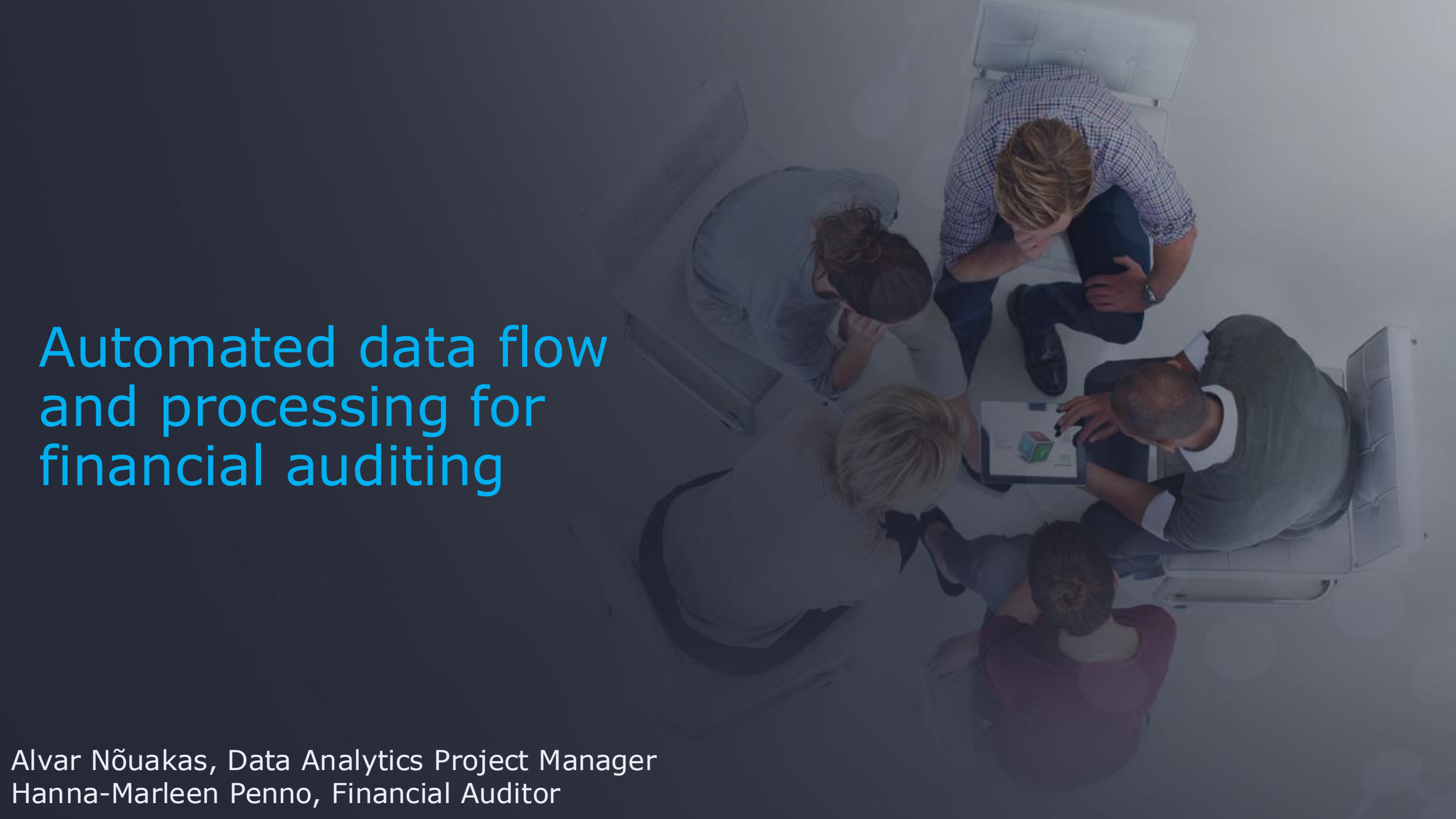




Automated data flow and processing for financial auditing

Alvar Nõuakas, Data Analytics Project Manager
Hanna-Marleen Penno, Financial Auditor

Why do we need automated data flow?

- Less manual work and time for more value-adding tasks
- Secure data transfer
- Possibility to use pseudonymized data
- Possibility to use financial data across the field, for other auditors

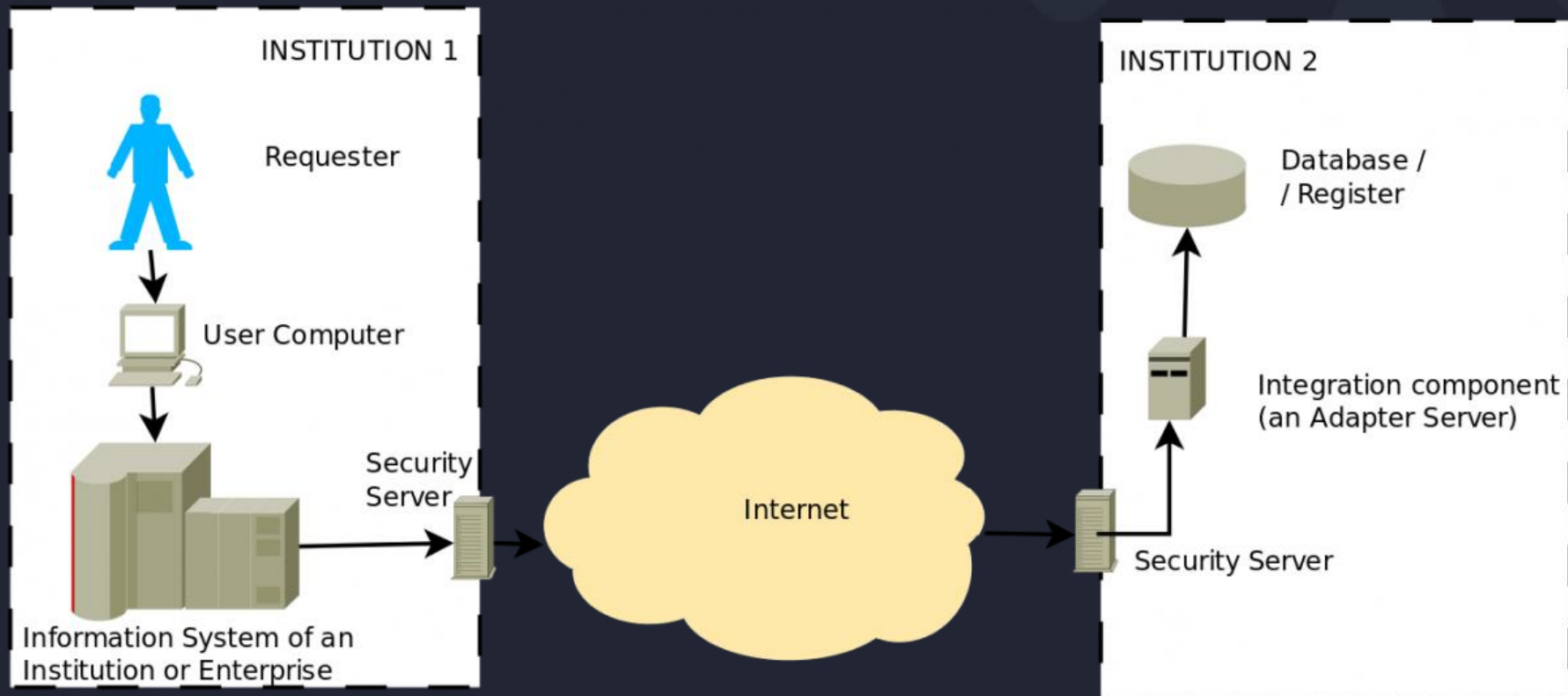
And of course

- All the prerequisites to utilize the solution have been met!

The possibilities provided in digital society: X-tee

The X-tee is the backbone of the Estonian State because the absolute majority of registers and databases kept by the Estonian State, are made available via X-tee.

Without X-tee, if the State wanted to store and exchange its data it would have to build a Central SuperDatabase or establish a horse sleigh company ☺ to move data storage devices between municipalities and agencies across Estonia.



X-tee and National Audit Office



X-Road Metrics: X-Road Networking Visualization for instance EE

X-Road Metrics: X-Road Networking Visualization for instance EE, from 2024-11-20 to 2024-11-30.

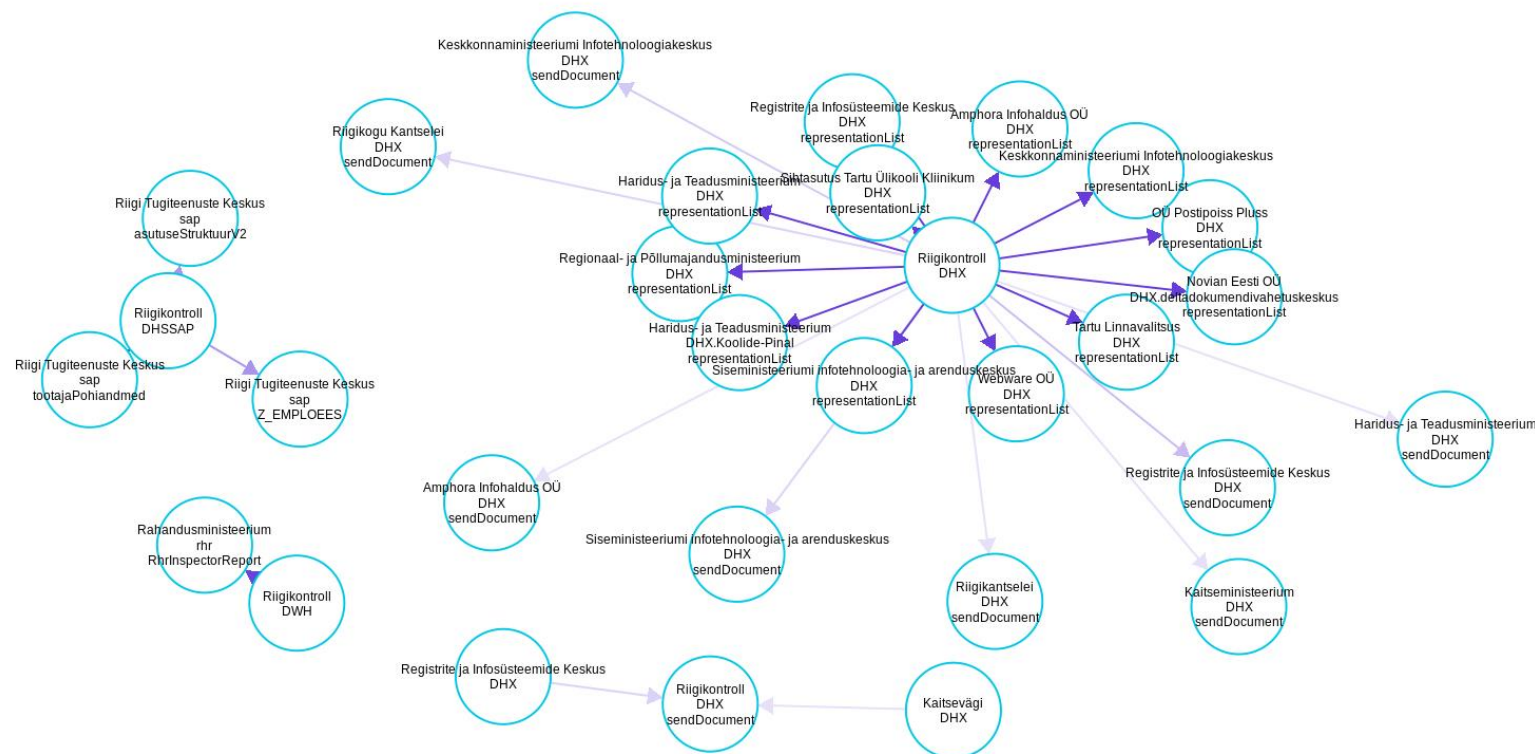
Select member: Riigikontroll

Select threshold (top n number of queries): 41

Select the level of details: ☐ Member level, ☐ Subsystem level, ☒ Service level

Display members as: ☒ Name, ☐ Registry code

Include metaservices: ☒ No, ☐ Yes



<https://logs.x-tee.ee/visualizer/?profile=EE>

<https://www.x-tee.ee/factsheets/EE/#eng>



EST ENG

Requests this month*

As of 1 Dec 2024

41,563,273



Latest month*
271,977,590

Previous year
2,413,571,598

Requests to date*
17,431,577,275

2,573 consecutive days of smooth X-tee experience in Estonia*

As of 2001, the protocol has been amended only 4 times

* Based on data from 1 Dec 2024

The X-tee in Estonia has:

867 institutions and enterprises
189 public sector institutions
ca 52,000 organizations as indirect users of X-tee services
1,841 interfaced information systems
184 security servers installed by members

Number of services that can be used via the X-tee

3,468

Every party who provides services offers 4 services on average

* Based on active X-tee member data

Designed to be secure

Traditional attacking vectors cannot be used with the X-tee due to its structure and architecture

X-tee implements the following security technologies

XAdES, ASIC, VPN, RSA, TLS, RFC3161, OCSP, PKI

5 most popular* service providers

32,966,042 EE/GOV/70009770/digilugu
29,342,618 EE/GOV/774000091/kirst
21,732,649 EE/GOV/774000091/rets
19,775,728 EE/GOV/70008440/r
15,184,846 EE/GOV/70001490/laiklusregister

* By query count towards the service provider in last month

Most popular platforms of information systems that have been interfaced with the X-tee

Progress PHP
Python NodeJS
OT SAP
JavaNET
C++ PISQL

3% of requests on X-tee are submitted by citizen. Assuming that every request saves 15 minutes - those

requests have saved 2,066 working years during previous calendar year.

There are no estimates on the rest of the queries.

The introductory material of the X-tee has been compiled with funding from the structural funds support scheme "Raising Public Awareness about the Information Society" of the European Regional Development Fund.

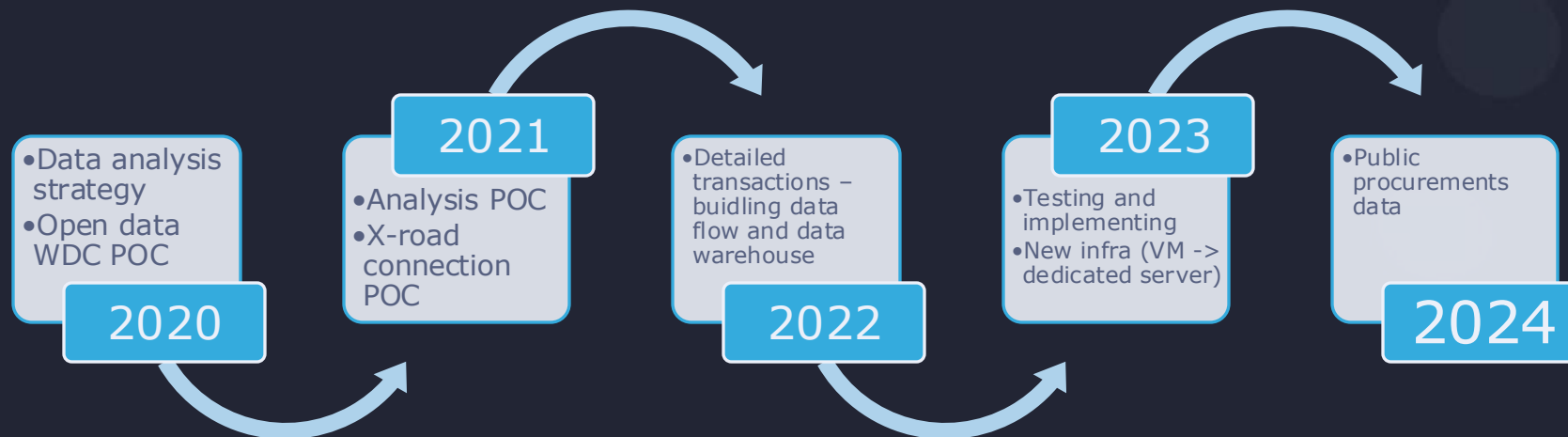
Strategic approach in NAOE

Digitalization strategy

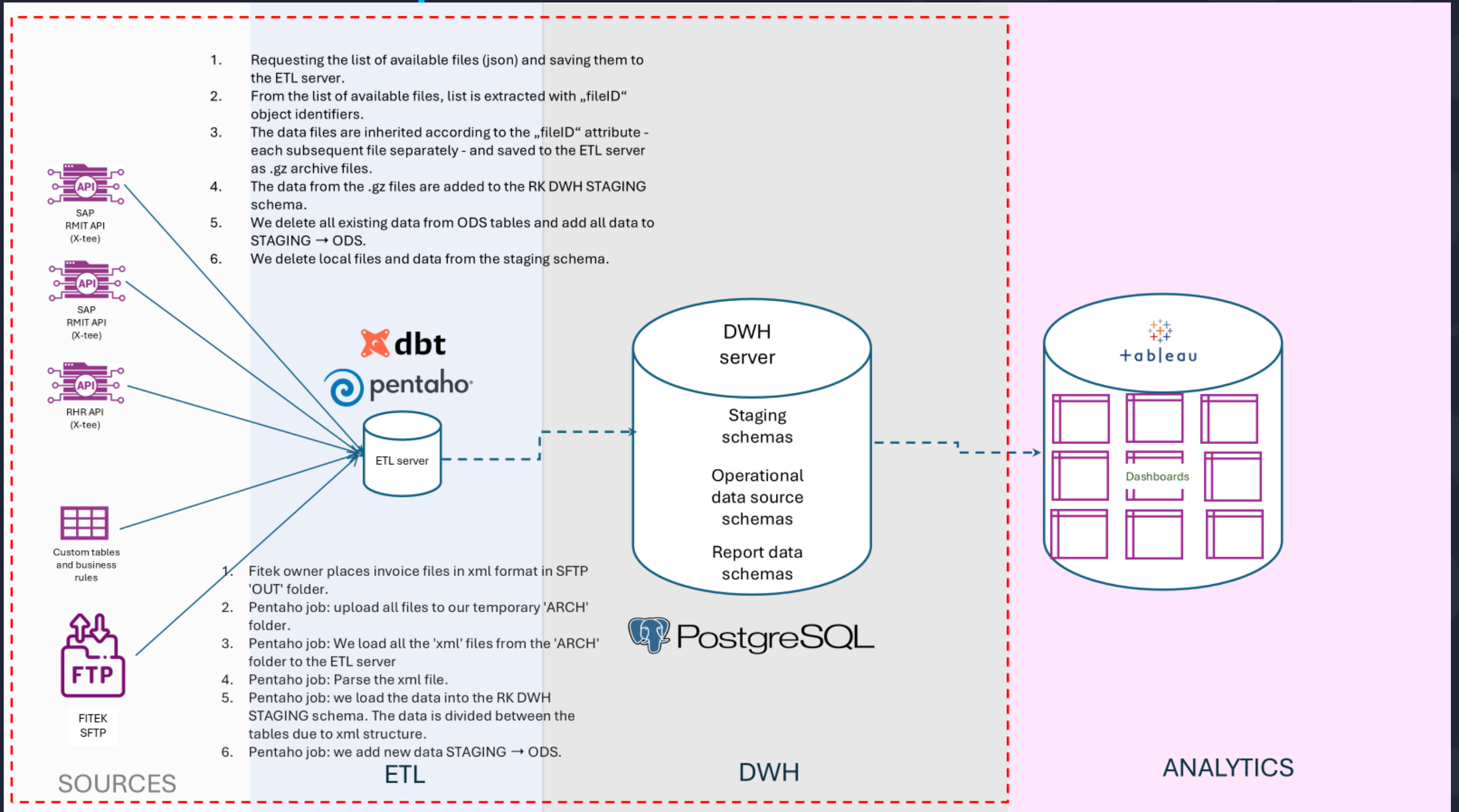
1. Possession of relevant data
2. Automation of monitoring
3. Being a frontrunner in effective e-service and data management
4. Standardizing and automating audit processes
5. Promoting the use of big data
6. Accessibility and effective utilization of open data
7. Capacity building
8. International cooperation
9. Visualization and new format for audits

Timeline

- » **2021** Development of first prototypes – HR budget management & public procurements (data on Excel and Tableau for visualization)
- » **2022** Data exchange projects via X-road and sftp
- » Starting development of analysis for detailed transactions (including data warehouse)
- » **2023** Finalizing analysis for detailed transactions
- » Implementing HR budget management based on data from X-road
- » **2024** public procurements data transfer via x-road



Technical setup



Business use

Topics

1. Brief overview of Estonian accounting and budgeting
2. What do we audit
3. Analytical desktops of financial audit:
 - ✓ Desktop of the public procurements
 - ✓ Desktop of the labour costs
 - ✓ Desktop of the financial auditing

How is accounting and budgeting organized

- » Accrual-based accounting (2004)
- » Accrual-based state budget (2017)
- » Activity-based budget (2020) (pilots 2016/2018)
- » One accounting system for all ministries (2012)
- » **State Shared Service Centre (2013)**
- » State account system for ministries as well as state owned companies
- » Remote access

What do we audit?

»One state audit, two opinions

- accuracy of annual accounts,
- regularity of transactions.

»One audit report +

audit memos to ministries (an overview of the work done in the audit, minor errors, weaknesses in internal control)

»Number of auditees:

- 11 governing areas,
- 4 constitutional institutions and Government Office,
- *State Forest Management Centre,*
- *61 State Foundations,*
- *28 state-owned companies.*

Technical support (State's IT tools and systems)

State level:

- » Procurement register (semi-public)
- » Financial statements database (semi-public)
 - » consolidation is an automatic process in this database
- » State's accounting data (SAP)
- » System of electronic invoices (FitekIn)

Ministry level

- » Document management systems
- » Governing area specific systems for revenues (rare)

Analytical desktops of financial audit

- » Desktop (Tableau)

- » ... of the public procurements

- » ... of the labour costs

- » ... of the financial accounting

- » In the future:

- » desktop of the budget implementation

- » AI collecting documents from the agencies' document management systems, e.g. internal rules of accounting, procurement procedure, directives etc-

Desktop of the public procurements (1)

- » Data from the procurement register once a month
- » Statistical analysis by types, content, contract volumes etc.
- » Different control questions,
 - » for example, whether the final cost of the procurement contract exceeds the cost agreed in the contract
 - » whether procurement notices/reports have been published at the time specified by law
 - » etc.

Desktop of the public procurements (2)

Teade >30 päeva 7 510 (All) ▼	Lõppemise teadet pole 30 päeva jooksul saadetud 13 128 (All) ▼	Planeeritavast lepingu algusest möödas >10 päeva 567 (All) ▼	Hanked, millega seotud lepingut on muudetud 6 491 (All) ▼	Kestus>48 kuud: Hankel. : 7 041 Raaml. : 3 123 (All) ▼	Esineb lepingu rikkumisi 547 (All) ▼	Alustamisest lepingu sõlmimiseni kulus vähemalt 50% rohkem aega kui tavapäraselt 4 250 (All) ▼	Lõplik maksumus> sõlmitud lepingu maksumus 7 254 (All) ▼		
Vali valitsemisala: (All) ▼		Vali hanke avaldamise ajavahemik: 2.01.2015 15.11.2021 □ ————— □		Otsi hankija järgi: □ □		Otsi hanke viitenr järgi: □ □			
Viitenumber	Valitsemisala lühend	Hankija	Avaldamise kuupäev	Lepingu Tüüp	Leping	Lepingu Seisund	Pakkuja	Lepingu muutuste arv	
122864	Null	Siseministeerium	20. märts 2015	Hankeleping (lepingu kaupa)	1-1	lõpetatud	Expat Relocation Estonia ..	0	^
					1-2	lõpetatud	Expat Relocation Estonia ..	0	
				Raamleping	1	lõpetatud	Expat Relocation Estonia ..	0	
123185	Null	Eesti Haigekassa	27. okt 2015	Hankeleping	1	lõpetatud	Osaühing MS Ärisüsteemid	0	
123378	Null	Eesti Haigekassa	16. okt 2015	Null	Null	Null	Null	0	
124148	Null	Siseministeerium	13. märts 2015	Hankeleping	1	lõpetatud	TURU-UURINGUTE AKTSI..	0	
127492	Null	Siseministeerium	13. märts 2015	Hankeleping	1	lõpetatud	CPD OÜ	0	
129078	Null	Riigi Kinnisvara Aktsi..	23. märts 2015	Hankeleping	1	lõpetatud	Rispeto OÜ	0	

Desktop of the public procurements (3)

Riigihangete töölaud					
TOP hanked hanke maksumuse järgi		TOP hankijad ja nende hangete maksumused		TOP pakkujad hanke maksumuse järgi	
Viitenumb..	Lõplik maksumus	Hankija	Lõplik maksumus	Pakkuja	Lõplik maksumus
226906	197 220 000	Eesti Haigekassa	1 776 399 226	Sihtasutus Elva Haigla	729 279 736
227347	191 019 491	Transpordiamet	1 332 589 118	TAMRO EESTI OÜ	652 877 836
194960	177 944 000	Riigi Kaitseinvesteeri..	1 077 710 823	MAGNUM MEDICAL OÜ	592 753 410
223986	115 258 187	Riigimetsa Majandami..	936 026 753	Sihtasutus Põltsamaa ..	522 841 675
190544	112 000 000	Elering AS	675 727 576	Nordecon AS	497 927 116
235839	100 000 036	Enefit Connect OÜ	633 730 877	Aktsiaselts Medicum T..	483 820 385
199527	100 000 000	sihtasutus Põhja-Eesti..	560 205 456	aktsiaselts RÄPINA H..	457 684 890
227411	100 000 000	Riigi Kinnisvara Aktsia..	521 801 908	AS TREV-2 Grupp	455 213 602
240314	100 000 000	Enefit Power AS	502 614 368	Aktsiaselts Medita Bal..	425 955 141
214395	96 930 000	aktsiaselts Eesti Raud..	466 017 610	Qvalitas Arstikeskus AS	419 778 348
226795	84 564 242	sihtasutus Tartu Üliko..	375 945 592	Sihtasutus Albinea	405 502 083
223243	81 000 000	Enefit Kaevandused AS	337 066 783	AKTSIASELTS KALLAV..	387 454 191
209940	80 000 000	Tallinna Kesklinna- ja..	306 815 871	Viru Haigla Aktsiaselts	379 200 703
180426	75 000 000	Aktsiaselts Tallinna Li..	302 900 903	Osaühing ESTMEDICA ..	374 409 904
Viimase kuu aja jooksul käimas olnud riigihangete arv		Viimase kuu aja jooksul alustatud riigihangete arv		Riigihangete arv, millega seonduv leping on viimase kuu jooksul lõpetatud	
16 074					
Hanke avaldamisest lepingu alguseni kulunud keskmine aeg (päevades)		Pakkumuse esitamisest lepingu sõlmimiseni kulunud keskmine aeg (päevades)		Kesksete/ ühishangete arv	
117,3		96,61		3 901	
				Kesksete/ ühishangete osakaal kõigist hangetest	
				4,6%	
				Alustatud osadeks jaotatud hangete arv	
				123	
				Alustatud osadeks jaotatud hangete osakaal kõigist alustatud hangetest	
				14,8%	

Avaldati

2.01.2015 15.11.2021

Valitsemisala lühend

(All)

Vali mitut TOP väärtus..

20

Vali TOP maksumuse liik

Lõplik maksumus

Valitsemisala lühend

(All)

[Kliki siia, et minna TOP hankijate töölauale](#)

[Kliki siia, et vaadata hangete pilve](#)

[Kliki siia, et vaadata sama CPV-ga hankeid](#)

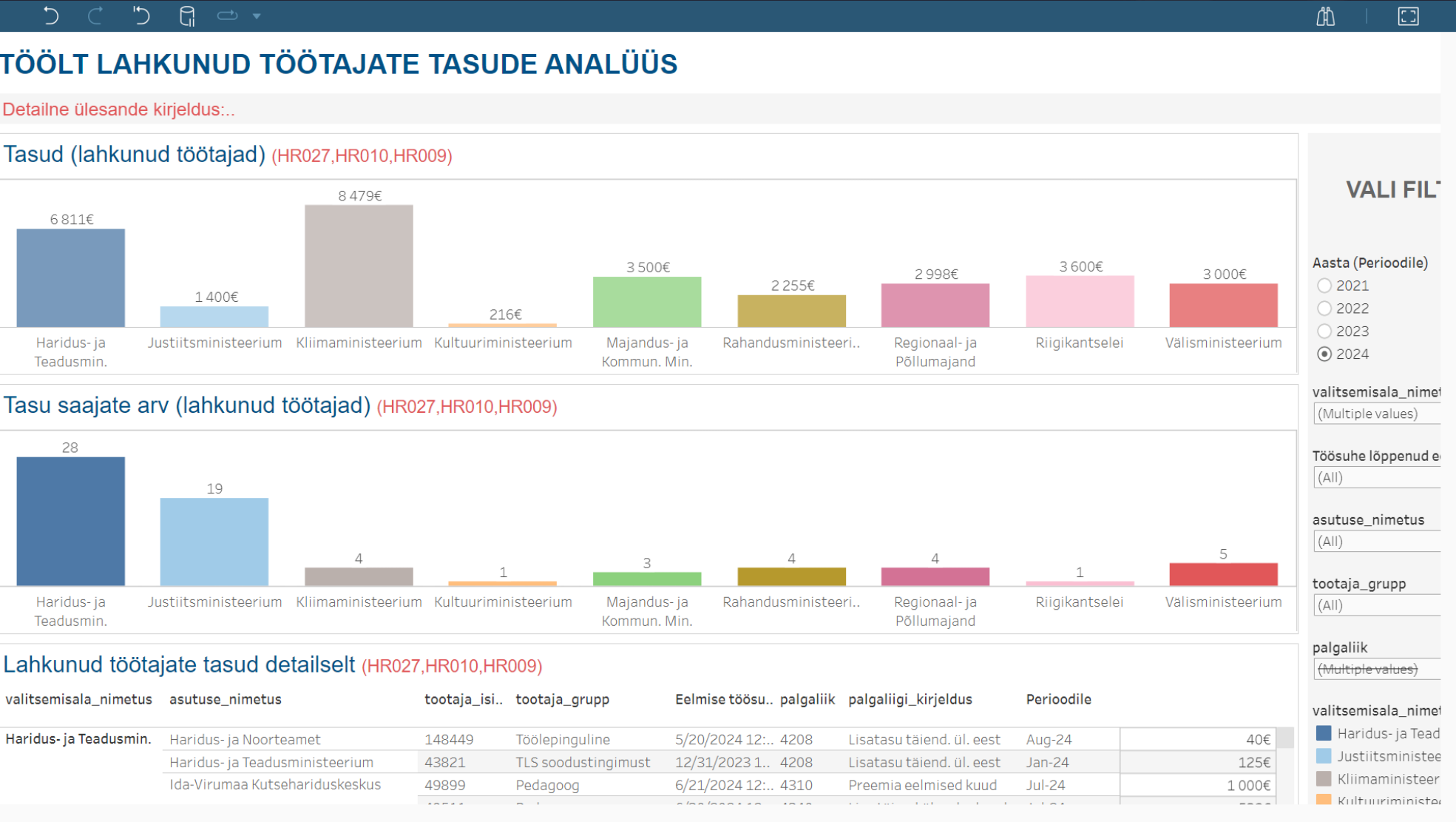
Desktop of the public procurements (4)

Vale menetlusliigiga hanked (maksumuse järgi) 352 Vale menetlusliik? Jah	Hanked, mille eeldatav/lõplik maksumus ületab RVP, kuid hanketeatesse on märgitud, et ei ületa RVP ja/või ei saadetud ELT. 0 Maksumus üle RVP aga märgitud pole (All)	Liiga lühikese tähtajaga hangete arv 0 Kas liiga väike tähtaeg? (All)	Ennetähtaegselt lõpetatud lepingu korral uute kattuva hankija ja CPV koodiga hangete arv (6 kuu jooksul) 1 027 Vajuta allolevale numbrile, et liikuda ennetähtaegselt lõpetatud hangete vaatesse	Hanked, mille menetlusliik ja CPV kood ei lähe kokku 0 Men.liik ja CPV ei lähe kokku (All)							
Avaldati 7.11.2018 10.11.2021	Valitsemisala lühend MKM	Hankija (All)	Viitenumber								
Valitsemisala lühend	Viitenumber	Peamine CPV kood	CPV koodide arv	Menetlusliigi kood	Hankija	Avaldati	Liiga väike esitamise aeg	Kas vale men. liik?	Maksumus üle RVP aga märgitud p..	Men.liik ja CPV ei lähe kokku	
MKM	202616	90400000-1	1	VO	aktsiaselts ..	7.11.2018	Ei	Jah	Ei	Ei	46 256
	203294	48900000-7	1	VO	Eesti Energ..	12.12.2018	Ei	Jah	Ei	Ei	
	203747	48900000-7	1	VO	Eesti Energ..	15.12.2018	Ei	Jah	Ei	Ei	31 601
	203843	90510000-5	1	VO	Enefit Pow..	19.12.2018	Ei	Jah	Ei	Ei	
	203882	48900000-7	1	VO	Eesti Energ..	21.12.2018	Ei	Jah	Ei	Ei	47 444
	204025	79410000-1	1	VO	Eesti Energ..	18.01.2019	Ei	Jah	Ei	Ei	49 800
	204562	79212000-3	1	VO	Enefit Kaev..	19.01.2019	Ei	Jah	Ei	Ei	44 338
	204950	44114250-9	1	VO	aktsiaselts ..	7.02.2019	Ei	Jah	Ei	Ei	37 800
	205055	45231111-6	1	VO	Enefit Pow..	1.02.2019	Ei	Jah	Ei	Ei	113 579
	205093	42100000-0	1	VO	Enefit Pow..	31.01.2019	Ei	Jah	Ei	Ei	33 961
	205097	66510000-8	1	VO	aktsiaselts ..	31.01.2019	Ei	Jah	Ei	Ei	51 112
	205102	66510000-8	1	VO	aktsiaselts ..	31.01.2019	Ei	Jah	Ei	Ei	48 215
	205150	50510000-3	2	VO	Enefit Pow..	5.02.2019	Ei	Jah	Ei	Ei	50 000
	205263	71320000-7	1	VO	Eesti Energ..	5.06.2019	Ei	Jah	Ei	Ei	4 110 000
	205343	38418000-8	1	VO	Enefit Pow..	8.02.2019	Ei	Jah	Ei	Ei	30 975
	205480	39714100-1	1	VO	Enefit Kaev..	8.02.2019	Ei	Jah	Ei	Ei	53 300
	205582	18200000-1	1	VO	Enefit Gree..	18.02.2019	Ei	Jah	Ei	Ei	272 000
	205735	38540000-2	1	VO	Enefit Pow..	18.02.2019	Ei	Jah	Ei	Ei	
	205817	09200000-1	1	VO	Enefit Pow..	20.02.2019	Ei	Jah	Ei	Ei	39 600
	205882	50220000-3	1	VO	aktsiaselts ..	27.02.2019	Ei	Jah	Ei	Ei	30 673
	205945	03121200-7	1	VO	Eesti Energ..	28.02.2019	Ei	Jah	Ei	Ei	39 000

Desktop of the labour costs (1)

- » Unpersonalized data from the state's accounting database every month
- » Personal data is replaced by a pseudonym
- » HR resources accounting and payroll analyse
 - » comparison with the previous two years
- » Personalized information is not compared with other registers, e.g. the tax office register (to hide undercover officers)
- » Different control analyses, for example
 - » whether the institution has concluded an additional contract with its employee
 - » whether the employee has not been paid a bonus of more than 20% of the basic salary
- » Output of analyses – transactions to be tested in detail

Desktop of the labour costs (2)



Desktop of the labour costs (3)

LISATASU TAIENDAVATE ULESANNETE EEST ULETAB POHIPALKA

2. Lisaks tuua välja pingerida asutustest (koos töötajate arvuga), kus on töötajatele makstud lisatasu rohkem kui põhipalka (töötajate arvu alusel, kes 1. punktis välja tulid). Seda pingerida võiks saada sorteerida ka

Lisatasu kokku (HR027)

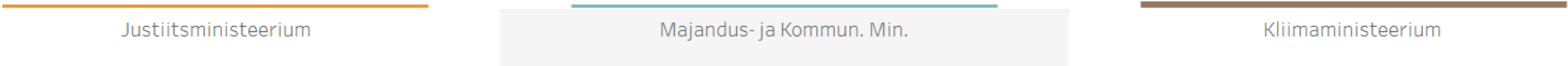
9 179€

Isikute arv kokku (HR027)

4

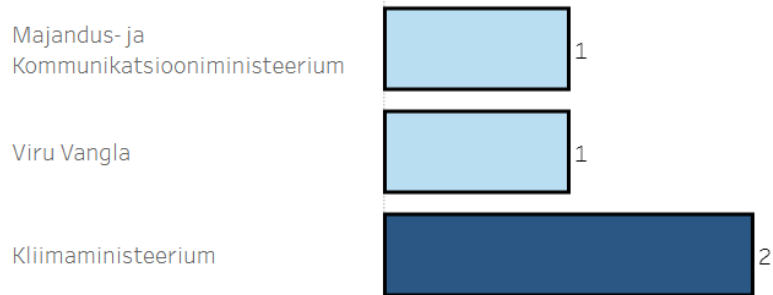
Valitsemisalade lõikes isikute arv (HR027)

*Kliki filtreerimiseks



Asutuste lõikes isikute arv (HR027)

*Kliki filtreerimiseks



Isikute lõikes detailselt (HR027)

*Järjestatud lisatasu % järgi

personali_n..	Action (Valit semisala ni..	personali_a..	Töötaja nimi	isik_id	Põhipalk isiku kohta	Lisat:
9000465	Majandus- j..	Majandus- j..	Null	Null	1 487€	1 5
5301715	Kliimaminis..	Kliimaminis..	Null	Null	1 384€	1 4
2100634	Justiitsmini..	Viru Vangla	Null	Null	1 174€	1 6

VALI FILTRID

Aruande al... January 2024

Aruande lõ... August 2024

valitsemis... (Multiple valu...

asutuse_n... (All)

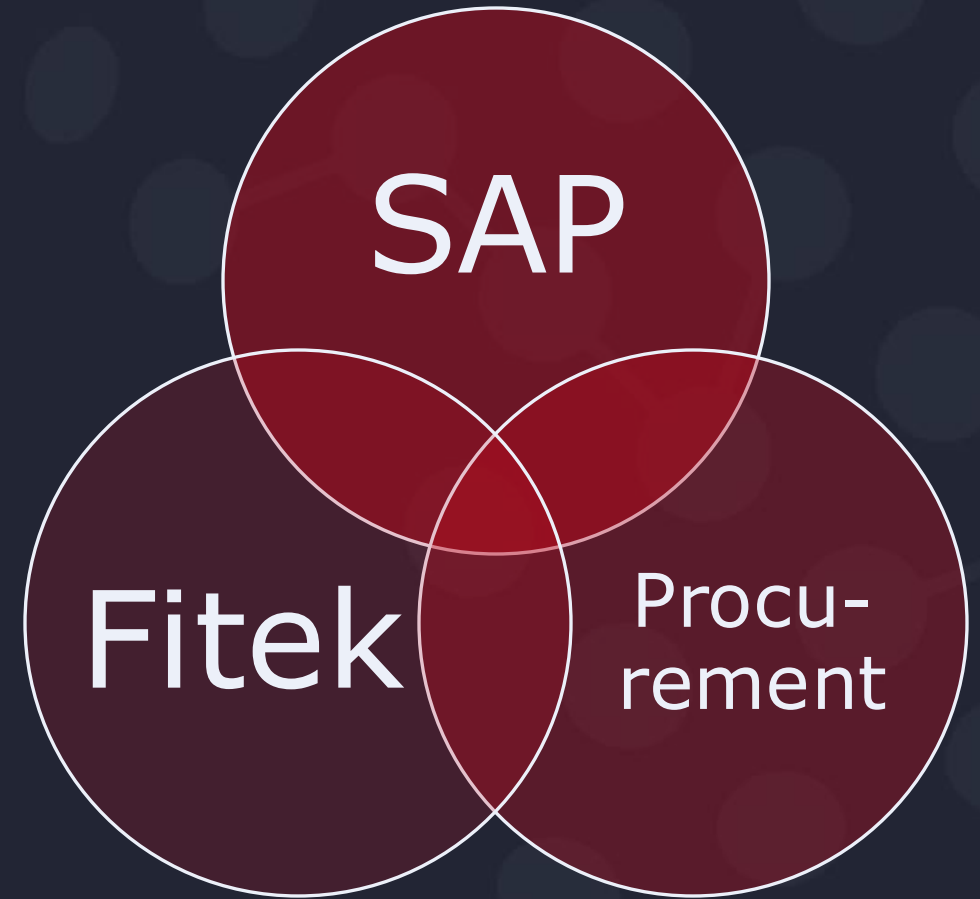
Lisatasu % põhipalgast
100

valitsemis... Justiitsmini:
Kliimaminist

Lisatasu %...
104% 185%

Desktop of the financial auditing (1)

- » Every weekday
 - » detailed accounting entries and account balances
 - » data of electronic invoices (incl. transaction confirmation rounds)
- » Every month: data from the procurement register



Desktop of the financial auditing (2)

- » On the basis of various dimensions, accounting data is combined with data from the system of electronic invoices and procurement register
- » From the data flow we get reports of fixed assets, accounts receivable and payable etc
- » General financial data analysis
 - » comparison with the previous two years
- » Opportunity to
 - » move from the general balance to the detailed entry and from there to the public procurement data or invoice data
 - » turn on comparison with materiality

Desktop of the financial auditing (3)

- » Different control analyses, for example
 - » the amount of the public procurement contract vs. the amount of the actual payments
 - » whether the employees in the transaction confirmation circle were at work at the time of confirmation
- » Opportunity to do random (stratified) sampling
- » Output of analyses – transactions to be tested in detail
- » We import the list of tested transactions with the results of the tests back into the analysis
 - » overview of problem areas
 - » mapping of white (unaudited) areas

Desktop of the financial auditing (4)

Edit

View: Original

Data Guide

Metrics

Share

Teistelt aru...
RP009 Käibe...

It is possible to drill down to detailed level on the dashboard

Käibed ja Saldod võrdlev analüüs;

It is possible to drill down to detailed level of government agencies

Kande aasta (RP004_ag..	Grupeerija (Ivl1) (RP00...	Haridus- ja Teadusmin. (G000)	Justiitsministeerium (J000)	Kaitseministeerium (K000)	Kliimaministeerium (L000)	Kultuuriministeerium (M000)	Majandus- ja Kommun. Min. (N000)	Õig...
2024	Bilanss	-88,135,515.69 €	-1,878,979.27 €	-258,962,388.08 €	-408,069,803.85 €	-11,599,041.34 €	-356,801,719.07 €	
	Tulem	88,135,515.69 €	1,878,979.27 €	258,962,388.08 €	408,030,922.41 €	11,599,041.34 €	356,801,719.07 €	
	Muu	125,846,441.39 €	43,785,235.77 €	484,254,121.45 €	206,846,722.11 €	88,324,716.82 €	642,885,251.10 €	
	Konto puudub kontoplaanis				38,881.44 €			
	Total	125,846,441.39 €	43,785,235.77 €	484,254,121.45 €	206,846,722.11 €	88,324,716.82 €	642,885,251.10 €	
Total		125,846,441.39 €	43,785,235.77 €	484,254,121.45 €	206,846,722.11 €	88,324,716.82 €	642,885,251.10 €	
Grand Total		125,846,441.39 €	43,785,235.77 €	484,254,121.45 €	206,846,722.11 €	88,324,716.82 €	642,885,251.10 €	

STATE ACCOUNTING ENTITIES

Statement of financial performance

Off-balance sheet

Balance sheet

Desktop of the financial auditing (5)

Riigihanke viitenumber

Hankija rolli kontroll

Hanke esimese lepingu kuupäev

Tarnija kood

Tarnija nimi

Tarnija registrikood

Tegevusala

Tegevusala nimetus

Tehingupartneri kood koos teisendustega

Toetus

Toetuse nimetus

Toetuse sisene/väline number

Toetuse sisene number

Toetuse väline number

View: Original

Data Guide

Metrics

Share

ibed ja saldod võrdle...

RP009 Käibed ja saldod detail...

RP004 Finantskanded

Finantskannete detailid

Finantskannete detailid (tä

RP004 detailandmete valim (select all ning filtreeri)

Vali kõik #####

6 DIM

7 DIM

8 DIM

9 DIM

10 DIM

Kannete arv

Keskm. päevi kandest sisestamiseni

Keskm. päevi kandest maksetähtaja

To group data, there are many dimensions, such as supplier name and grant project title

Dimensionoon..	Dimensionoon..	Dimensionoon..	Dimensionoon..	Dimensionoon..	Dimensionoon..	Dimensionoon..	Dimensionoon..	Dimensionoon..	Dimensionoon..	Kannete ar..	Avg. Päevi k..	Avg. Päevi ka..	Haridus- ja Teadusr
Tühi	Tühi	Tühi	Tühi	Tühi	Tühi	Tühi	Tühi	Tühi	Tühi	4,933	1.8	-21,508.0	
										12,016	2.4	-22,282.6	

Desktop of the financial auditing (6)

Auditeeritud kirjed Kontoplaanis Probleemi detailid **A separate detailed view, where we have used agreed-upon keywords alongside the audit findings**

Auditeeritud kirjed Kontoplaanis: Testitud tohingu

Andmeallikad:

1. FINANTSKANDE - asutuste ning kontode hierarhia
2. **The view can be drilled down to a more detailed level, e.g. account level or agency level**
3. **A separate report that shows the audited agencies (a) or problematic agencies (b) over the past 3 years**

ita + aidas g...
nev exceli sisend andmeaita (kontakt: Gerli)

Hierarhia		Valitsemisala															
tase 2	Hierarhia tase 3	B000	C000	D000	E000	F000	G000	J000	K000	L000	M000	N000	P000	R000	S000	T000	V000
Null	Null	(..	(Rii..	(..	(..	(Rii..	(..	(Ju..	(K..	(Kli..	(K..	(..	(..	(..	(Sis..	(So..	(..
																	0
Bilanss	1 Varad	12	0	0	1	0	159	9	447	74	2	78	7	125	306	61	52
	2 Kohustised ja netovara	39	29	0	4	3	190	16	633	76	18	187	13	118	349	95	66
Muu	9 Täiendav informatsioon ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0
Tulem	3 Tegevustulud	0	0	0	0	0	26	0	24	15	0	19	1	9	18	28	1
	4 Antud toetused	0		0	0	0	14	3	38	10	12	30	5	4	5	22	3
	5 Tööjõu- ja majandamisk..	58	29	0	5	3	53	7	218	19	7	120	5	19	61	67	13
	6 Muud kulud	49	28	0	4	3	53	5	80	19	4	82	3	19	162	33	11
	7 Netofinantseerimine eel..	9	0	0	0	0	3	0	0	13	2	11	0	0	7	23	0

Hierarhia a... Konto

Möödik ar... Testitud tehingud

(a) Testitud tehingud

Leiu märk(b) Probleemsed kirjed

Asutus (All)

Valitsemis... (All)

1_kontoliik (All)

0 Konto Ty... (All)

Tehingukla... (All)

Testitud te... (All)

Thank you!

» Any questions?

alvar.nouakas@riigikontroll.ee
hanna-marleen.penno@riigikontroll.ee