 objects: - one each for the

entering and exiting streams and one for the lake. Note that the segmentation always occurs at the edge of the higher class object.

Level 3: The segmentation rules require that a Water object be segmented in the case of intersection with certain Structure objects which include Waterfalls, Weirs and Canal Locks. (Note that, if the Structure does not cross the water body completely, the upstream extent of the Structure is projected into a virtual break across the water.) Depending on the particular Structure, the underlying Water object may be broken into two segments (one above and one below the Structure) or three segments (where the Structure has polygon geometry (one above, one below, and one coinciding with the extent of the Structure).

Level 4: Where a Way object crosses a Water object, it is required that the Water object be segmented to the extent of the spanning (upper) object(s). (The spanning objects may include non-Way objects, such as Verges or Sidewalks). The spanned Water segment has Z-Order value set to -1, with the spanning object's Z-Order value remaining as it was.

Level 5: Water objects that form part of the water network are required to have a line geometry that expresses connectivity - the centreline. The line is continuous from start point to end point but must be segmented at transition points and junction points. Transitions happen in the circumstances covered by Level 2, 3 & 4. Junctions occur, for example, where two streams meet.

Segmentation is mainly concerned with Water, Way and Rail Objects.

Frequently Asked Questions:

What is PRIME2?

PRIME2 is an internal OSi database that replaces some of its separate core databases with a single data store, structured into a new data model. The design of this new data model allows OSi to improve the management of its core data and presents opportunities to customers in product delivery. Whilst **PRIME2** was initially an internal OSi project and is seen as an enabler to re-structure our internal data management function, the potential for customers to benefit continues to be a significant driver in its delivery.
The creation of the **PRIME2** data model is done within the context of new spatial information architecture. This architecture is based on a number of guiding principles:

- OSi require a single homogenous architecture to deliver services for internal and external customers.
- **PRIME2** enables the use of leading-edge applications to deliver each service requirement.
- OSi's storage model is standards compliant and not tied to any one application provider.
- OSi's storage model will be independent of product supply and data capture models.

What is it used for?

PRIME2 provides the means for GIS data users to accurately integrate and use multiple data sources to provide for better analysis and decision making, optimising resources and delivering efficiencies.

Who might use it?

Any organisation that uses geographical data; government bodies, engineering companies, network managers (electricity distribution, sewage, water) insurance, surveyors, engineers, environmental agencies – and OSi.

Is it better than PRIME?

Yes.
The **PRIME2** data model provides Ireland with a best practice authoritative spatial data infrastructure for the consistent and accurate referencing and integration of national data related to location. This new data platform is aligned to the Department for Public Expenditure and Reform eGovernment Strategy 2012-2015 and will enable the amalgamation of multiple national datasets providing for better analysis, more informed decision making and will result in greater efficiencies in both the public and private sector.

This strategy supports:

- The efficient management of high quality spatial information through its life-cycle,
- The availability of high quality information that supports OSi production, OSi quality management and customer product requirements
- The flexibility to react to dynamic market forces in product and service delivery
- The transition of OSi from data provision to intelligent spatial information sharing.

The effective and efficient development of raw data into high quality spatial information is the primary driver for OSi's information-management strategy.

What data is in PRIME2?

PRIME2 is a new seamless National Dataset. However, **PRIME2**'s core geographic data is re-engineered from existing OSi databases; it is not a physical re-survey of Ireland. But the **PRIME2** update process is already in train, with OSi surveyors feeding updates into the database each day, and the data continues to be enhanced, with staff working to upgrade much of the legacy data.

What other data could be in PRIME2?

PRIME2 has the capability to integrate any suitably formatted third party data. One benefit of this is that OSi can add suitably verified third party data to its database

How will the absence of separate map sheets affect users?

Data deliveries can now be requested by co-ordinates, which will centre a local area on a point. There will be no risk of error due to anomalies on adjoining map edges (as were sometimes the case with maps from different update cycles).

Does the data still look the same?

There are some major differences; in the basic **PRIME2** format:

- Roads now look somewhat different; roadside kerbs and grass margins are now shown as polygons
- There are no pecked features (dotted lines). However this may be changed, subject to the output format and styling criteria.
- There is no text displayed; names etc. are contained in the geometry's metadata. Again, this may be changed, subject to the output format and styling criteria.

What file formats does it come in?

There is almost no limit – OSi use FME as their ETL which supports over 300 formats. Here are some of the more common ones:

- DWG
- DXF
- DGN
- SHP
- TAB
- Postgis
- SQL Server
- FGDB

What size are the files?

There is no standard file size. **PRIME2** data can be extracted based on any spatial extent, and the file format will affect the file size. As an indicator, the full State coverage in an Oracle database is 50GB.

How Does PRIME data appear in PRIME2?

Buildings:

PRIME Data		PRIME2 Data			
Theme	**Description**	**Class**	**Form**	**Function**	**Geometry Type**
DW_HOUSE	Residential Dwelling House on 5K maps	Building	detached building, semi-detached building, terraced building, apartment, etc.	residence	Polygon & Point
GL_HOUSE	Domestic & Commercial Glasshouses	Building	Glasshouse	Not Applicable	Polygon & Point
SOLID	All solid-walled building Types	Building	Building General, End of Terrace, detached building, semi-detached building, terraced building, apartment, etc.	Residence, Religious Building, Hotel, Office, Bank, Garda Station, Castle, Residence etc.	Polygon & Point
PECK	Open-Sided Building	Structure	Canopy	Building Overhang, Bus Shelter, Carport, Bicycle Shelter, Bandstand, Covered Sports Terrace, Toll Booth, Not Applicable	Polygon

Roads:

PRIME Data		PRIME2 Data			
Theme	**Description**	**Class**	**Form**	**Function**	**Geometry Type**
AVE_FOOTP 1:5000	Rural Private Avenue, Footpath	Way	Single Carriageway	Fifth Class	Polygon
AVE_FOOTP 1:1000 1:2500	Urban Sidewalk	Artificial	Man-Made Surface	Sidewalk	Polygon
FOURTH	Fourth Class Road	Way	Single Carriageway	Fourth Class	Polygon
NAT_PRIMAR	National Primary Routes (Motorway, National Primary)	Way	Motorway or Dual Carriageway	Main Road	Polygon
NAT_SECOND	National Secondary Routes	Way	Dual Carriageway or Single Carriageway	First Class	Polygon
OTHER	Road Centreline	Network Segment	Not Applicable	Not Applicable	Main to Fifth Class: as a GDF1 attribute, or a GDF2 Line
STREET	Street Name Text	Way	Dual Carriageway or Single Carriageway	Way Class (1st 2nd,3rd 4th)	None Street Name text is an attribute of a WAY object
THIRD	Third Class road	Way	Single Carriageway, Service Road	Third Class / Third Class (Access only) (but may be reclassified to Fourth, Fifth or Sixth Class)	Polygon
FORESTRY	Unique to 1:2,500 mapping. Tracks within forestry	Way	Walk General	7th Class	Polygon

Water:

PRIME Data		PRIME2 Data			
Theme	**Description**	**Class**	**Form**	**Function**	**Geometry Type**
BEACHES	depicts natural sand, shingle coastal areas	Locale	Beach	Not applicable	polygon
CANAL	An artificial watercourse for inland navigation or irrigation	Water	Canal Canal Basin Canal Harbour Canal Lock	n/a	polygon
COASTAL	Used for OSi internal cartographic purposes				
DOCKS	Unused in PRIME				
DRAIN	An open excavation, 2m or more wide, to allow water to drain from land	Water	Drain	Not applicable	polygon
HARBOURS	Unused in PRIME				
LAKE	A large naturally-formed body of water surrounded by land	Water	Lake or Lake Saltwater	Not applicable or Reservoir	polygon
PIER	DATA ASSOCIATED WITH PIERS	Structure	Pier Open, Pier Solid	Not applicable	polygon
POND	A small body of still water formed naturally or by artificial means	Water	Pond	Not applicable	polygon
PORTS	Unused in PRIME				
RESERVOIR	RESERVOIR NAMES AND POLYGONS	Water	Lake, Reservoir Closed, Reservoir Open	Not applicable	polygon
RIVER	POLYGONS AND NAMES OF RIVERS	Water	River	Navigable or Non-Navigable River	polygon
STREAM	Double streams are 2 metres or more in width; Streams below 2 metres wide and are captured as a single line feature	Water Water_Single_Stream	Stream, Stream Tidal	n/a, Canal Feeder, (Stream Tidal n/a)	polygon, line
TIDALPC	Unused in PRIME				
WATER	WATER SUPPLY NETWORK (Manholes, Fire Hydrants). Also delineates water treatment plants	Structure	Utility Point	Hydrant, Manhole	point
WATERFALL	WATERFALL SYMBOL AND NAME. Also included on the top line of SLOP_MAS to generate symbology	Structure	Waterfall	Top of Waterfall	line