INSPIRE Monitoring and Reporting 2022: Process, results and way forward

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73rd MIG-T meeting – February 17, 2023

Context

Context

- Farewell to custom code
- Welcome to GeoNetwork Open Source
  - Migration tougher than anticipated
  - More than one year of development, testing and training
  - One of the first real test cases for the new GeoNetwork 4.0 based on microservices
  - Very complex architecture and unprecedentedly high number of metadata records

Context

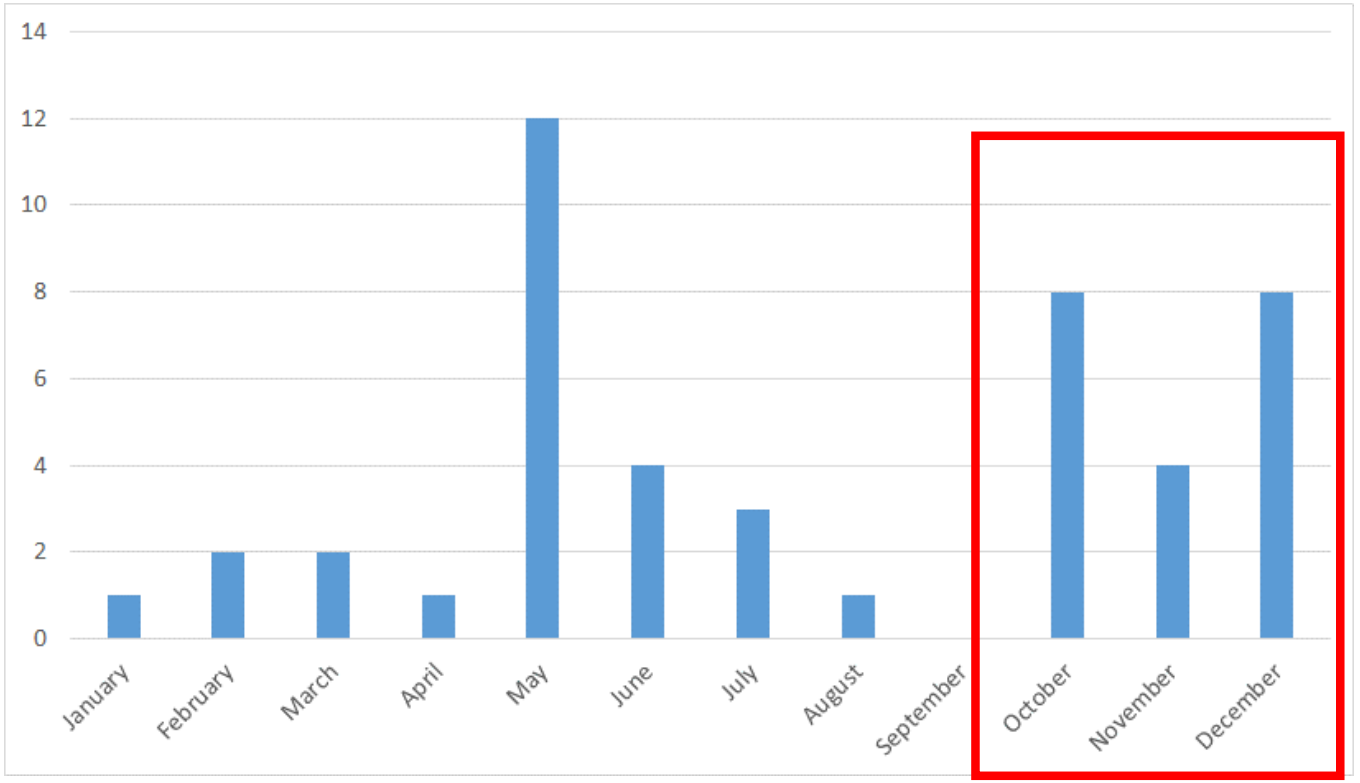
- Strategic decision to go ahead with open source technology
  - Part of ‘mainstreaming’ and simplification agenda for the central INSPIRE infrastructure
  - Improved transparency and reproducibility of the results by the MS
  - Long-term commitment
- New infrastructure and the HVD Implementing Act

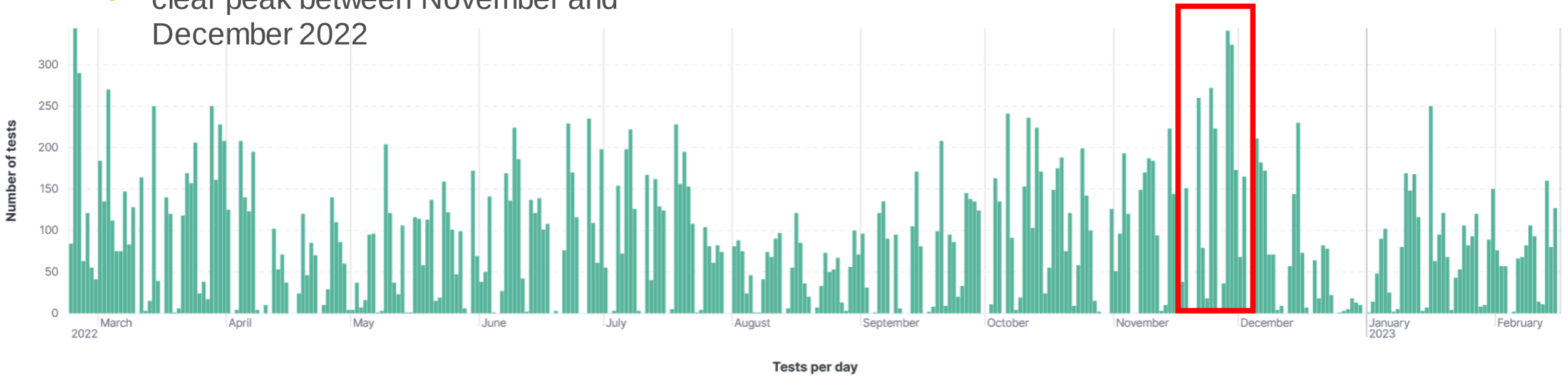
Cloud resources

- INSPIRE Geoportal backend
  - Initial: 8 CPUs, 16 GB ram, 200 GB (root) + 1 TB (data)
  - Current: incrementally scaled to 48 CPUs, 384 GB ram, 200GB (root) + 4TB (data)
- INSPIRE Reference Validator
  - ETF instances: up to 8 nodes, 2 vCPUs, 8 GB ram, 100 GB SSD
  - Bulk validation tool: 2 nodes
    - 1 node: 2 vCPUs, 8 GB ram, 124 GB hdd
    - 1 node (used for DE validation): 4 vCPUs, 16 GB ram, 248 GB hdd

Context

- Issues opened in the Geoportal helpdesk in 2022
  - Opened by 17 MS (thank you!)
  - 46 issues in total
- Tests run in the INSPIRE Reference Validator
  - clear peak between November and December 2022





Special thanks to

- All the JRC colleagues involved in the process
  - Fabiano Spinelli, Davide Artasensi, Loizos Bailas, Andrea Musumeci, Pierpaolo Cira

- The Consortium supporting the operation of the INSPIRE infrastructure

Guadaltel bilbomática EPSILON Italia

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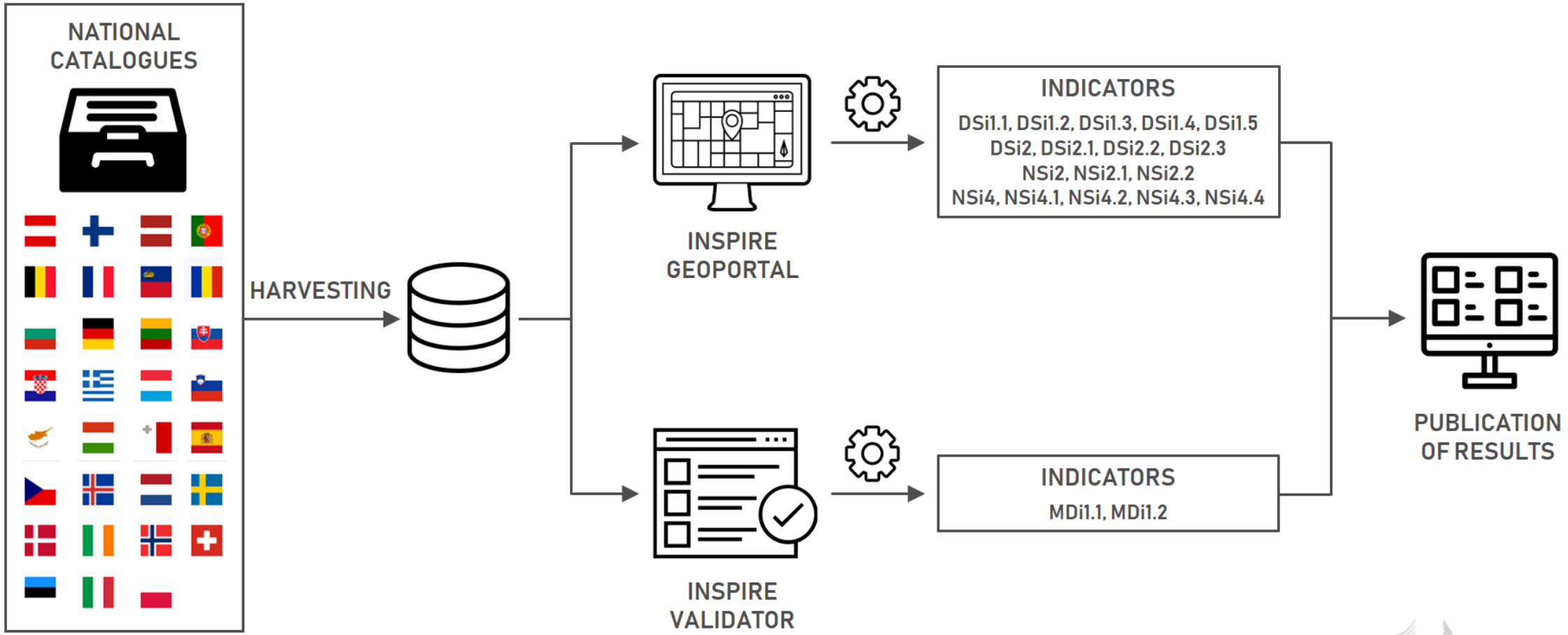
Results

Monitoring and Reporting 2022 – Process

- Overall process:



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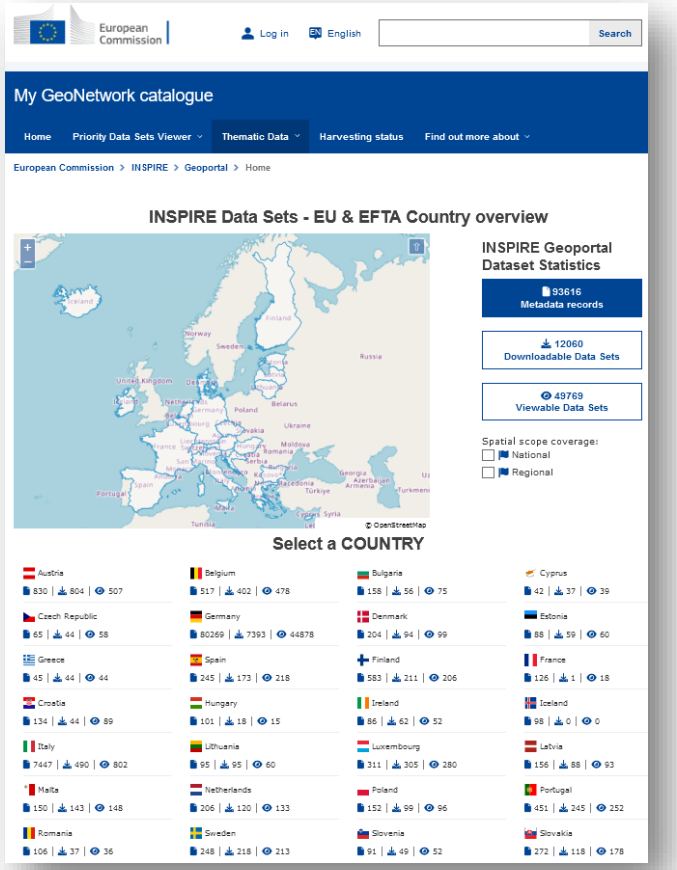
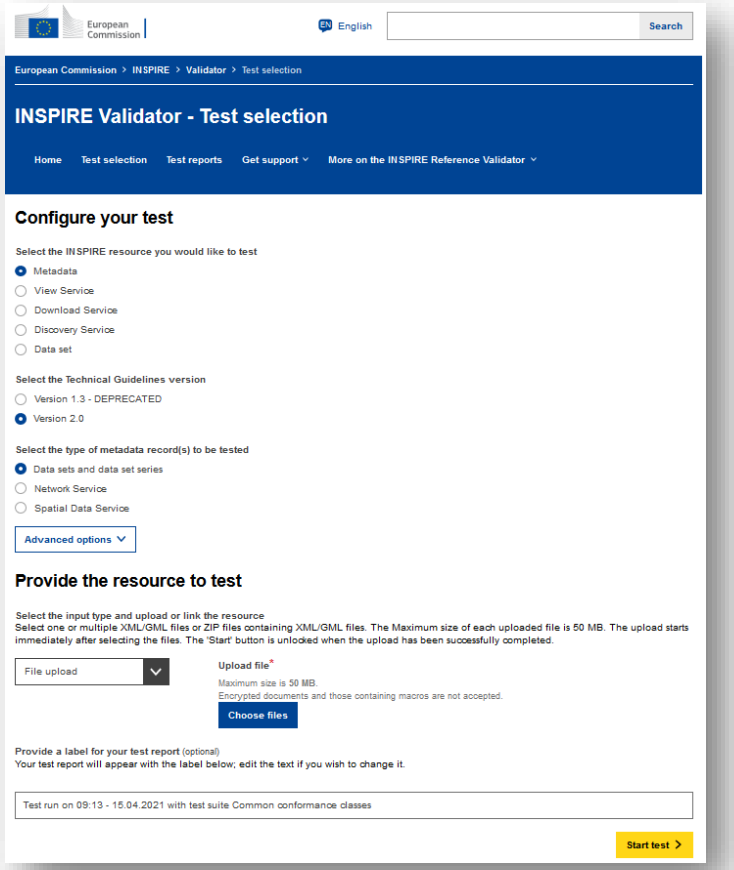
Monitoring and Reporting 2022 – Software



- INSPIRE Geoportal based on GeoNetwork v.4.2.0



- INSPIRE Reference Validator v.2022.3 (released on 21/09/2022)
- Bulk validation tool v.2021.1.0 (released on 5/10/2021)

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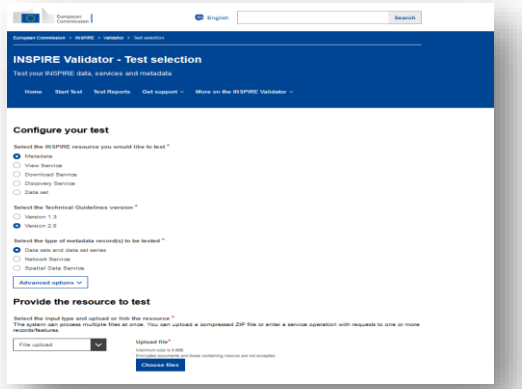
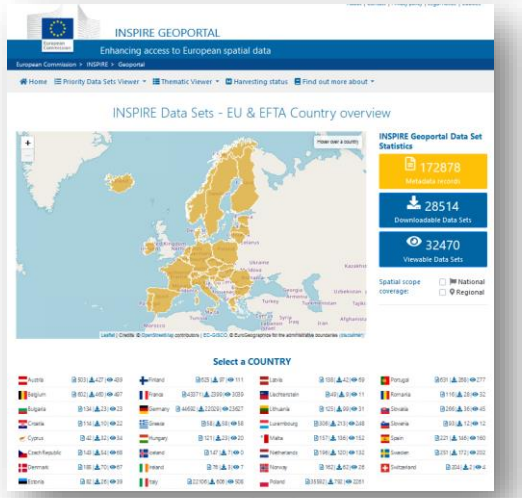
Monitoring and Reporting 2022 – Indicators

- Indicators grouped into 5 categories:
  - availability of spatial data and services
    - DSi1.1, DSi1.2, DSi1.3, DSi1.4, DSi1.5
  - conformity of metadata
    - MDi1.1, MDi1.2
  - conformity of spatial data sets
    - DSi2, DSi2.1, DSi2.2, DSi2.3
  - accessibility of spatial data sets
    - NSi2, NSi2.1, NSi2.2
  - conformity of network services
    - NSi4, NSi4.1, NSi4.2, NSi4.3, NSi4.4

INSPIRE Reference Validator
(metadata validation)



INSPIRE Geoportal
(linkages check)



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Monitoring and Reporting 2022 – Indicators

- Indicators grouped into 5 categories:
  - availability of spatial data and services
    - DSi1.1, DSi1.2, DSi1.3, DSi1.4, DSi1.5

absolute values

  - conformity of metadata
    - MDi1.1, MDi1.2
  - conformity of spatial data sets
    - DSi2, DSi2.1, DSi2.2, DSi2.3
  - accessibility of spatial data sets
    - NSi2, NSi2.1, NSi2.2
  - conformity of network services
    - NSi4, NSi4.1, NSi4.2, NSi4.3, NSi4.4

relative values
(percentages)

Monitoring and Reporting 2022 – Results

- Median values of all indicators in the years 2019-2022:
  - overall: slow but continuous improvement

calculated automatically (Validator)

YEAR	DSi1.1	DSi1.2	DSi1.3	DSi1.4	DSi1.5
2019	164	142	47	0	74
2020	161	182	51	0	94
2021	167	192	55	2	109
2022	157	193	58	0	101

availability of spatial data and services

YEAR	MDi1.1	MDi1.2
2019	38%	38%
2020	55%	67%
2021	78%	92%
2022	89%	90%

conformity of metadata

YEAR	DSi2	DSi2.1	DSi2.2	DSi2.3
2019	38%	73%	33%	35%
2020	43%	75%	47%	38%
2021	70%	87%	67%	62%
2022	73%	91%	71%	70%

conformity of spatial data sets

calculated automatically (Geoportal)

YEAR	NSi2	NSi2.1	NSi2.2
2019	16%	32%	20%
2020	32%	44%	42%
2021	45%	57%	54%
2022	50%	62%	56%

accessibility of spatial data sets

YEAR	NSi4	NSi4.1	NSi4.2	NSi4.3	NSi4.4
2019	49%	50%	46%	51%	0%
2020	71%	67%	67%	83%	0%
2021	92%	100%	94%	92%	100%
2022	92%	100%	93%	91%	0%

conformity of network services

Overall results – 2022 performance

0 ≤ X < 10%
10% ≤ X < 30%
30% ≤ X < 50%
50% ≤ X < 70%
70% ≤ X < 90%
90% ≤ X ≤ 100%

country	DSi1.1	DSi1.2	DSi1.3	DSi1.4	DSi1.5	MDi1.1	MDi1.2	DSi2	DSi2.1	DSi2.2	DSi2.3	NSi2	NSi2.1	NSi2.2	NSi4	NSi4.1	NSi4.2	NSi4.3	NSi4.4
AT	830	625	90	260	563	99%	99%	86%	88%	98%	70%	60%	61%	97%	97%	100%	96%	98%	#N/A
BE	558	240	281	467	78	95%	63%	73%	96%	71%	71%	79%	93%	80%	92%	83%	93%	91%	#N/A
BG	166	37	101	56	81	37%	51%	96%	100%	100%	98%	34%	46%	34%	0%	0%	0%	0%	#N/A
CH	207	35	0	0	4	0%	0%	2%	7%	0%	0%	0%	2%	0%	0%	0%	0%	0%	#N/A
CY	42	61	10	0	0	0%	0%	2%	0%	25%	0%	81%	93%	88%	0%	#N/A	0%	0%	#N/A
CZ	90	193	33	12	78	93%	98%	48%	100%	91%	21%	78%	93%	83%	96%	100%	95%	97%	100%
DE	81044	151526	258	2650	212	93%	96%	81%	68%	51%	82%	72%	76%	76%	99%	100%	99%	99%	#N/A
DK	206	246	59	0	202	63%	97%	63%	95%	71%	57%	42%	48%	46%	95%	100%	94%	96%	#N/A
EE	89	117	25	0	89	97%	95%	98%	100%	90%	100%	66%	67%	66%	97%	100%	95%	98%	#N/A
EL	45	98	43	0	45	100%	100%	100%	100%	#N/A	100%	96%	98%	98%	0%	0%	0%	0%	#N/A
ES	245	321	75	43	188	93%	99%	100%	100%	100%	99%	70%	89%	71%	100%	100%	100%	100%	#N/A
FI	661	207	34	232	178	75%	86%	19%	9%	21%	22%	32%	34%	38%	54%	0%	56%	53%	#N/A
FR	228	56	146	11	103	2%	4%	76%	81%	92%	74%	1%	18%	1%	7%	0%	9%	0%	#N/A
HR	151	216	18	22	101	95%	90%	98%	100%	100%	97%	27%	67%	29%	93%	100%	90%	99%	#N/A
HU	111	59	13	0	8	1%	0%	36%	48%	45%	33%	14%	14%	16%	32%	60%	26%	33%	#N/A
IE	83	26	41	0	83	100%	100%	100%	100%	100%	100%	63%	63%	75%	100%	100%	100%	100%	#N/A
IS	98	28	5	2	92	89%	86%	52%	62%	72%	36%	0%	0%	0%	0%	#N/A	0%	0%	#N/A
IT	7671	2231	583	4383	960	99%	96%	31%	34%	20%	27%	6%	10%	6%	5%	14%	6%	2%	0%
LI	72	3	0	0	53	78%	33%	11%	8%	16%	6%	0%	17%	0%	50%	#N/A	100%	0%	#N/A
LT	95	122	72	0	95	93%	100%	98%	97%	100%	99%	63%	63%	100%	100%	100%	100%	100%	#N/A
LU	311	59	96	0	311	100%	100%	73%	100%	94%	62%	90%	90%	98%	100%	100%	100%	100%	#N/A
LV	157	240	72	0	0	0%	0%	76%	83%	55%	81%	54%	59%	56%	0%	#N/A	0%	0%	#N/A
MT	150	150	40	0	148	99%	99%	100%	100%	100%	100%	95%	99%	95%	99%	100%	100%	99%	#N/A
NL	214	352	63	0	192	77%	91%	53%	91%	33%	70%	50%	64%	57%	93%	100%	93%	93%	#N/A
NO	144	239	14	3	140	84%	79%	36%	38%	28%	38%	15%	19%	42%	16%	100%	15%	15%	#N/A
PL	156	258	58	0	155	99%	89%	94%	100%	50%	93%	56%	62%	63%	97%	100%	95%	99%	#N/A
PT	456	508	106	165	199	62%	90%	47%	60%	53%	43%	49%	56%	54%	67%	#N/A	73%	58%	#N/A
RO	107	76	29	15	92	52%	84%	40%	70%	27%	32%	33%	34%	35%	90%	100%	94%	85%	#N/A
SE	248	227	64	0	237	83%	83%	100%	100%	100%	100%	83%	86%	88%	100%	100%	100%	100%	#N/A
SI	98	131	9	0	84	64%	90%	82%	100%	81%	90%	40%	60%	50%	100%	#N/A	100%	100%	#N/A
SK	274	430	59	10	192	99%	46%	21%	16%	29%	19%	43%	65%	43%	30%	100%	30%	29%	0%

Absolute number indicators
Comparison vs. 2021, 2020, 2019

- increase ≥ 30%
- increase ≥ 20% and < 30%
- increase ≥ 10% and < 20%
- increase/decrease < 10%
- decrease ≥ 10% and < 20%
- decrease ≥ 20% and < 30%
- decrease ≥ 30%

country	DSi1.1	DSi1.2	DSi1.3	DSi1.4	DSi1.5
AT	830	625	90	260	563
BE	558	240	281	467	78
BG	166	37	101	56	81
CH	207	35	0	0	4
CY	42	61	10	0	0
CZ	90	193	33	12	78
DE	81044	151526	258	2650	212
DK	206	246	59	0	202
EE	89	117	25	0	89
EL	45	98	43	0	45
ES	245	321	75	43	188
FI	661	207	34	232	178
FR	228	56	146	11	103
HR	151	216	18	22	101
HU	111	59	13	0	8
IE	83	26	41	0	83
IS	98	28	5	2	92
IT	7671	2231	583	4383	960
LI	72	3	0	0	53
LT	95	122	72	0	95
LU	311	59	96	0	311
LV	157	240	72	0	0
MT	150	150	40	0	148
NL	214	352	63	0	192
NO	144	239	14	3	140
PL	156	258	58	0	155
PT	456	508	106	165	199
RO	107	76	29	15	92
SE	248	227	64	0	237
SI	98	131	9	0	84
SK	274	430	59	10	192

country	DSi1.1	DSi1.2	DSi1.3	DSi1.4	DSi1.5
AT	830	625	90	260	563
BE	558	240	281	467	78
BG	166	37	101	56	81
CH	207	35	0	0	4
CY	42	61	10	0	0
CZ	90	193	33	12	78
DE	81044	151526	258	2650	212
DK	206	246	59	0	202
EE	89	117	25	0	89
EL	45	98	43	0	45
ES	245	321	75	43	188
FI	661	207	34	232	178
FR	228	56	146	11	103
HR	151	216	18	22	101
HU	111	59	13	0	8
IE	83	26	41	0	83
IS	98	28	5	2	92
IT	7671	2231	583	4383	960
LI	72	3	0	0	53
LT	95	122	72	0	95
LU	311	59	96	0	311
LV	157	240	72	0	0
MT	150	150	40	0	148
NL	214	352	63	0	192
NO	144	239	14	3	140
PL	156	258	58	0	155
PT	456	508	106	165	199
RO	107	76	29	15	92
SE	248	227	64	0	237
SI	98	131	9	0	84
SK	274	430	59	10	192

country	DSi1.1	DSi1.2	DSi1.3	DSi1.4	DSi1.5
AT	830	625	90	260	563
BE	558	240	281	467	78
BG	166	37	101	56	81
CH	207	35	0	0	4
CY	42	61	10	0	0
CZ	90	193	33	12	78
DE	81044	151526	258	2650	212
DK	206	246	59	0	202
EE	89	117	25	0	89
EL	45	98	43	0	45
ES	245	321	75	43	188
FI	661	207	34	232	178
FR	228	56	146	11	103
HR	151	216	18	22	101
HU	111	59	13	0	8
IE	83	26	41	0	83
IS	98	28	5	2	92
IT	7671	2231	583	4383	960
LI	72	3	0	0	53
LT	95	122	72	0	95
LU	311	59	96	0	311
LV	157	240	72	0	0
MT	150	150	40	0	148
NL	214	352	63	0	192
NO	144	239	14	3	140
PL	156	258	58	0	155
PT	456	508	106	165	199
RO	107	76	29	15	92
SE	248	227	64	0	237
SI	98	131	9	0	84
SK	274	430	59	10	192

Relative number indicators Comparison vs. 2021

increase of more than 10 percentage points compared to 2021
increase/decrease of less than 10 percentage points compared to 2021
decrease of more than 10 percentage points compared to 2021

country	MDi1.1	MDi1.2	DSi2	DSi2.1	DSi2.2	DSi2.3	NSi2	NSi2.1	NSi2.2	NSi4	NSi4.1	NSi4.2	NSi4.3	NSi4.4
AT	99%	99%	86%	88%	98%	70%	60%	61%	97%	97%	100%	96%	98%	#N/A
BE	95%	63%	73%	96%	71%	71%	79%	93%	80%	92%	83%	93%	91%	#N/A
BG	37%	51%	96%	100%	100%	98%	34%	46%	34%	0%	0%	0%	0%	#N/A
CH	0%	0%	2%	7%	0%	0%	0%	2%	0%	0%	0%	0%	0%	#N/A
CY	0%	0%	2%	0%	25%	0%	81%	93%	88%	0%	#N/A	0%	0%	#N/A
CZ	93%	98%	48%	100%	91%	21%	78%	93%	83%	96%	100%	95%	97%	100%
DE	93%	96%	81%	68%	51%	82%	72%	76%	76%	99%	100%	99%	99%	#N/A
DK	63%	97%	63%	95%	71%	57%	42%	48%	46%	95%	100%	94%	96%	#N/A
EE	97%	95%	98%	100%	90%	100%	66%	67%	66%	97%	100%	95%	98%	#N/A
EL	100%	100%	100%	100%	#N/A	100%	96%	98%	98%	0%	0%	0%	0%	#N/A
ES	93%	99%	100%	100%	100%	99%	70%	89%	71%	100%	100%	100%	100%	#N/A
FI	75%	86%	19%	9%	21%	22%	32%	34%	38%	54%	0%	56%	53%	#N/A
FR	2%	4%	76%	81%	92%	74%	1%	18%	1%	7%	0%	9%	0%	#N/A
HR	95%	90%	98%	100%	100%	97%	27%	67%	29%	93%	100%	90%	99%	#N/A
HU	1%	0%	36%	48%	45%	33%	14%	14%	16%	32%	60%	26%	33%	#N/A
IE	100%	100%	100%	100%	100%	100%	63%	63%	75%	100%	100%	100%	100%	#N/A
IS	89%	86%	52%	62%	72%	36%	0%	0%	0%	0%	#N/A	0%	0%	#N/A
IT	99%	96%	31%	34%	20%	27%	6%	10%	6%	5%	14%	6%	2%	0%
LI	78%	33%	11%	8%	16%	6%	0%	17%	0%	50%	#N/A	100%	0%	#N/A
LT	93%	100%	98%	97%	100%	99%	63%	63%	100%	100%	100%	100%	100%	#N/A
LU	100%	100%	73%	100%	94%	62%	90%	90%	98%	100%	100%	100%	100%	#N/A
LV	0%	0%	76%	83%	55%	81%	54%	59%	56%	0%	#N/A	0%	0%	#N/A
MT	99%	99%	100%	100%	100%	100%	95%	99%	95%	99%	100%	100%	99%	#N/A
NL	77%	91%	53%	91%	33%	70%	50%	64%	57%	93%	100%	93%	93%	#N/A
NO	84%	79%	36%	38%	28%	38%	15%	19%	42%	16%	100%	15%	15%	#N/A
PL	99%	89%	94%	100%	50%	93%	56%	62%	63%	97%	100%	95%	99%	#N/A
PT	62%	90%	47%	60%	53%	43%	49%	56%	54%	67%	#N/A	73%	58%	#N/A
RO	52%	84%	40%	70%	27%	32%	33%	34%	35%	90%	100%	94%	85%	#N/A
SE	83%	83%	100%	100%	100%	100%	83%	86%	88%	100%	100%	100%	100%	#N/A
SI	64%	90%	82%	100%	81%	90%	40%	60%	50%	100%	#N/A	100%	100%	#N/A
SK	99%	46%	21%	16%	29%	19%	43%	65%	43%	30%	100%	30%	29%	0%

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Relative number indicators
Comparison vs. 2020

increase of more than 10 percentage points compared to 2020
increase/decrease of less than 10 percentage points compared to 2020
decrease of more than 10 percentage points compared to 2020

country	MDi1.1	MDi1.2	DSi2	DSi2.1	DSi2.2	DSi2.3	NSi2	NSi2.1	NSi2.2	NSi4	NSi4.1	NSi4.2	NSi4.3	NSi4.4
AT	99%	99%	86%	88%	98%	70%	60%	61%	97%	97%	100%	96%	98%	#N/A
BE	95%	63%	73%	96%	71%	71%	79%	93%	80%	92%	83%	93%	91%	#N/A
BG	37%	51%	96%	100%	100%	98%	34%	46%	34%	0%	0%	0%	0%	#N/A
CH	0%	0%	2%	7%	0%	0%	0%	2%	0%	0%	0%	0%	0%	#N/A
CY	0%	0%	2%	0%	25%	0%	81%	93%	88%	0%	#N/A	0%	0%	#N/A
CZ	93%	98%	48%	100%	91%	21%	78%	93%	83%	96%	100%	95%	97%	100%
DE	93%	96%	81%	68%	51%	82%	72%	76%	76%	99%	100%	99%	99%	#N/A
DK	63%	97%	63%	95%	71%	57%	42%	48%	46%	95%	100%	94%	96%	#N/A
EE	97%	95%	98%	100%	90%	100%	66%	67%	66%	97%	100%	95%	98%	#N/A
EL	100%	100%	100%	100%	#N/A	100%	96%	98%	98%	0%	0%	0%	0%	#N/A
ES	93%	99%	100%	100%	100%	99%	70%	89%	71%	100%	100%	100%	100%	#N/A
FI	75%	86%	19%	9%	21%	22%	32%	34%	38%	54%	0%	56%	53%	#N/A
FR	2%	4%	76%	81%	92%	74%	1%	18%	1%	7%	0%	9%	0%	#N/A
HR	95%	90%	98%	100%	100%	97%	27%	67%	29%	93%	100%	90%	99%	#N/A
HU	1%	0%	36%	48%	45%	33%	14%	14%	16%	32%	60%	26%	33%	#N/A
IE	100%	100%	100%	100%	100%	100%	63%	63%	75%	100%	100%	100%	100%	#N/A
IS	89%	86%	52%	62%	72%	36%	0%	0%	0%	0%	#N/A	0%	0%	#N/A
IT	99%	96%	31%	34%	20%	27%	6%	10%	6%	5%	14%	6%	2%	0%
LI	78%	33%	11%	8%	16%	6%	0%	17%	0%	50%	#N/A	100%	0%	#N/A
LT	93%	100%	98%	97%	100%	99%	63%	63%	100%	100%	100%	100%	100%	#N/A
LU	100%	100%	73%	100%	94%	62%	90%	90%	98%	100%	100%	100%	100%	#N/A
LV	0%	0%	76%	83%	55%	81%	54%	59%	56%	0%	#N/A	0%	0%	#N/A
MT	99%	99%	100%	100%	100%	100%	95%	99%	95%	99%	100%	100%	99%	#N/A
NL	77%	91%	53%	91%	33%	70%	50%	64%	57%	93%	100%	93%	93%	#N/A
NO	84%	79%	36%	38%	28%	38%	15%	19%	42%	16%	100%	15%	15%	#N/A
PL	99%	89%	94%	100%	50%	93%	56%	62%	63%	97%	100%	95%	99%	#N/A
PT	62%	90%	47%	60%	53%	43%	49%	56%	54%	67%	#N/A	73%	58%	#N/A
RO	52%	84%	40%	70%	27%	32%	33%	34%	35%	90%	100%	94%	85%	#N/A
SE	83%	83%	100%	100%	100%	100%	83%	86%	88%	100%	100%	100%	100%	#N/A
SI	64%	90%	82%	100%	81%	90%	40%	60%	50%	100%	#N/A	100%	100%	#N/A
SK	99%	46%	21%	16%	29%	19%	43%	65%	43%	30%	100%	30%	29%	0%

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Relative number indicators
Comparison vs. 2019

increase of more than 10 percentage points compared to 2019
increase/decrease of less than 10 percentage points compared to 2019
decrease of more than 10 percentage points compared to 2019

country	MDi1.1	MDi1.2	DSi2	DSi2.1	DSi2.2	DSi2.3	NSi2	NSi2.1	NSi2.2	NSi4	NSi4.1	NSi4.2	NSi4.3	NSi4.4
AT	99%	99%	86%	88%	98%	70%	60%	61%	97%	97%	100%	96%	98%	#N/A
BE	95%	63%	73%	96%	71%	71%	79%	93%	80%	92%	83%	93%	91%	#N/A
BG	37%	51%	96%	100%	100%	98%	34%	46%	34%	0%	0%	0%	0%	#N/A
CH	0%	0%	2%	7%	0%	0%	0%	2%	0%	0%	0%	0%	0%	#N/A
CY	0%	0%	2%	0%	25%	0%	81%	93%	88%	0%	#N/A	0%	0%	#N/A
CZ	93%	98%	48%	100%	91%	21%	78%	93%	83%	96%	100%	95%	97%	100%
DE	93%	96%	81%	68%	51%	82%	72%	76%	76%	99%	100%	99%	99%	#N/A
DK	63%	97%	63%	95%	71%	57%	42%	48%	46%	95%	100%	94%	96%	#N/A
EE	97%	95%	98%	100%	90%	100%	66%	67%	66%	97%	100%	95%	98%	#N/A
EL	100%	100%	100%	100%	#N/A	100%	96%	98%	98%	0%	0%	0%	0%	#N/A
ES	93%	99%	100%	100%	100%	99%	70%	89%	71%	100%	100%	100%	100%	#N/A
FI	75%	86%	19%	9%	21%	22%	32%	34%	38%	54%	0%	56%	53%	#N/A
FR	2%	4%	76%	81%	92%	74%	1%	18%	1%	7%	0%	9%	0%	#N/A
HR	95%	90%	98%	100%	100%	97%	27%	67%	29%	93%	100%	90%	99%	#N/A
HU	1%	0%	36%	48%	45%	33%	14%	14%	16%	32%	60%	26%	33%	#N/A
IE	100%	100%	100%	100%	100%	100%	63%	63%	75%	100%	100%	100%	100%	#N/A
IS	89%	86%	52%	62%	72%	36%	0%	0%	0%	0%	#N/A	0%	0%	#N/A
IT	99%	96%	31%	34%	20%	27%	6%	10%	6%	5%	14%	6%	2%	0%
LI	78%	33%	11%	8%	16%	6%	0%	17%	0%	50%	#N/A	100%	0%	#N/A
LT	93%	100%	98%	97%	100%	99%	63%	63%	100%	100%	100%	100%	100%	#N/A
LU	100%	100%	73%	100%	94%	62%	90%	90%	98%	100%	100%	100%	100%	#N/A
LV	0%	0%	76%	83%	55%	81%	54%	59%	56%	0%	#N/A	0%	0%	#N/A
MT	99%	99%	100%	100%	100%	100%	95%	99%	95%	99%	100%	100%	99%	#N/A
NL	77%	91%	53%	91%	33%	70%	50%	64%	57%	93%	100%	93%	93%	#N/A
NO	84%	79%	36%	38%	28%	38%	15%	19%	42%	16%	100%	15%	15%	#N/A
PL	99%	89%	94%	100%	50%	93%	56%	62%	63%	97%	100%	95%	99%	#N/A
PT	62%	90%	47%	60%	53%	43%	49%	56%	54%	67%	#N/A	73%	58%	#N/A
RO	52%	84%	40%	70%	27%	32%	33%	34%	35%	90%	100%	94%	85%	#N/A
SE	83%	83%	100%	100%	100%	100%	83%	86%	88%	100%	100%	100%	100%	#N/A
SI	64%	90%	82%	100%	81%	90%	40%	60%	50%	100%	#N/A	100%	100%	#N/A
SK	99%	46%	21%	16%	29%	19%	43%	65%	43%	30%	100%	30%	29%	0%

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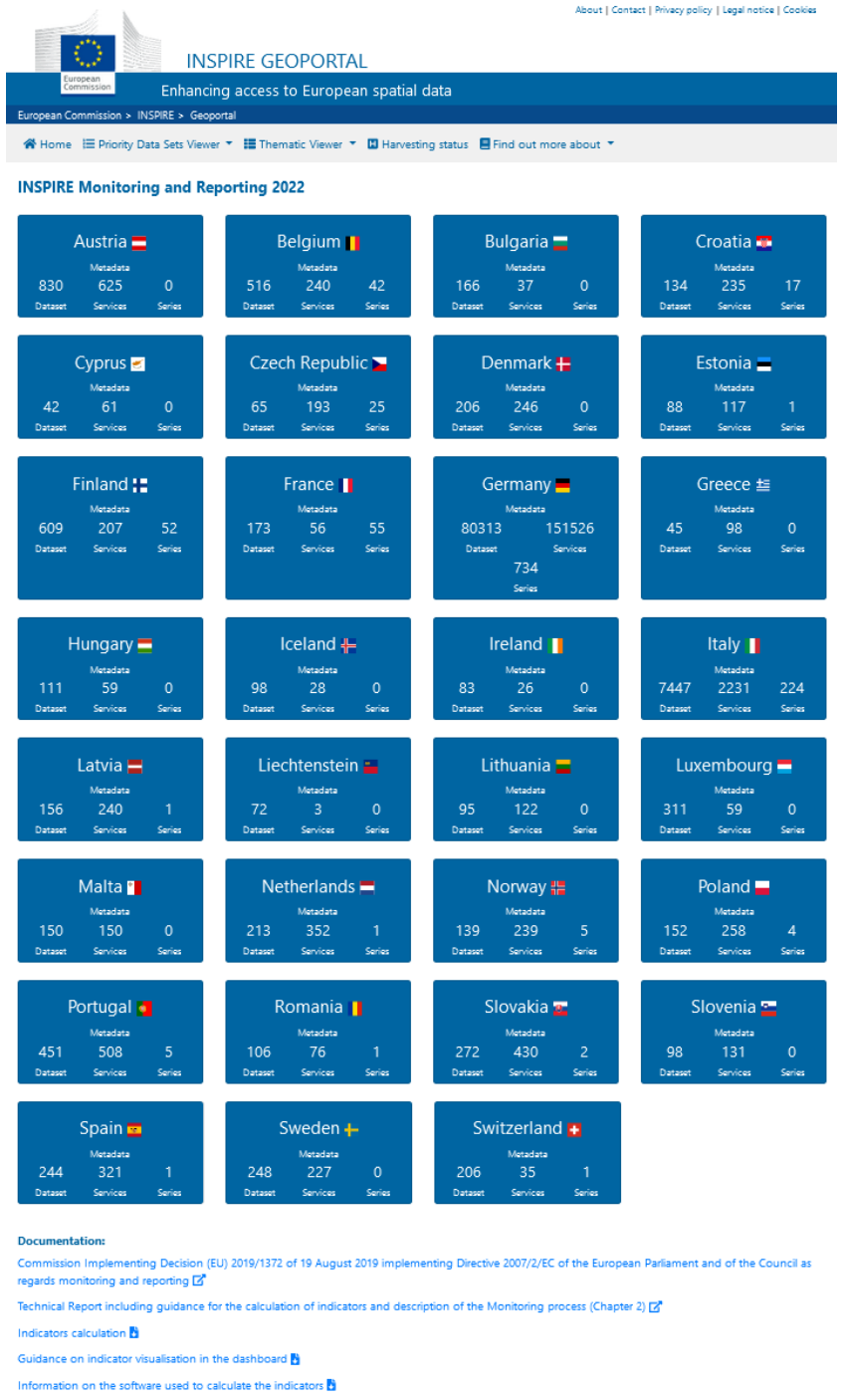
Monitoring and Reporting 2022 – Dashboard

- Landing page:
  - number of data sets, data set series & services for all countries
  - documentation to help understand the results

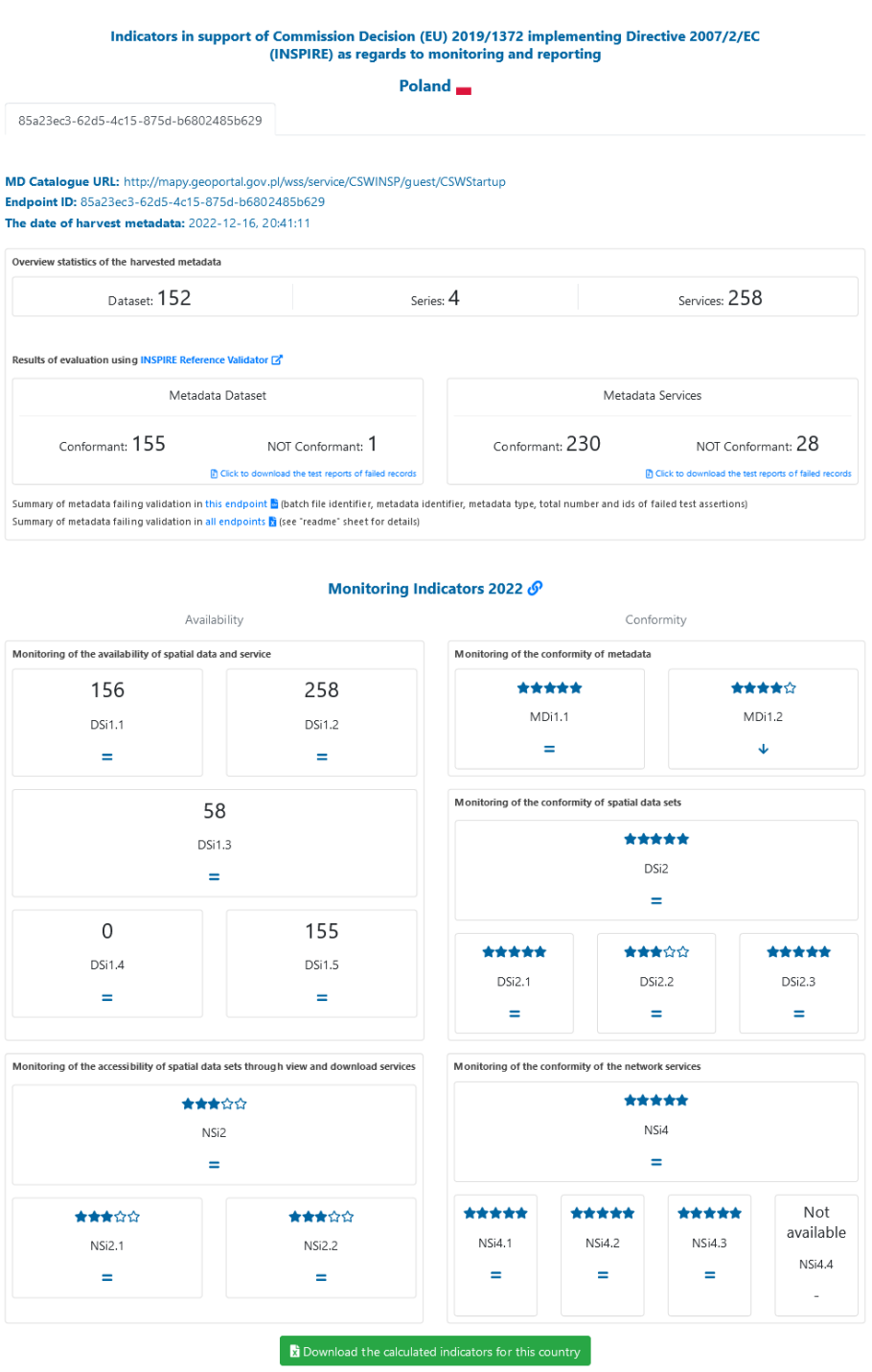
https://inspire-geoportal.ec.europa.eu/mr2022.html



Monitoring and Reporting 2022 – Dashboard

- Country-specific page:
  - overview statistics: number of data sets, data set series & services, number of conformant & non conformant metadata
  - values of Monitoring and Reporting 2022 indicators

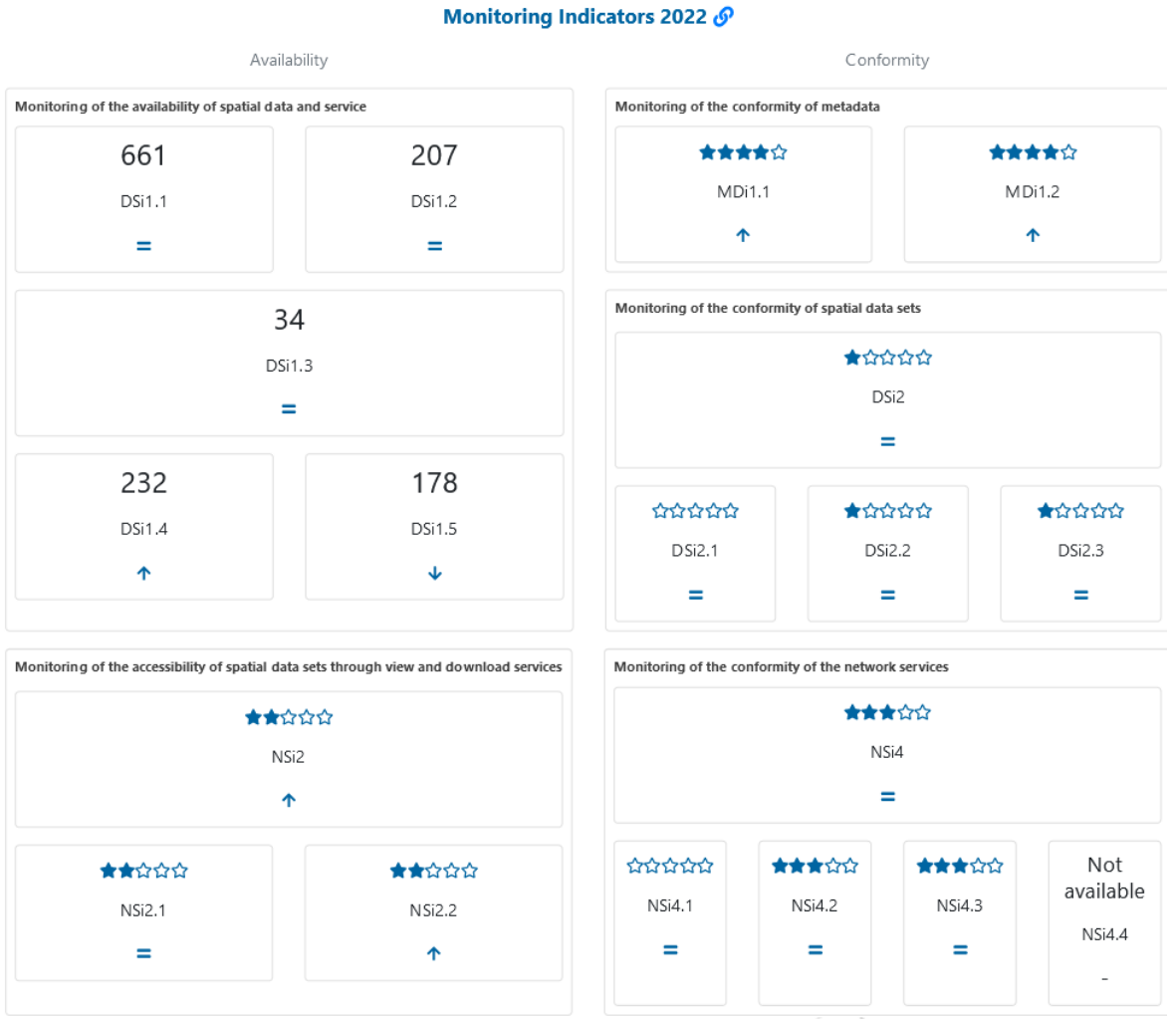
https://inspire-geoportal.ec.europa.eu/mr2022.html



Monitoring and Reporting 2022 – Dashboard

- Visualization of indicators
  - star-based scoring system (for percentage indicators):
    - ☆☆☆☆☆ 0 ≤ X < 10%
    - ★☆☆☆☆ 10% ≤ X < 30%
    - ★★☆☆☆ 30% ≤ X < 50%
    - ★★★☆☆ 50% ≤ X < 70%
    - ★★★★☆ 70% ≤ X < 90%
    - ★★★★★ 90% ≤ X ≤ 100%
  - comparison against 2021 results:
    - for relative number indicators:
      - ↑ increase of at least 10%
      - ↓ decrease of at least 10%
      - = increase or decrease of less than 10%
    - for absolute number indicators:

      same rule but considering 10% of the 2021 values



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Monitoring and Reporting 2022 – Dashboard

- Documentation

▾ Notes on calculation of MDi1.1 and MDi1.2

The evaluation of these indicators involves a validation of the collected metadata through the INSPIRE Reference Validator (v2021.3.1).

All metadata records are validated against the Conformance Classes corresponding to the INSPIRE MD TG v2.0:

- ✔ if the recognized INSPIRE Resource Type is **"dataset"** or **"series"**, the applied executable test suites are **"Conformance Class 2: INSPIRE data sets and data set series interoperability metadata"** and **"Conformance Class 2b: INSPIRE data sets and data set series metadata for Monitoring"**;
- ✔ if the recognized INSPIRE Resource Type is **"service"**, the applied executable test suite is:
  - ✔✔ **"Conformance Class 4: INSPIRE Network Services metadata"**, if the service is a Network Service (service type equal to "view", "download", "discovery" or "transformation")
  - ✔✔ **"Conformance Class 5: INSPIRE Invocable Spatial Data Services metadata"**, if the service is an Invocable Spatial Data Service (service type equal to "other")

Documentation:

Implementing Decision

Commission Implementing Decision (EU) 2019/1372 of 19 August 2019 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards monitoring and reporting

Technical Report including guidance for the calculation of indicators and description of the Monitoring process (Chapter 2) — Technical Report on M&R

Indicators calculation — explanation of how indicators are calculated

Guidance on indicator visualisation in the dashboard — explanation of indicator visualisation

Information on the software used to calculate the indicators — info on the versions of Geoportal & Validator used

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Results from the metadata validation

Results of evaluation using INSPIRE Reference Validator

Metadata Dataset		Metadata Services	
Conformant: 141	NOT Conformant: 6	Conformant: 211	NOT Conformant: 13
	Click to download the test reports of failed records		Click to download the test reports of failed records

Summary of metadata failing validation in this endpoint (batch file identifier, metadata identifier, metadata type, total number and ids of failed test assertions)

Summary of metadata failing validation in all endpoints (see "readme" sheet for details)

ZIP files including failed reports in HTML and JSON

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Results from the metadata validation

Results of evaluation using INSPIRE Reference Validator

Metadata Dataset		Metadata Services	
Conformant: 141	NOT Conformant: 6	Conformant: 211	NOT Conformant: 13
Click to download the test reports of failed records		Click to download the test reports of failed records	

Summary of metadata failing validation in this endpoint (batch file identifier, metadata identifier, metadata type, total number and ids of failed test assertions)

Summary of metadata failing validation in all endpoints (see "readme" sheet for details)

	A	B	C	D	E	F
1	**file_id**	**md_id**	**type**	**error_count**	**errors**	
2	121-140/1	59630bde-6361-4175-8f7b-1791ecfa78cf	dataset	1	1.4	
3	281-300/17	e02e7c33-818a-463e-a565-3847f2b8cb30	dataset	1	2.5	
4	341-360/14	aac1ad8b-4fb3-4bea-803c-64c8a22b33fc	dataset	1	C.16	
5	341-360/2	326ef9d6-78fb-496e-9215-07ae1d96afec	dataset	2	C.1 C.16	
6	361-371/5	eeeba0a6-0fe8-4be3-8392-39851d3f98c3	service	1	C.16	
7	361-371/8	f62e9051-5374-4d1d-89db-522f71839a7f	service	1	C.16	
8	41-60/6	242a54d1-9857-4582-9236-68b69ff8695a	service	2	C.1 C.22	
9	281-300/6	d6892cc7-7c63-4d74-a86e-71a2196f9c16	service	2	C.1 C.22	
10	281-300/12	d9e282b1-d016-4eaf-b2b6-ad7ce2fe528a	service	2	C.1 C.22	
11	341-360/3	368e2919-0bfa-43be-89bd-45e91d047cc3	service	1	C.16	
12	321-340/17	10d86cd3-93d6-4056-906b-01c9bedcf6f0	service	1	C.16	
13	341-360/9	77a3b667-68fd-4250-9b26-8ee62e32046f	service	1	C.16	
14	341-360/12	8079e314-508c-4b8e-83ae-e56b518db50c	service	1	C.16	
15	341-360/5	37473a91-068e-4950-a3cd-8bcc0b453ffd	service	1	C.16	
16	341-360/8	7480a470-c674-46c2-91ee-5f342d967678	service	1	C.16	
17	361-371/3	e81e37e8-3c68-42cf-9e78-9e70fe4f2209	dataset	1	C.16	

Sheet1

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Results from the metadata validation

Results of evaluation using INSPIRE Reference Validator

Metadata Dataset		Metadata Services	
Conformant: 141	NOT Conformant: 6	Conformant: 211	NOT Conformant: 13
Click to download the test reports of failed records		Click to download the test reports of failed records	

Summary of metadata failing validation in this endpoint (batch file identifier, metadata identifier, metadata type, total number and ids of failed test assertions)

Summary of metadata failing validation in all endpoints (see "readme" sheet for details)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
1	Country	endpoint	md_failed	md_unknown	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	C.1	C.2	C.5	C.6	C.7	C.8	C.9	C.10	C.11	C.12	C.13	C.14	C.15	C.16
2	AT	8d8e666a-	7	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
3	BE-GEO	07041901-	19	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0
4	BE-GEOBRU	fcbd6e24-8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
5	BE-VLAANDEREN	16ef7cb3-b	4	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
6	BE-WALLONIE	46372588-	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
7	BG	0513916a-	104	3	5	0	11	13	0	8	5	0	5	11	52	34	0	3	29	0	0	0	42	1	0	0	24	0	0
8	CH	864dd8d5-	207	0	11	0	74	89	0	0	3	3	122	215	123	0	0	0	41	0	0	0	25	28	0	5	0	0	25
9	CY	0ebf78d5-7	42	0	0	0	1	0	0	42	0	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0
10	CZ	8b722540-	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	DE	711a39f4-8	6075	5	6	0	17	492	453	1672	15	287	262	372	266	0	0	647	96	0	0	0	180	23	0	9	184	6	650
12	DK	76edce98-(	76	0	0	0	0	3	0	0	0	63	2	5	10	15	0	0	0	0	0	0	0	2	0	0	3	0	4
13	EE	02c2748f-8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	EL	d6c7bb79-I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	ES	917ecef2-(	17	0	0	0	3	1	1	0	3	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
16	FI	b0259e81-	162	0	1	0	17	30	0	4	5	14	2	8	17	5	0	3	11	0	0	0	5	0	1	2	74	0	1
17	FR	e44416c9-(	223	0	0	0	0	178	0	104	5	0	4	44	0	24	0	89	18	0	0	0	14	32	0	1	43	104	87
18	HR	b50f8b12-5	7	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	3

readme | dataset | service

Lessons learnt

Monitoring and Reporting 2022 – Lessons learnt

General conclusions

- Overall, slight improvement of results compared to the 2021 exercise.
- Significant improvement comparing with previous years M&R baselines, increasing from 2020 to 2019, respectively.
- Heterogeneity in performance of the different countries still remains.
- Concerns about the reliability of indicators on the conformity of datasets and services (self-declarations).
- Several issues were identified in the INSPIRE infrastructure during the M&R process, which may turn into opportunities for future improvement.
- But also good practices!

Conformity of datasets and services

Self-declared conformity

- Many countries (the same as in 2021) declared values equal or close to 100% for all the indicators on the conformity of datasets and services.

country	MDi1.1	MDi1.2	DSi2	DSi2.1	DSi2.2	DSi2.3	NSi2	NSi2.1	NSi2.2	NSi4	NSi4.1	NSi4.2	NSi4.3	NSi4.4
AT	99%	99%	86%	88%	98%	70%	60%	61%	97%	97%	100%	96%	98%	#N/A
BE	95%	63%	73%	96%	71%	71%	79%	93%	80%	92%	83%	93%	91%	#N/A
BG	37%	51%	96%	100%	100%	98%	34%	46%	34%	0%	0%	0%	0%	#N/A
CH	0%	0%	2%	7%	0%	0%	0%	2%	0%	0%	0%	0%	0%	#N/A
CY	0%	0%	2%	0%	25%	0%	81%	93%	88%	0%	#N/A	0%	0%	#N/A
CZ	93%	98%	48%	100%	91%	21%	78%	93%	83%	96%	100%	95%	97%	100%
DE	93%	96%	81%	68%	51%	82%	72%	76%	76%	99%	100%	99%	99%	#N/A
DK	63%	97%	63%	95%	71%	57%	42%	48%	46%	95%	100%	94%	96%	#N/A
EE	97%	95%	98%	100%	90%	100%	66%	67%	66%	97%	100%	95%	98%	#N/A
EL	100%	100%	100%	100%	#N/A	100%	96%	98%	98%	0%	0%	0%	0%	#N/A
ES	93%	99%	100%	100%	100%	99%	70%	89%	71%	100%	100%	100%	100%	#N/A
FI	75%	86%	19%	9%	21%	22%	32%	34%	38%	54%	0%	56%	53%	#N/A
FR	2%	4%	76%	81%	92%	74%	1%	18%	1%	7%	0%	9%	0%	#N/A
HR	95%	90%	98%	100%	100%	97%	27%	67%	29%	93%	100%	90%	99%	#N/A
HU	1%	0%	36%	48%	45%	33%	14%	14%	16%	32%	60%	26%	33%	#N/A
IE	100%	100%	100%	100%	100%	100%	63%	63%	75%	100%	100%	100%	100%	#N/A
IS	89%	86%	52%	62%	72%	36%	0%	0%	0%	0%	#N/A	0%	0%	#N/A
IT	99%	96%	31%	34%	20%	27%	6%	10%	6%	5%	14%	6%	2%	0%
LI	78%	33%	11%	8%	16%	6%	0%	17%	0%	50%	#N/A	100%	0%	#N/A
LT	93%	100%	98%	97%	100%	99%	63%	63%	100%	100%	100%	100%	100%	#N/A
LU	100%	100%	73%	100%	94%	62%	90%	90%	98%	100%	100%	100%	100%	#N/A
LV	0%	0%	76%	83%	55%	81%	54%	59%	56%	0%	#N/A	0%	0%	#N/A
MT	99%	99%	100%	100%	100%	100%	95%	99%	95%	99%	100%	100%	99%	#N/A
NL	77%	91%	53%	91%	33%	70%	50%	64%	57%	93%	100%	93%	93%	#N/A
NO	84%	79%	36%	38%	28%	38%	15%	19%	42%	16%	100%	15%	15%	#N/A
PL	99%	89%	94%	100%	50%	93%	56%	62%	63%	97%	100%	95%	99%	#N/A
PT	62%	90%	47%	60%	53%	43%	49%	56%	54%	67%	#N/A	73%	58%	#N/A
RO	52%	84%	40%	70%	27%	32%	33%	34%	35%	90%	100%	94%	85%	#N/A
SE	83%	83%	100%	100%	100%	100%	83%	86%	88%	100%	100%	100%	100%	#N/A
SI	64%	90%	82%	100%	81%	90%	40%	60%	50%	100%	#N/A	100%	100%	#N/A
SK	99%	46%	21%	16%	29%	19%	43%	65%	43%	30%	100%	30%	29%	0%

Conformity of datasets and services

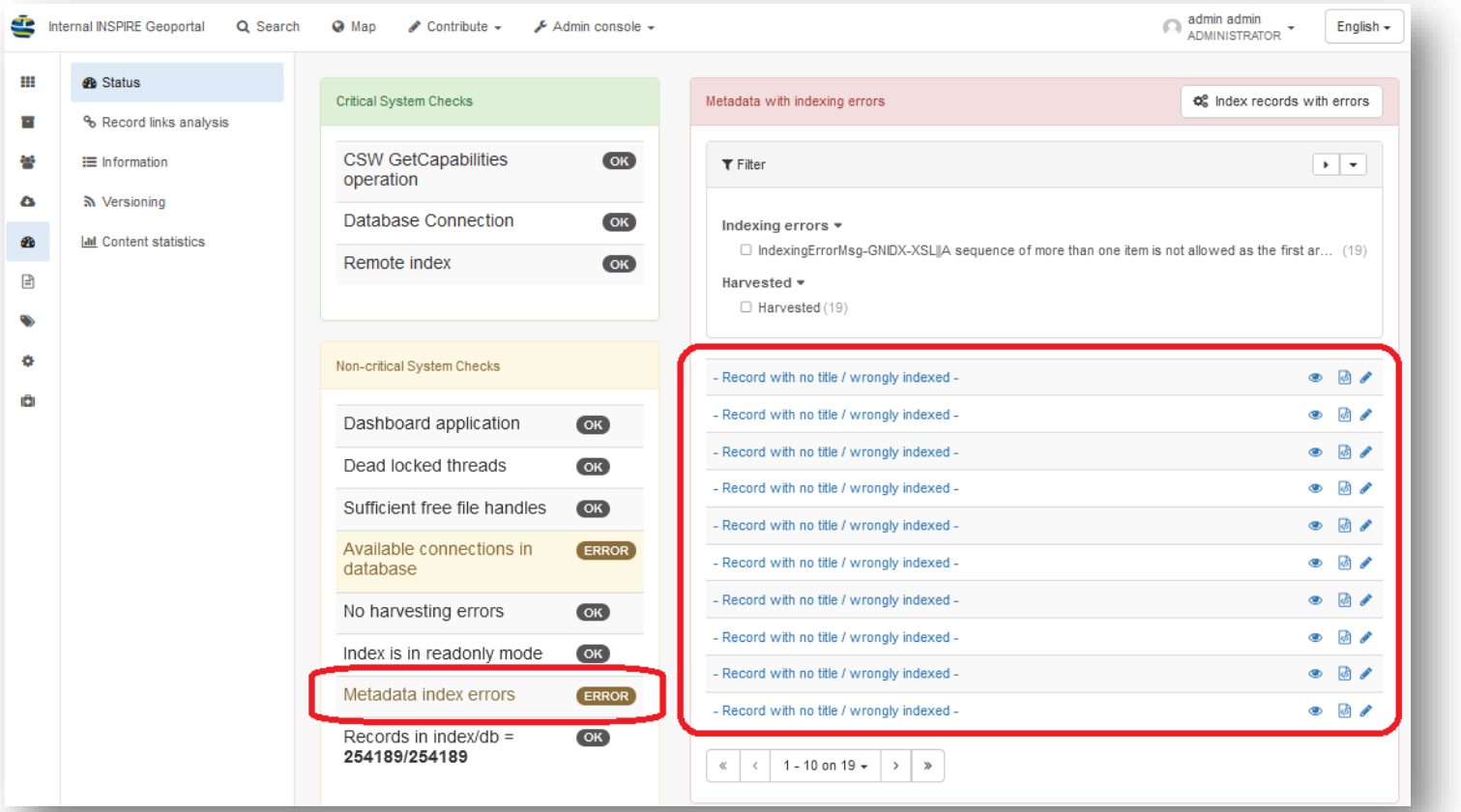
Self-declared conformity

- A random, manual QC of conformity was performed on a small sample of datasets and services from these countries using the INSPIRE Reference Validator.
  - The overall result of the JRC manual conformity check was very low:
    - Almost equal to 0%!
  - Despite no conclusions could be derived, we proved that the calculated values for the conformity indicators are not reliable:
    - Conformity of spatial data sets: DSi1.1, DSi1.2, DSi1.3, DSi1.4, DSi1.5
    - Conformity of network services: NSi4, NSi4.1, NSi4.2, NSi4.3, NSi4.4
  - The INSPIRE Reference Validator was probably not used to check the conformity in many cases.

Issues identified
Opportunities for improvement

Metadata records with indexation errors present in national catalogues

- Metadata records with XML (ISO 19139) encoding errors, failed to be indexed by GeoNetwork.



→ Consequences:

a) Metadata records not available in the INSPIRE Geoportal (not processed by ElasticSearch).

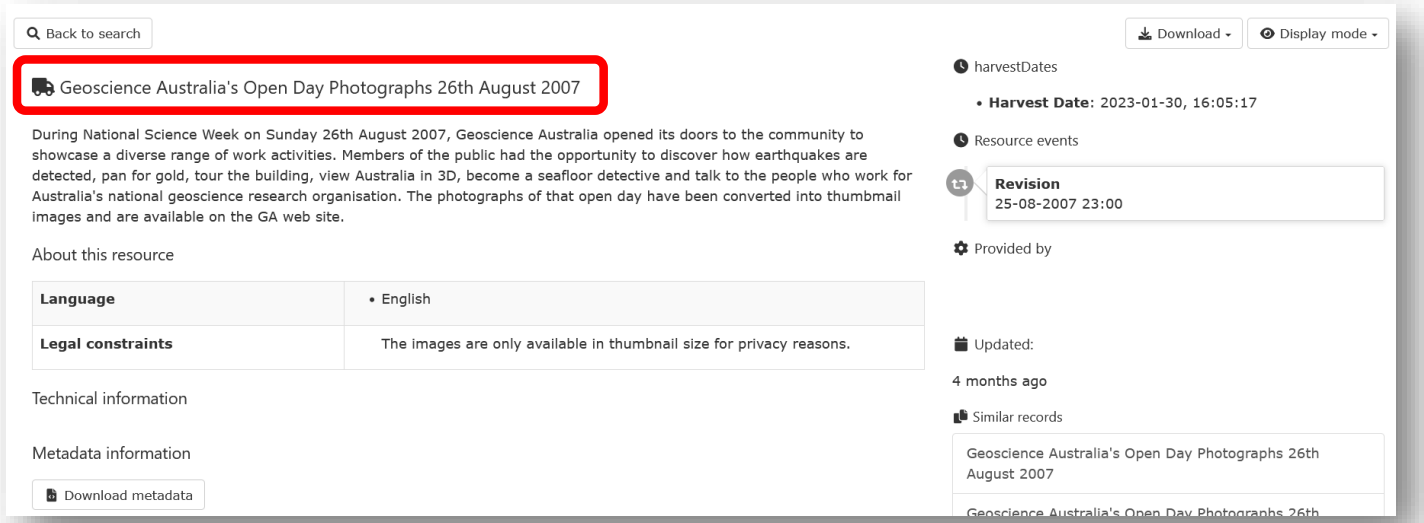
b) Possible decrease in indicators.

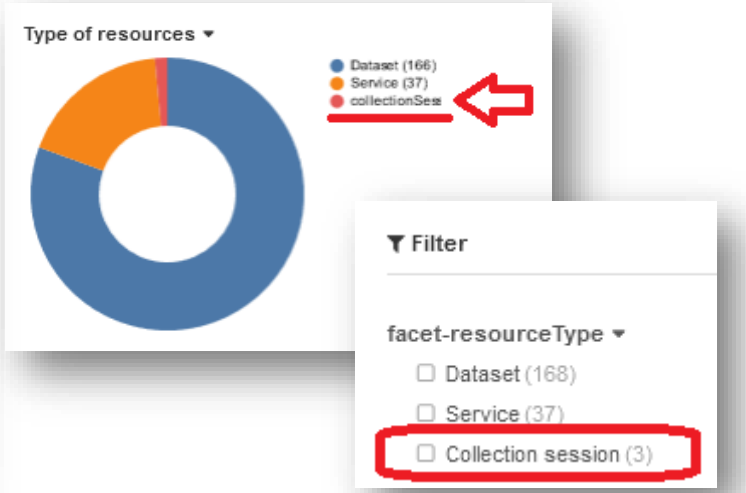
European Commission

Issues identified
Opportunities for improvement

Non-INSPIRE metadata records present in national catalogues

- Example metadata records coming within standard GeoNetwork installations.
- Metadata records with `<gmd:hierarchyLevel>` different from dataset / service.





→ Consequences:

a) Non-INSPIRE metadata records harvested by the INSPIRE Geoportal.
b) Possible decrease in indicators.

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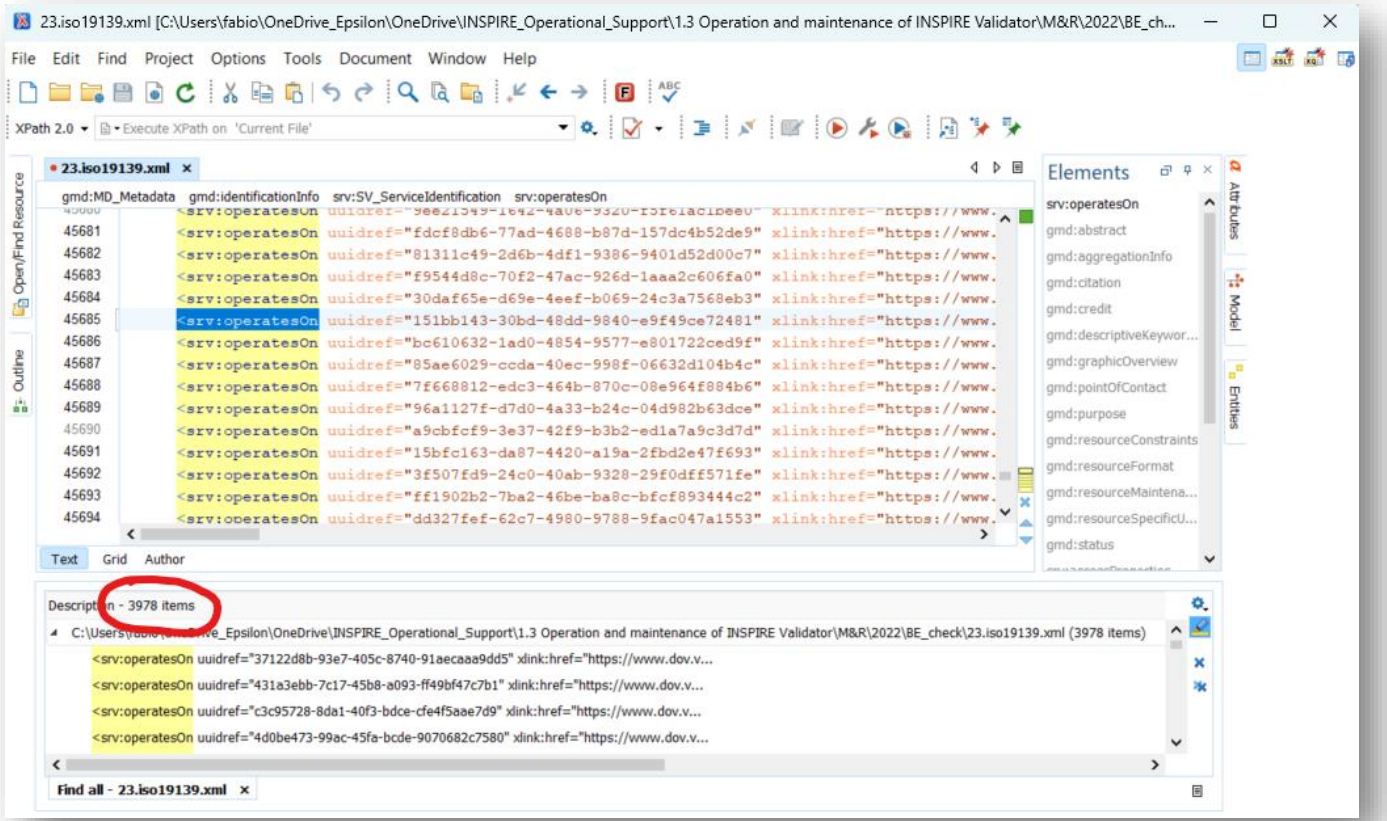
Issues identified
Opportunities for improvement

Practices breaking functionality of infrastructure tools

- Using one service to serve thousands of datasets - Example:
  - About 4000 `<srv:operatesOn>` occurrences used in a service metadata record.
- Usability of (some) ATOM services is questioned - Examples:
  - ATOM services with thousands of sub-feed entries (e.g. +6000, +13000).
  - Repetitions: Harvesting a single endpoint / Endpoints from several countries / Year.



→ Consequences: Reduced performance and/or system failures.

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Issues identified
Opportunities for improvement

Conformity of network services non properly declared

Example:

- Incorrect use of elements to declare the conformity using `<DQ_DomainConsistency>` report.

```
<gmd:report>
  <gmd:DQ_DomainConsistency xsi:type="gmd:DQ_DomainConsistency_Type">
    <gmd:result>
      <gmd:DQ_ConformanceResult xsi:type="gmd:DQ_ConformanceResult_Type">
        <gmd:specification>
          <gmd:CI_Citation>
            <gmd:title xsi:type="gmd:PT_FreeText_PropertyType">
              <gmx:Anchor xlink:href="http://data.europa.eu/eli/reg/2010/1089">&#x39A;&#x391;&#x39D;&#x39F;&#x39D;&#x399;&#x3A3;&#x39C;&#x39F;&#x3A3; (&#x395;&#x395;)
              &#x3B1;&#x3C1;&#x3B9;&#x3B8;. 976/2009 &#x3A4;&#x397;&#x3A3; &#x395;&#x3A0;&#x399;&#x3A4;&#x3A1;&#x39F;&#x3A0;&#x397;&#x3A3; &#x3C4;&#x3B7;&#x3C2; 19&#x3B7;&#x3C2;
              &#x39F;&#x3BA;&#x3C4;&#x3C9;&#x3B2;&#x3C1;&#x3AF;&#x3BF;&#x3C5; 2010 &#x3C3;&#x3C7;&#x3B5;&#x3C4;&#x3B9;&#x3BA;&#x3AC; &#x3BC;&#x3B5; &#x3C4;&#x3B7;&#x3BD;
              &#x3B5;&#x3C6;&#x3B1;&#x3C1;&#x3BC;&#x3BF;&#x3B3;&#x3AE; &#x3C4;&#x3B7;&#x3C2; &#x3BF;&#x3B4;&#x3B7;&#x3B3;&#x3AF;&#x3B1;&#x3C2; 2007/2/&#x395;&#x39A; &#x3C4;&#x3BF;&#x3C5;
              &#x395;&#x3C5;&#x3C1;&#x3C9;&#x3C0;&#x3B1;&#x3CA;&#x3BA;&#x3BF;&#x3CD; &#x39A;&#x3BF;&#x3B9;&#x3BD;&#x3BF;&#x3B2;&#x3BF;&#x3C5;&#x3BB;&#x3AF;&#x3BF;&#x3C5;
              &#x3BA;&#x3B1;&#x3B9; &#x3C4;&#x3BF;&#x3C5; &#x3A3;&#x3C5;&#x3BC;&#x3B2;&#x3BF;&#x3C5;&#x3BB;&#x3AF;&#x3BF;&#x3C5; &#x3CC;&#x3C3;&#x3BF;&#x3BD;
              &#x3B1;&#x3C6;&#x3BF;&#x3C1;&#x3AC; &#x3C4;&#x3B9;&#x3C2; &#x3B4;&#x3B9;&#x3BA;&#x3C4;&#x3C5;&#x3B1;&#x3BA;&#x3AD;&#x3C2;
              &#x3C5;&#x3C0;&#x3B7;&#x3C1;&#x3B5;&#x3C3;&#x3AF;&#x3B5;&#x3C2;</gmx:Anchor>
              <gmd:PT_FreeText>
                <gmd:textGroup>
                  <gmd:LocalisedCharacterString locale="#_ ">&#x39A;&#x391;&#x39D;&#x39F;&#x39D;&#x399;&#x3A3;&#x39C;&#x39F;&#x3A3; (&#x395;&#x395;) &#x3B1;&#x3C1;&#x3B9;&#x3B8;. 976/2009
                  &#x3A4;&#x397;&#x3A3; &#x395;&#x3A0;&#x399;&#x3A4;&#x3A1;&#x39F;&#x3A0;&#x397;&#x3A3; &#x3C4;&#x3B7;&#x3C2; 19&#x3B7;&#x3C2;
                  &#x39F;&#x3BA;&#x3C4;&#x3C9;&#x3B2;&#x3C1;&#x3AF;&#x3BF;&#x3C5; 2010 &#x3C3;&#x3C7;&#x3B5;&#x3C4;&#x3B9;&#x3BA;&#x3AC; &#x3BC;&#x3B5; &#x3C4;&#x3B7;&#x3BD;
                  &#x3B5;&#x3C6;&#x3B1;&#x3C1;&#x3BC;&#x3BF;&#x3B3;&#x3AE; &#x3C4;&#x3B7;&#x3C2; &#x3BF;&#x3B4;&#x3B7;&#x3B3;&#x3AF;&#x3B1;&#x3C2; 2007/2/&#x395;&#x39A;
                  &#x3C4;&#x3BF;&#x3C5; &#x395;&#x3C5;&#x3C1;&#x3C9;&#x3C0;&#x3B1;&#x3CA;&#x3BA;&#x3BF;&#x3CD;
                  &#x39A;&#x3BF;&#x3B9;&#x3BD;&#x3BF;&#x3B2;&#x3BF;&#x3C5;&#x3BB;&#x3AF;&#x3BF;&#x3C5; &#x3BA;&#x3B1;&#x3B9; &#x3C4;&#x3BF;&#x3C5;
                  &#x3A3;&#x3C5;&#x3BC;&#x3B2;&#x3BF;&#x3C5;&#x3BB;&#x3AF;&#x3BF;&#x3C5; &#x3CC;&#x3C3;&#x3BF;&#x3BD; &#x3B1;&#x3C6;&#x3BF;&#x3C1;&#x3AC; &#x3C4;&#x3B9;&#x3C2;
                  &#x3B4;&#x3B9;&#x3BA;&#x3C4;&#x3C5;&#x3B1;&#x3BA;&#x3AD;&#x3C2; &#x3C5;&#x3C0;&#x3B7;&#x3C1;&#x3B5;&#x3C3;&#x3AF;&#x3B5;&#x3C2;</gmd:LocalisedCharacterString>
                </gmd:textGroup>
              </gmd:PT_FreeText>
            </gmd:title>
            <gmd:date>
              <gmd:CI_Date>
                <gmd:date>
                  <gco:Date>2009-10-20</gco:Date>
                </gmd:date>
```

→ Consequences: Non-representative indicators on conformity of network services.

European Commission

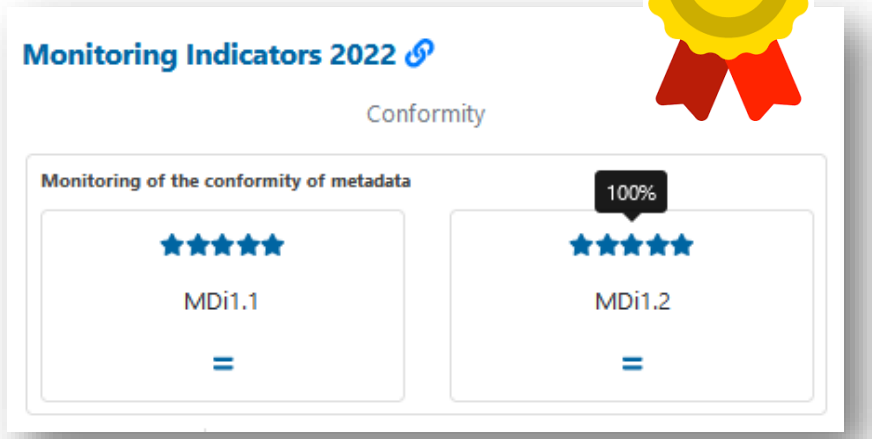
Good practices identified

Finland (FI)

- Addressing the transition to the TG Metadata 2.0 (from TG Metadata 1.3) – including local level - despite affecting indicators in different way:
  - Positive impact on metadata conformity indicators.
  - Potential negative impact in other indicators due to variety of implementation status.

Ireland (IE), Greece (EL), Luxembourg (LU)

- 100% Conformity of INSPIRE metadata.



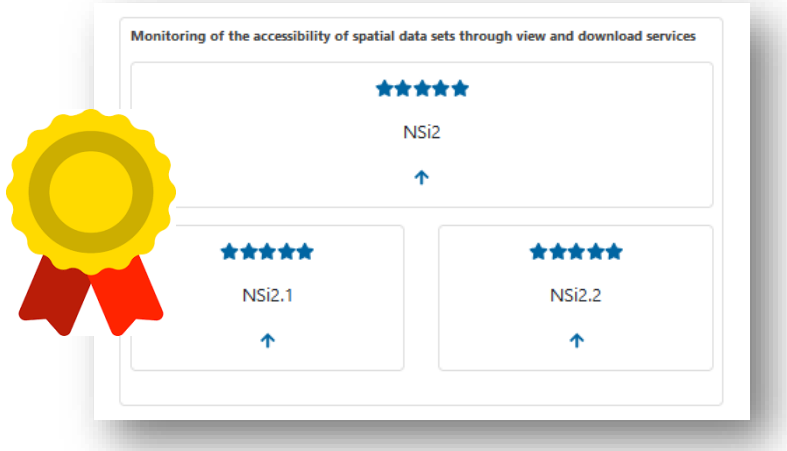
Other countries effectively using the INSPIRE Reference Validator

- Some countries with metadata conformity near to 100%.

Good practices identified

Belgium (BE), Malta (MT), Spain (ES)

- Network services accessibility winners!



Overall improvement of M&R indicators (2022 vs. 2021)

- Belgium (BE), Denmark (DK), Estonia (EE), Spain (ES), Ireland (IE), Malta (MT), Norway (NO), Poland (PL), Romania (RO), Sweden (SE), Slovenia (SI).

Slovakia

- Proactive attitude and continuous feedback to the INSPIRE Geoportal team (e.g. issues detected, potential solutions, active participation in GitHub helpdesks).

Revamped INSPIRE Geoportal
Next steps

Revamped INSPIRE Geoportal rollout

- Resolve system vulnerabilities identified during the security assessment.

Fine tuning of the GeoNetwork backend

- Improve performance of the system (ATOM feeds processing, database data ingestion) – Meanwhile, harvesting bandwidths for each country are suggested.

Harvester

- Improve support for (complex) OGC Filters in GeoNetwork.

Link-checker tool

- Solve the anomaly on accessibility of datasets (downloadable and viewable indicators).

Data-service Linking Simplification

- Support the good practice in the GeoNetwork backend

→ A joint effort with GeoCat is key for achieving these steps.

Thank you!

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European Commission