

**ANZ Metadata Working Group**

Report from Meeting 5

28-29 October 2019, Canberra

Background:

The outcomes for the meeting were for all members to be better informed about activities and practices in the community; to endorse the metadata best practice guide; to endorse metadata for services; to note requirements for publication of vocabularies; and to collect requirements for metadata for imagery and digital data preservation.

Meeting summary:

**Day 1** of the meeting (28 October) focused predominantly on updates on ISO/OGC standards, the W3C Data Exchange Working Group, and the Technical Metadata Working Group. In addition, Joel Haasdyk provided an impromptu presentation on the requirement for temporal elements in records

**Day 2** of the meeting (29 October) was intended for workshops, but for each scheduled discussion it was decided to request participants gauge input from relevant areas within their workplace. Two additional items were presented during day 2: Joel Haasdyk presented on the Complexity of data transformation for the Australian Terrestrial Reference Framework; and Evert Bleys presented options for capturing data dictionary within ISO 19115-1

Increased membership since the last meeting was noted

Actions from previous meetings:

Most actions from the previous meeting have been progressed or completed, except **Action 52** which has not commenced

Metadata storyboard / video presentation (Irina Bastrakova)

Metadata storyboard to be translated into video presentation explaining what metadata is, what this working group is achieving, and how it can assist various communities. New initiative, has proven successful elsewhere (i.e. Location Index project).

ACTION: Members to provide input into preliminary storyboard notes (to be distributed by Irina for comment)

**INTERNATIONAL UPDATES**

ISO/OGC standards update (Chris Body)

*Chris chairs the IT004 group, and has been contracted by OGC to provide linkages with work being done in Australia and New Zealand*

* Linked data requires a focus on organisational data management practices and the understanding and support of senior leadership for its role in initiatives such as digital twin. If you don't have good organisational data management, then everything else will fall over. Need to convince leadership of (continued) good data management
* ISO TC211 Geographic Information Group: Requirements driven by international involvement in Sustainable Development Goals have necessitated focus on linking various standards to enable further work in this area
* As geospatial integration and technology mature and there are less barriers to getting information out, requirements for integration extend beyond our traditional groups/industry. New initiatives in information modelling, health, and smart cities for example, provide the tools and the will to integrate other data types with geospatial data.
* Critical that we get feedback from various expertise organisations to feed back into these international standards. No longer able to be a single country writing our own standards - ISO TC211 and Standards Australia just mirroring those standards since it started. When these are agreed and become international standards they become Australian/New Zealand Standards. In parts of the world ISO standards are more fundamentally acknowledged and endorsed than OGC
* Standards being addressed:
	+ Imagery - existing work provides significant framework. Australian and NZ community not as engaged with these standards compared with 19115-1. Chinese focus in this area due to range of satellites etc. requiring international standards which are being pushed into international areas. We are starting to leverage what our requirements are. Draft standards, others being revised
	+ Metadata (19115-2) - extensions for acquisition and processing
	+ Preservation of digital data and metadata - earth observation
	+ Geospatial APIs
	+ Addressing
	+ Land cover and land use
	+ LADM
	+ Data Quality (19157) - input would be valuable
* OGC: Progress of official standards supplied via slide gives idea of scope of work. Observation/measurements up for revision
* BIM and GIS conceptual model hasn't gone that well mainly due to a lack of understanding between the two and the complexity involved - redoing body of work next year
* 3DIM: a domain working group looking at 3D and land, building, etc., mainly smart cities and data integration. Richness of metadata so important to this. Digital Twin environment
* Standards around feature level metadata - how do we start linking standards together as requirements grow? Responsibility of this group to address this; international level looking at MDWG to engage on how good the standard is. Encourage and challenge MDWG members to delve deeper into standards. Input required to check OGC/ISO documentation is right

ACTION: Shanti to discuss with colleague (expert in simulation world) who is aware of linkages and may be able to contribute

W3C Data eXchange Working Group update (Simon Cox)

ConNeg by 'profile'

* Profile is a subset or structural form of a dataset, similar to a schema
* Work includes development of a standard for http content negotiation by profile - will specify how to request a particular schematic representation of a dataset (or any other artefact) over http to complement the request for something in a particular format. Work is close to completion and is likely to be released as a W3C Note.

DCAT2

* Dataset Catalogue vocabulary DCAT version 2 is anticipated be released by W3C as a standard in mid-November. DCAT2 features include:
	+ Data Service as a first-class type;
	+ A DCAT2 record has one-to-many parts - catalogues are subsets of data sets, and catalogues can catalogue other catalogues (essentially federate). This allows creation of rich relationships between resources (e.g. versioning or provenance) in a very flexible way using a "Role" indicator;
	+ 5 temporal properties allowing for more level of detail on time/space;
	+ Use of GeoSpark formalisation for spatial properties (text representation of geometry);
	+ Attribution relationships;
	+ Treatment of relationships between datasets, datasets/distribution and datasets/data services;
	+ A documented alignment with schema.org, including tabulation showing which DCAT2 classes/property relate to which schema.org types/properties (informative annex indicating general alignment)
* DCAT is an RDF vocabulary (denoted by a URI); in order to preserve backward compatibility with the quite large installed base of DCAT catalogues, the same namespace has been retained to ensure that existing DCAT catalogues are compatible.
* More frequent releases of new DCAT versions can be expected in future. Best practice around versioning (recommendations around how to describe a dataset series) is the next challenge to be considered.
* Byron requested further explanation of CRS/reference systems support and how that's handled by DCAT2 - Simon advised CRS-es are supported by well-known text. Dynamic datum and coordinate ethics is outside the scope of DCAT. Recommendation is that well-known text is used for transferring coordinate information, and that includes the support for coordinate reference systems and datums which you get from well-known text.
* Evert queried Simon's thoughts on whether we should move from ISO 19115-1 to a DCAT solution. Simon's view was that ISO 19115-1 is a specialist system and is unlikely to get much traction outside the geospatial community. DCAT has a broader scope deliberately aimed at a broader community, not just geospatial data, but is still a relatively specialised system. Feels RDF vocabulary (DCAT) makes it easier to mix and match with other RDF vocabularies, however they are both just candidates within general pool. The ability to transform an existing metadata record into multiple forms is relatively trivial relative to the work required to make sure you have decent metadata records in the first place.

Google dataset search

* Google dataset search - metadata embedded in landing pages allow harvesting directly by Google. While the google dataset search conforms to industry standards, it does not adequately manage more complex data. To address this, a small emerging ecosystem of third-party indexes are being built to more precisely harvest scientific and research data (e.g. ARDC collaboration)

**UPDATE FROM TECHNICAL METADATA WORKING GROUP**

Metadata Best Practice User Guide (Byron Cochrane)

Presentation of various elements within the User Guide and issues/solutions. A summary of points:

* User Guide under development due to lack of information on appropriate use of metadata under the current standard. Requirement for alignment of entries, particularly for data integration/harvesting
* Working Group has been developing this document for 18 months so far
* GitHub has replaced Loomio as collaborative space
* User Guide approaches metadata requirements at element level, using framework based on pattern language
* Document currently includes Data Resources and metadata about the metadata. Metadata services have not been addressed yet
* Metadata identifiers used to put definitions into context
* Prioritised elements using a star system (from an ICSM perspective)
* Living document - elements which haven't been addressed yet, and outstanding issues that need to be further resolved
* Future-proofing document - how to ensure it remains relevant and encourage users to engage with GitHub
* Importance for keywords to be populated with controlled vocabularies from relevant thesauruses

Discussion:

* When queried whether there were controlled vocabularies for things like Metadata Type Descriptive, advised this element is described by convention in the guidance document for the patterns
* GeoNetwork is probably the only toolset that supports the standard at present, although others may join
* A lot of systems are set up to take SKOS registries to populate keywords, e.g. PoolParty - anything that holds a proper RDF registry of terms is appropriate. If the tools we have don't support it they should be extended because keywords only make sense as a reference if they are centrally and well managed
* Development of platforms where people can publish their controlled vocabularies - need to make sure this is done in a coordinated way, rather than individual solutions
* Coordination role: ARDC agreed to support publishing community vocabularies. ARDC utilisse PoolParty tool which can be used by multiple parties to create vocabularies, and as a collaborative tool - includes version control and allows publication. Advantage that PoolParty is already being used by a number of groups within the research community as well as government, so we already have existing authoritative vocabularies
* Andrew Whiting queried how to get published vocabularies from ARDC into bigger geospatial platforms. Was advised PoolParty is available in different formats (RDF/semantic web, JSON, XML), so accessible by multiple communities and software platforms, but communication is required. so people can find those ontologies. Byron noted groups such as OGC have international recognition so more likely to be part of a global solution to publishing vocabularies
* Belinda: Gap between existing vocabulary services and ability to integrate it into a tool. How to find keywords and what other people are using so individual organisations don’t need to reinvent solutions; was hoping this best-practice guide would fill in those gaps. Noted by Group this is a collaboration/communication issue rather than a metadata issue. Was agreed that linkages to list of published vocabularies would be a useful addition to the User Guide
* Good Practice Guide acts as a framework under which we can identify issues for future attention using associated GitHub Issue Tracker. Could help record which keywords are important to different communities
* Next step - publication of Guidelines through centralised ICSM GitHub repository
* Additional resources will be required for development and maintenance of Guidelines
* A requirement for a business case for metadata champions to be resourced was noted
* Vocabularies are important elements of metadata and targeting and educating users in new areas such as Emergency Management is important
* Also important is that the Good Practice Guide is accessible and of benefit to all levels of user, from those with little to no experience with metadata, to experts

How do we make best use of Good Practice Guide document as it stands?

* Issues around versioning for both pdf and web version, though web version updates are far simpler to implement. Need to identify what makes a different version, and how do we update it.
* Use and usability:
	+ Building crosswalks: can use to map between elements and related metadata standards, guidance etc. for any sort of community
	+ Bespoke collections: Collection of elements taken from ISO 19115-1, useful if primary concern is about discovery of resources using metadata. Placeholder which can be adapted by any type of community. Doesn't link to entire to document, but to relevant page/section.
	+ Embedded help: Future possibility for inclusion in tools
* How to maintain: GitHub provides tools but need rules of governance
* How to keep in alignment with related resources

ACTION: Add linkage to list of published vocabularies to Metadata Best Practice User Guide

ACTION: Review roadmap at next meeting to build use cases

ACTION: Once Roadmap updated and business case developed, MDWG members to approach their ANZLIC/ICSM representatives requesting funding for ongoing work on Metadata User Guide

Recommendation for Metadata for Services (Melanie Barlow and Irina Bastrakova)

* Melanie presented an updated version of the recommended elements for Metadata for Services. She also noted that Simon Cox provided crosswalks between ISO 19115-1 and DCAT2 for the services metadata
* ISO 19139 Metadata Application Profile goes further in queryable properties, so using catalogue service for the web protocol combined with this profile, you would be able to search for a service of a particular type. Requested feedback on whether people find this in practice
* Similarly queried whether there's an equivalent in progress for ISO 19115-3
* Scenario of trying to connect metadata for data and metadata for services, plus metadata from service APIs if applicable
* ARDC work on harmonising data and metadata services (where available) what sort of elements are recommended to be populated for certain user stories to be satisfied.
* This work also highlights potential work for populating OGC services (e.g. WMS), and how to capture licence info at this level
* Further work includes what service metadata is required at the endpoint. Who needs to know what about a protocol, how it's used, etc.
* Some of this work will be addressed through Geospatial Capabilities Communities of Practice - let Melanie know if you would like to participate

ACTION: Provide feedback on whether users find they are able to search for a service of a particular type using catalogue service for the web protocol combined with ISO 19139. Is there an equivalent in progress for ISO 19115-3?

ACTION: Contact Melanie if you would like to be involved in Geospatial Capabilities Communities of Practice

ACTION: Irina to present on metadata working group activities at Geospatial Capabilities Communities of Practice

ACTION: Technical Metadata Working Group to provide recommendation to document service - what metadata is required, what elements are needed - and suggest development of vocabularies which allow classification of services/protocols/service type

ACTION: Consider how to structure capabilities and how to provide metadata to document those. Feedback requested from MDWG members

Vocabularies: development, publication (Irina Bastrakova)

* What is a vocabulary and why do we need them? A vocabulary can be simple or hierarchical (sub-vocabularies)
* Why: data integration; organise knowledge; tags to improve search; improve communication; machine-learning; extra knowledge that may lead to discovery of new relationships
	+ ISO 19115-1 defined vocabularies
	+ Community defined vocabularies
* Governance varies - strict protocols for ISO vocabs; community protocols defined by a community, official organisation or group
* Published through Research Vocabularies Australia (RVA) Portal - available; consistent; machine readable; semantic web; ability to collaborate
* Options for publication: RVA only or hybrid, e.g. vocabulary published RVA and terms published at CSIRO
* How to coordinate review of AGIFT for NAA - how to collaborate to develop terms?
* There are still many gaps in ISO 11915, e.g. temporal extent
* Terms may have multiple definitions, and identifiers e.g. local identifier and international identifier - can keep local secure
* How to organise collaboration to develop community vocabularies? Identify what vocabularies we might have within our various organisations then share internally and maybe identify common denominators

ACTION: Asked members to share vocabulary lists where possible and ask permission to publish them as public access

ACTION: Review of ANZLIC vocabularies

Legal and Security Constraints Explained (Shanti Rowlison)

* Why we use legal and security constraints. Provides mechanism to allow machine-machine automation; and a means of capturing information for users and data managers
* Snapshot of constraints from ISO standard
	+ **useLimitation** - provides opportunity for resource custodians to identify that there are specific limitations on the resource for a given use. Expect to be used on data resource rather than metadata record
	+ **Releasability** - distribution limited markers (e.g. official use only). Specify when the resource can be released
	+ **LegalConstraints** – e.g. privacy requirements, copyrights
	+ **accessConstraints** - e.g. useful if login is required, or internal vs external.
	+ **useConstraints** - e.g. how the resource can be used
	+ **otherConstraints** - any additional constraints, e.g. not available for x years
	+ **securityConstraints** - classification system defined
	+ **handingDescription** - e.g. Cabinet in Confidence hand delivered
* Australia's recent changes - deviated from ISO. For commonality of terms with those overseas may need to translate from Aus Govt back to ISO (refer to "then" and "Now" table)
* Distributed earlier Australian classification (useful for comparing with historical classifications) to avoid the issue of maintaining consistency between classifications
* Confusion for the user on where to put restrictions like "not for navigation". Up to agency to decide what type of constraint dependant on agency requirements
* Query why you'd put time constraints in otherConstraints not in Releasability - historically reason
* Belinda asked how CreativeCommons would be shown - generally agreed under legalConstraints
* Current issue within 19115-1 is that each distribution can be licenced separately but this is not allowed in metadata. A good way forward is to publish each option in the Best Practice User Guide
* Access restrictions/constraints are also requirements from an archive perspective - rights to National Archive constraints provided by original agency for both resource and metadata

GDA2020 and Australian Datum Modernisation: how to define in metadata (Irina Bastrakova)

* Following Nick Brown's overview from last meeting, the Technical Metadata Working Group was tasked with developing a recommendation on how ATRF (Australian Terrestrial Reference Framework) would be integrated within metadata.
* Upgrades to AGRS:
	+ GDA2020: remains static datum. More closely aligned to positions using satellite system e.g. GPS;
	+ ATRF: reflecting movement of Australian plates. Features change with time. Operates in time-dependent reference frame. Users can choose to use either GDA2020 or ATRF;
	+ AVWS (Australian Vertical Working Service): new reference service from Jan 2020.
* Need to reflect upgrades in metadata, requiring additional parameters to be included e.g. time. Refer to table summary of discussion. What do we need to be aware of - what reference system: temporal, vertical, horizontal? Must record when object observed d= temporal reference point. Need to include lineage either as lineage statement (accuracy, provenance, methods of transformation applied); or more structured process steps allowing recording of parameters in different details, e.g. timing (those elements which would help for future transformations of data in time). Reference systems can be captured in ISO 19115-1.
* What other things would we need to consider? Not clear where we would need to define data accuracy or consistency. Need to extend codelist for daytime types. ISO 19115-2 allows capture of data over time - data accuracy, transformations, epochs, etc. Can we use this standard to capture? Mandatory/optional elements need to be reviewed as temporal extent becoming mandatory. How to record provenance of data transformation? Are there other ISO standards which apply? Capturing the level of positioning and accuracy required; need to capture type of transformation - e.g. ESRI/quality of transformation affects. All open questions for discussion.
* Some of requirements for dynamic datum needs to be captured in the dataset itself, especially for complex and long-term datasets. How much do we need to reflect in metadata?
* Do existing standards satisfy requirements? Depends on how you look at dataset. If you consider as is and link to all previous versions as separate metadata record maybe yes. If want to make more complex object with multiple elements, procedures not necessary.Is ISO 19115-1 the best standard for capturing this information? Need to look at data quality standard. Properly structured machine-readable information would be important for capturing provenance. Process step construct which is slightly different for each domain could be a solution? For each use case a fit-for-purpose solution needs to be developed

Explanation/discussion of 5 different time stamps (Joel Haasdyk)

* Explanation/discussion of 5 different time stamps: use case, CRS, Coordinate Epoch, and Observational Epoch. Aust govt commitment to provide centimetre accuracy. Need coordinate epoch to give this else major discrepancies. ATRF2014 = CRS; coordinate epoch not 2014 - confusing for non-technical users. Invited further discussion later/offline
* ISO is looking to us to drive a solution. Need to write this up to get information out there quickly given timeframes, including ICSM website. Anything we'd recommend, people collecting data would need to record into the future to address these issues. Test capability of ISO 19115-2:2019 - can this be used to address issues? Maybe we already have a solution but don't know about it - need to see if this is the case. WGS84; alignment issues if don't have coordinate epoch. Outside Australia may not have information to be able to translate coordinate epoch. OGC aware of need to include in standards forward.
* How do we publish metadata requirements to broader community - important information that needs to be made available to people sooner rather than later. How are we going to do that? Do you (ICSM) have capacity to write some of this up and include on website. Resourcing issues - buy-in for resourcing needs to be developed. Additional resourcing required - SBAS funding? Simple message - to have accurate data need to allow for time. Records need to have temporal element. Missing link without standard development is to provide a solution.

ACTION: Developing communication materials for buy-in to address resource needs. Potential to record webinar - timeframes critical so needs to be soon.

Metadata in New Zealand - update from LINZ (Jeremy Palmer)

* LINZ reset around geospatial strategy, data publishing and data management. Internal governance around standards and metadata to do with spatial publishing. Internal teams that look after various aspects. Majority now have internal data management functions and roles established within them. Last 7-8 years trying to improve maturity around data management to improve outcomes. We are part of ANZLIC and coming up with profile of ISO metadata standard and have been using that standard ever since for day to day operations. What has happened over time have released more and more data online though web services and APIS and have run into problems. So are reopening box and looking into it. Ideas at this stage, haven’t come up with any firm path forward.
* Customers appreciate structural metadata and data dictionaries. Our aim is to improve discoverability and searchability, address accuracy and limitations, automating workflows, and define what data is and how it can be used or prevent misuse
* Drivers for change: poor search experience; improvements internal dataset management and software/system; improving internal data management; cloud based data storage and access; improved workflow automation for processing chains and consumption/reuse. Using existing ISO metadata standard and editor; PDF data dictionaries from word docs or scripts; more accessible online HTML data dictionaries - linkability and human readability. Basic and lacking consistency to date. Metadata created as an afterthought. Metadata is used for discovery - ISO metadata imported into LDS drives > search indexes, landing pages, etc. Most customers not using metadata itself (<1% of traffic to data). Problems knowing where appropriate to put things like copyright but came up with general guidelines for internal use
* Issues:
	+ Tools retired/no longer maintained. Still deciding way forward
	+ ISO metadata is not used by customers, admins see it as compliance task. Overly complex for admins and users - has many fields not used or understood by users
	+ Need consistent approach to metadata creation and taxonomy. Attribute/column metadata poor resulting in higher call volumes & misuse. No standard approach for delivery of "structured" attribute or processing metadata; means automatic processing not easy.
	+ Effort and priority of storing metadata - customer research/analysis
	+ How to solve automating workflows e.g. Spatiotemporal Asset Catalogue (STAC). Best approaches for external metadata sharing
	+ How to record data layers - e.g. metadata around imagery/acquisition (licence, accuracy, precision, when captured, key attributes, etc); feature/row level metadata
* To implement data management workflow in data lake need to bring in geospatial architects and collaborate with communities to help evolve the existing standards

**WORKSHOPS**

Requirements for imagery metadata (Irina Bastrakova)

* ISO 19115-2:2019 was published Jan 2019 as a comprehensive standard covering the whole data life-cycle from acquisition to retirement. Field data collection as well as other forms of data collection.

ISO 19115-2:2019 is reusing classes from other ISO standards. Extended information includes how we describe sensors and methods on data collection, e.g. instruments used for acquisition. Acquisition: redefined vocabularies. Significantly extended lineage information, particularly for process steps. More specific and extended compared with 19115-1. Extended spatial representation info to include geolocation. Added Ground Control Point Quality. Extended Content information for imagery

* A number of issues were identified: typos, integration with 19115-3, datum not specified to particular standard, etc. Now the standard is under review.
* From an ICSM perspective the stakeholder groups include FSDF, ELVIS SC, ANZLIC MDWG members, and others
* Shanti noted that the new version has a lot of optional fields. Which of those fields would we recommend users to populate - what would be useful to capture? Defence seeking this guidance. Extents and spatial representation from yesterday discussion apparent these need to be captured, but what else is there. Do we need instrument details? Preservation requirements?
* Workshop focus (Irina): What organisations are doing at the moment and what the gaps are
	+ Q1: What information you collect in addition to imagery/data itself, e.g. Ancillary and provenance information
	+ Q2: Do you have any specifications/templates that you provide for data/imagery collection?
	+ Q3: What are the gaps?
	+ Q4: Do you currently store ancillary/provenance information? Is it stored in a structured way?
* Chris suggested reaching out to specific communities (Lidar, marine defence) with a framework that the standard addresses, and request what community requires out of it. Come up with a collective imagery framework. Get user communities more signed-on in the process as they have stake from the start. Process of stepping through will develop full understanding of outcome to get end result.
* Feel it is better to flesh out what the users need themselves, rather than workshop within this group

ACTION: Irina to email 4 questions to MDWG members to for response on behalf of their work agencies. Deadline for response: end of November

ACTION: From responses to MDWG questions, develop market survey to gauge input, e.g. imagery and Lidar Working Group, to gather use cases

* Concerns raised:
	+ Current and future fitness for purpose of information so future users can interpret/trust data
	+ Usable in 10 years - reduce technological obsolescence
	+ Understand in business context plus make use in long term
	+ Broad metadata requirements under ISO - for better fit going forward require use cases and information to embed
	+ People may be progressing in their own way whether or not it complies with ISO

Requirement for data preservation metadata (Shanti Rowlison)

ISO 19165 Data Preservation Metadata

* What part of ISO 19115-1 does ISO 19165 extend? Outlined in slides:
	+ Linkages to the Archives
	+ Legal parameters
	+ Extensions of spatial referencing
	+ Standards used for defining information (e.g. source data, source format)
	+ Lineage information
	+ Linkages to other associated resources
* Defence approach: develop requirement for new capabilities, but difficult to add to existing capabilities (timeframes, resourcing). What fields do we think are critical? Who needs it implement it; when do we need to implement it; and do we need to have future guidance for this particular extension? Sees this as NAA role under Act - role needs to be clarified
* Defence has been trying to obtain guidance for a general geospatial disposal (authority?) approach from NAA. When does an image become a separate record with disposal/retainment requirements? Currently there is no whole of government policy on mandatory requirements, and there is a need for this. Need awareness of what Data Commissioner is doing - area of influence driving this agenda. DC2020/NAA space and how it fits with Data Commissioner; waiting to see next iteration of digital data policy
* DC2020 prescribe how the digital data needs to be preserved. However it is difficult to map between DC2020 and 19115-1. Maybe 19165 can help here? DoEE has been developing a recordkeeping reference for metadata using ANZ standard for historical requirements.

ACTION: NAA role in providing guidance around ISO 19165 needs to be clarified

ACTION: DoEE to share recordkeeping reference with group

ACTION: Same approach as first workshop discussion

*CARRIED OVER FROM DAY 1 AGENDA*

Metadata capability: structured and machine-readable approach for data dictionary (Evert Bleys)

* Note copy of xsd for Preservation Standard available from GitHub repository (from GitHub.com, go to ISO-TC211 and select Schemas).

ACTION: Evert to send link xsd outlined above

ACTION: If you need xsd on standard refer to Irina as ICSM representative to push through for review. Others to influence: Shanti, Margie, Chris, Evert

* In defining data structures Evert proposes three possible paths - choice based on business imperatives:
	+ Path 1 (easy option): Metadata/schema added an object as distributable file for download (Word, Excel, UML diagram). But can only discover structure once resource has been found and definition file downloaded, and description is effectively a narrative which can lead to discrepancies in approach
	+ Path 2 (not so easy): Define structure bit by bit - goes from metadata to content info (abstract class with range of implementations). If raster, 19115-1/-2 applies, but if a structured dataset then call it an association to ISO 19110. With a raster object, come from an abstract object to a coverage description down into attributes of that - structure designed around basis for imagery, which is relatively simple.
	+ Path 3: Tabular data - two options, putting structures in a feature catalogue, therefore searching feature catalogue metadata rather than ISO 19115 and reversing out of that:
	(a) Flat files - Round 1 = Dataset/table; Round 2 = Column; Drop to: Column Attribute; Drop to: listed values
	(b) Relational tables - Round 1 = Dataset; Round 2 = Table; Round 3 = Column; Drop to: Column Attribute; Drop to: listed values PLUS relationships
* Relationships should be relatively stable. May add tables. GeoNetwork Schema allows to use 19115 and 19110. This is where you would document database structure well as part of governance. Need skills base to do these things - don't want people who don't want system/description. Need someone who can describe and knows the system. Required for interagency consistency - requires cooperation and determination
* Identification of skillsets: learnt skills not defined. DAMA-BOC is good start. Using database to generate diagrams is dangerous as database tends to be round blog, spun around still works. Need perspective of why it was built and thought pattern of database engineer who designed it / compare with what database produces itself.
* These options might be over-engineered for a basic use-case. Evert agreed - it gets into adjacent space - don't want to build tight models for specific outcomes because not future-proofed. Think of it as a tree working from attribute back up to database. For this type of object, here's the template. GeoNetwork has this schema in as a separate object from 19115. Option 2b Tabular - 19110:2016 methodology for feature cataloguing. A feature is "anything", so model is designed to be able to describe anything. Irina noted reverse engineering set of databases to be able to include data / describe data dictionary in a structured way. Want to be able to automate process trying to develop ways to extract data from data dictionary in oracle space so we don't need to do it manually. With pattern can extract bits and pieces and apply it. Example in XML parser which Irina suggested needs to be automated. Databases need to be good enough that you don't need many of them. Jeremy asked to see some examples

ACTION: Provide further examples for this

* Australia is taking advantage of 19115-1 to explore issues of forward compatibility to ensure that anything done in old model will progress to new model without a glitch. 19115(>110?) model changed significantly as long as could give a pathway for people to transform their pathway. Byron noted that we need to preserve best practices and where those things exist, for example the same element of parent metadata can define multiple things, but maybe associated resource can map parent resource instead.
* Discussion yesterday about time: Coordinate epoch. Could it be done right now with 19115 without any changes? It can because those components are part of ResourceTemporalExtent - a GML object (time instance). By default ISO 8601, however time primitive allows for a frame - can put in a decimal - can say frame is decimal years. Can put in 2019.12345. Allows for ATRF. Jeremy raised a concern about losing standardisation/interoperability with workarounds. Evert responded that a defined set of words in free text field with no other content allowed lets you transfer to future solution. Label.xml construct called helper gives usable/defined options such as "unknown". Irina said that we need documented examples of how this can be implemented as interim solution given Jan 2020 imminent and provide instructions to transfer to future solution.

**ADMINISTRATION**

ACTION: Agreed BPUG to be published

ACTION: Agreed to publish Metadata for Services: Table (Melanie) to be published as basis for work

ACTION: Agreed publication of vocabularies. RVA portal continue to be used as a tool

ACTION: Workshop topics: decided on plan of action to approach specific communities with preliminary questionnaire and later more specific communities with targeted approach

ACTION: Paper Joel presented to OGC in Banff to be distributed (note this should also be available on the ICSM website)

ACTION: Irina to send transcript, communication video and questions. Feedback/suggestions requested by email to Irina

**NEXT MEETING**

* It was agreed that the next meeting of the ANZLIC Metadata Working Group will be held in Melbourne towards the end of February. Should any issues arise with regards this timing/location, please let Irina know ASAP.

**Meeting attendees:**

*In person:*

Irina Bastrakova, Geoscience Australia (Chair)

Jenny Long, Geoscience Australia (Secretariat)

Robyn Tottenham, Department of Agriculture

Glenys Barodien, Department of Agriculture

Ian Mullen, Department of Agriculture

Julia Martin, Australian Research Data Commons

Joel Haasdyk, NSW Government

Dave Connell, Australian Antarctic Division

David Robertson, Australian Bureau of Statistics

Belinda Allison, ACT Government

Melanie Barlow, Australian Research Data Commons

Shanti Rowlison, Defence

David Drynan, Department of Environment & Energy

Kemal Hasandedic, Department of Environment & Energy

Andrew Whiting, Geoscience Australia

Graham Logan, Geoscience Australia

Lesley Waterhouse, Geoscience Australia

Margie Smith, Geoscience Australia

Jenny Rowland, Geoscience Australia

Chris Body, Standards Australia

Evert Bleys, ISO TC211

Jeremy Palmer, Land Information New Zealand

Cameron Shorter, NSW Government

Byron Cochrane, OpenWork Ltd

Marco Wallenius, National Archives

Andrew Marshall, Geoscience Australia

David Lescinsky, Geoscience Australia

*Online:*

Jacquie LeLievre, Department of Environment, Land, Water & Planning Victoria

Natalia Atkins, Integrated Marine Observation System

Michael Rigby, Australian Urban Research Infrastructure Network

Simon Cox, CSIRO Land & Water

Adam Rice, Department of Infrastructure, Transport, Cities and Regional Development

Brenda Lilley, Great Barrier Reef Marine Park Authority

Kheeran Dharmawardena, Cytrax Consulting

Jenny Smith, LandGate, WA

Joseph Street

Ian Beitzel, Department of Natural Resources, Mines and Energy, QLD Government

Phillip Rudd, Department of Infrastructure, Planning and Logistics, NT Government

Viet Duong,

Anthony Eastcott, LandGate, WA