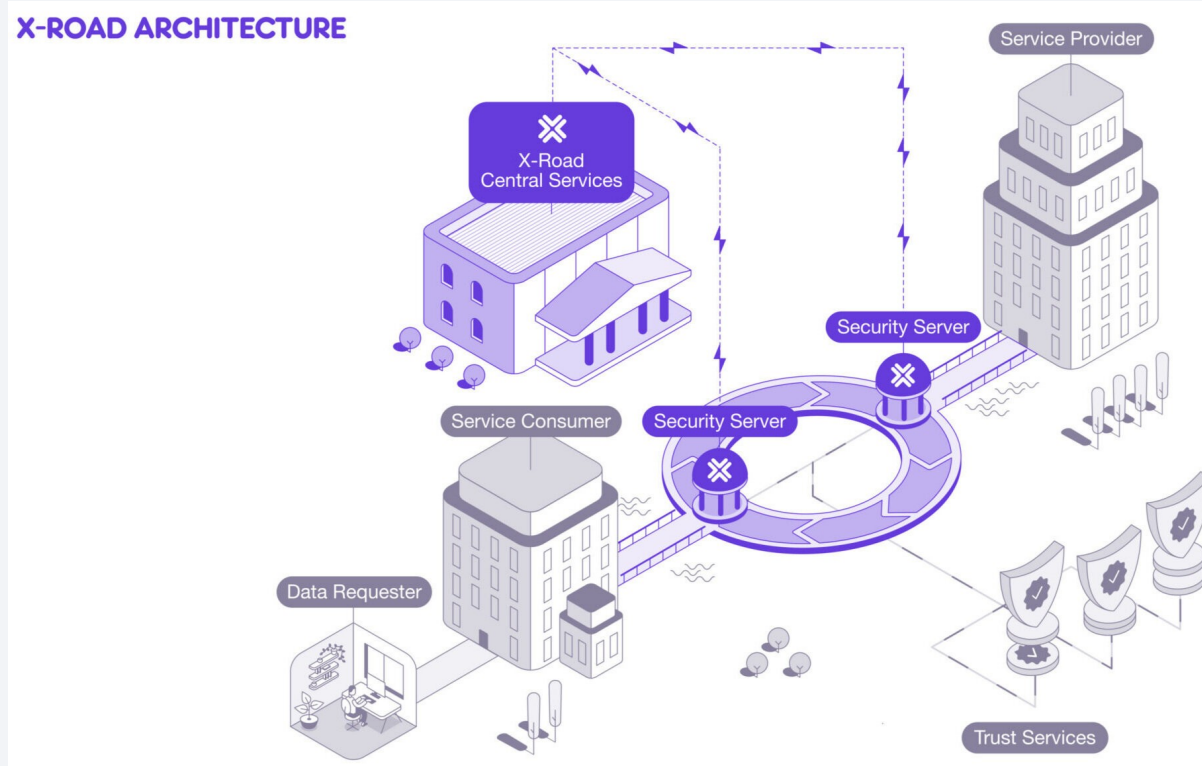


XRoad SH

Überblick

- XRoad
- Technik: REST und TLS
- Einsatzbereich 1: OZG 2.0
- Einsatzbereich 2: eGovernment-Plattform API
- Einsatzbereich 3: Registermodernisierung
- Umsetzung: Landesdatennetz
- UseCases XRoad

XRoad



Technik: REST

- Nutzung von HTTP-Schlüsselworten wie GET/POST/PUT/DELETE....
- Nutzung von URLs zur Adressierung

Servers

default

GET	/	Liste verfügbarer Autobahnen
GET	/{"roadId"}/services/roadworks	Liste aktueller Baustellen
GET	/details/roadworks/{"roadworkId"}	Details einer Baustelle
GET	/{"roadId"}/services/webcam	Liste verfügbarer Webcams
GET	/details/webcam/{"webcamId"}	Details einer Webcam

ABSTRACT OF THE DISSERTATION

Architectural Styles and the Design of Network-based Software Architectures

by

Roy Thomas Fielding

Doctor of Philosophy in Information and Computer Science

University of California, Irvine, 2000

Professor Richard N. Taylor, Chair

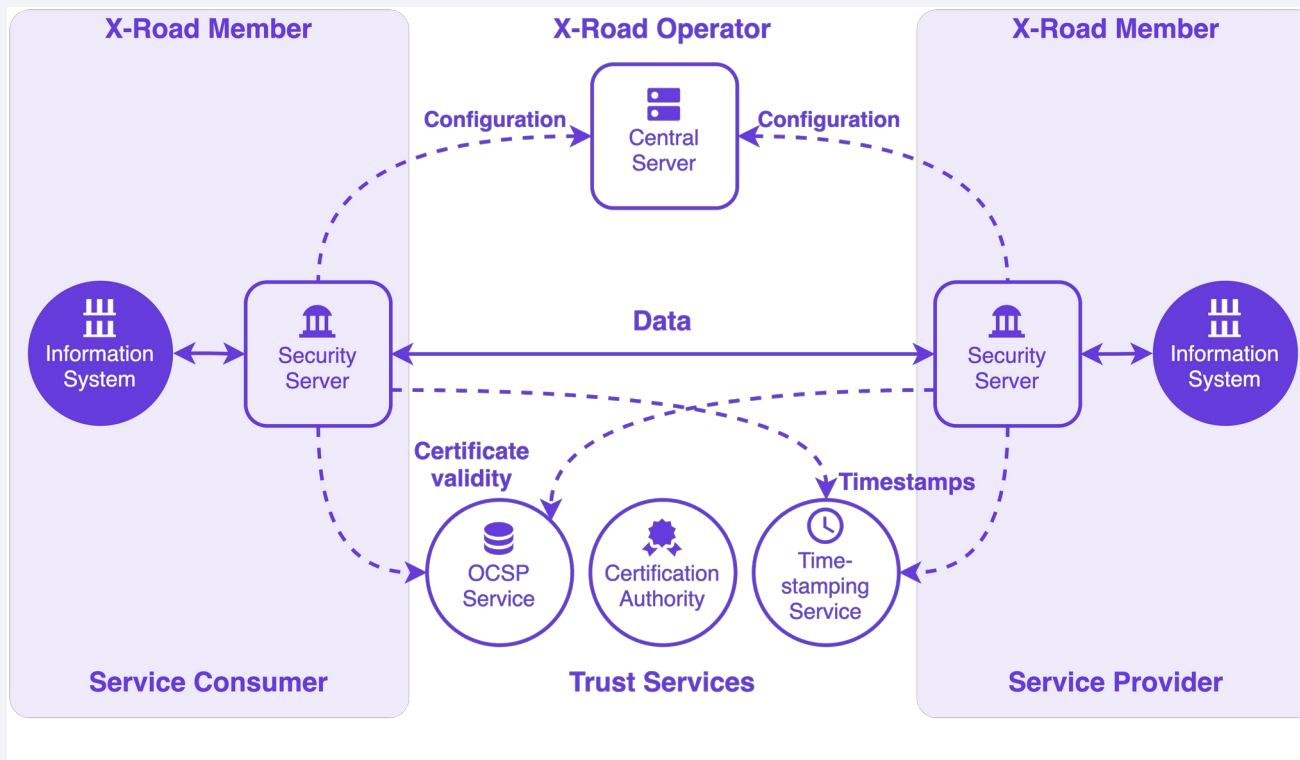
This dissertation defines a framework for understanding software architecture via architectural styles and demonstrates how styles can be used to guide the architectural design of network-based application software. A survey of architectural styles for network-based applications is used to classify styles according to the architectural properties they induce on an architecture for distributed hypermedia. I then introduce the Representational State Transfer (REST) architectural style and describe how REST has been used to guide the design and development of the architecture for the modern Web.

Technik: REST

```
sven.thomsen2@sh-n-dlin-10:~> curl -X 'GET' 'https://verkehr.autobahn.de/o/autobahn/' -H 'accept: application/json'
{"roads":["A1","A2","A3","A4","A5","A6","A7","A8","A9","A10","A11","A12","A13","A14","A15","A17","A19","A20","A21","A
23","A24","A25","A26","A27","A28","A29","A30","A31","A33","A36","A37","A38","A39","A40","A42","A43","A44","A45","A46
","A48","A49","A52","A57","A59","A60","A60 ","A61","A62","A63","A64","A65","A66","A67","A70","A71","A72","A73","A81","
A82","A83","A84","A85","A86","A88","A89","A100","A111","A112","A114","A115","A117","A118","A119","A120","A121","A122","A123","A124","A125","A126","A127","A128","A129","A130","A131","A132","A133","A134","A135","A136","A137","A138","A139","A140","A141","A142","A143","A144","A145","A146","A147","A148","A149","A150","A151","A152","A153","A154","A155","A156","A157","A158","A159","A160","A161","A162","A163","A164","A165","A166","A167","A168","A169","A170","A171","A172","A173","A174","A175","A176","A177","A178","A179","A180","A181","A182","A183","A184","A185","A186","A187","A188","A189","A190","A191","A192","A193","A194","A195","A196","A197","A198","A199","A200","A201","A202","A203","A204","A205","A206","A207","A208","A209","A210","A211","A212","A213","A214","A215","A216","A217","A218","A219","A220","A221","A222","A223","A224","A225","A226","A227","A228","A229","A230","A231","A232","A233","A234","A235","A236","A237","A238","A239","A240","A241","A242","A243","A244","A245","A246","A247","A248","A249","A250","A251","A252","A253","A254","A255","A256","A257","A258","A259","A260","A261","A262","A263","A264","A265","A266","A267","A268","A269","A270","A271","A272","A273","A274","A275","A276","A277","A278","A279","A280","A281","A282","A283","A284","A285","A286","A287","A288","A289","A290","A291","A292","A293","A294","A295","A296","A297","A298","A299","A300","A301","A302","A303","A304","A305","A306","A307","A308","A309","A310","A311","A312","A313","A314","A315","A316","A317","A318","A319","A320","A321","A322","A323","A324","A325","A326","A327","A328","A329","A330","A331","A332","A333","A334","A335","A336","A337","A338","A339","A340","A341","A342","A343","A344","A345","A346","A347","A348","A349","A350","A351","A352","A353","A354","A355","A356","A357","A358","A359","A360","A361","A362","A363","A364","A365","A366","A367","A368","A369","A370","A371","A372","A373","A374","A375","A376","A377","A378","A379","A380","A381","A382","A383","A384","A385","A386","A387","A388","A389","A390","A391","A392","A393","A394","A395","A396","A397","A398","A399","A400","A401","A402","A403","A404","A405","A406","A407","A408","A409","A410","A411","A412","A413","A414","A415","A416","A417","A418","A419","A420","A421","A422","A423","A424","A425","A426","A427","A428","A429","A430","A431","A432","A433","A434","A435","A436","A437","A438","A439","A440","A441","A442","A443","A444","A445","A446","A447","A448","A449","A450","A451","A452","A453","A454","A455","A456","A457","A458","A459","A460","A461","A462","A463","A464","A465","A466","A467","A468","A469","A470","A471","A472","A473","A474","A475","A476","A477","A478","A479","A480","A481","A482","A483","A484","A485","A486","A487","A488","A489","A490","A491","A492","A493","A494","A495","A496","A497","A498","A499","A500","A501","A502","A503","A504","A505","A506","A507","A508","A509","A510","A511","A512","A513","A514","A515","A516","A517","A518","A519","A520","A521","A522","A523","A524","A525","A526","A527","A528","A529","A530","A531","A532","A533","A534","A535","A536","A537","A538","A539","A540","A541","A542","A543","A544","A545","A546","A547","A548","A549","A550","A551","A552","A553","A554","A555","A556","A557","A558","A559","A560","A561","A562","A563","A564","A565","A566","A567","A568","A569","A570","A571","A572","A573","A574","A575","A576","A577","A578","A579","A580","A581","A582","A583","A584","A585","A586","A587","A588","A589","A590","A591","A592","A593","A594","A595","A596","A597","A598","A599","A600","A601","A602","A603","A604","A605","A606","A607","A608","A609","A610","A611","A612","A613","A614","A615","A616","A617","A618","A619","A620","A621","A622","A623","A624","A625","A626","A627","A628","A629","A630","A631","A632","A633","A634","A635","A636","A637","A638","A639","A640","A641","A642","A643","A644","A645","A646","A647","A648","A649","A650","A651","A652","A653","A654","A655","A656","A657","A658","A659","A660","A661","A662","A663","A664","A665","A666","A667","A668","A669","A670","A671","A672","A673","A674","A675","A676","A677","A678","A679","A680","A681","A682","A683","A684","A685","A686","A687","A688","A689","A690","A691","A692","A693","A694","A695","A696","A697","A698","A699","A700","A701","A702","A703","A704","A705","A706","A707","A708","A709","A710","A711","A712","A713","A714","A715","A716","A717","A718","A719","A720","A721","A722","A723","A724","A725","A726","A727","A728","A729","A730","A731","A732","A733","A734","A735","A736","A737","A738","A739","A740","A741","A742","A743","A744","A745","A746","A747","A748","A749","A750","A751","A752","A753","A754","A755","A756","A757","A758","A759","A760","A761","A762","A763","A764","A765","A766","A767","A768","A769","A770","A771","A772","A773","A774","A775","A776","A777","A778","A779","A780","A781","A782","A783","A784","A785","A786","A787","A788","A789","A790","A791","A792","A793","A794","A795","A796","A797","A798","A799","A800","A801","A802","A803","A804","A805","A806","A807","A808","A809","A810","A811","A812","A813","A814","A815","A816","A817","A818","A819","A8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sven.thomsen2@sh-n-dlin-10:~> curl -s -X 'GET' 'https://verkehr.autobahn.de/o/autobahn/A7/services/roadworks' -H 'accept: application/json' | jq '.roadworks[].title | .'
"A7 | Füssen - Nesselwang"
"A7 | Füssen - Nesselwang"
"A7 | Reinertshofertunnel - Nesselwang"
"A7 | Reinertshofertunnel - Vorwald"
"A7 | Reinertshofertunnel - Nesselwang"
"A7 | Nesselwang - Reinertshofertunnel"
"A7 | Nesselwang - Füssen"
"A7 | Oy-Mittelberg - Rottachtal"
"A7 | Rottachtal - Vorwald"
"A7 | Allgäu - Kempten-Leubas"
"A7 | Vorwald - Reinertshofertunnel"
"A7 | Allgäuer Tor - Bad Grönenbach"
"A7 | Allgäuer Tor - Dietmannsried"
"A7 | Bad Grönenbach - Allgäuer Tor"
"A7 | Memmingen - Bad Grönenbach"
"A7 | Aumühle - Berkheim"
"A7 | Buchwald - Hahnenberg"
```

Technik: TLS



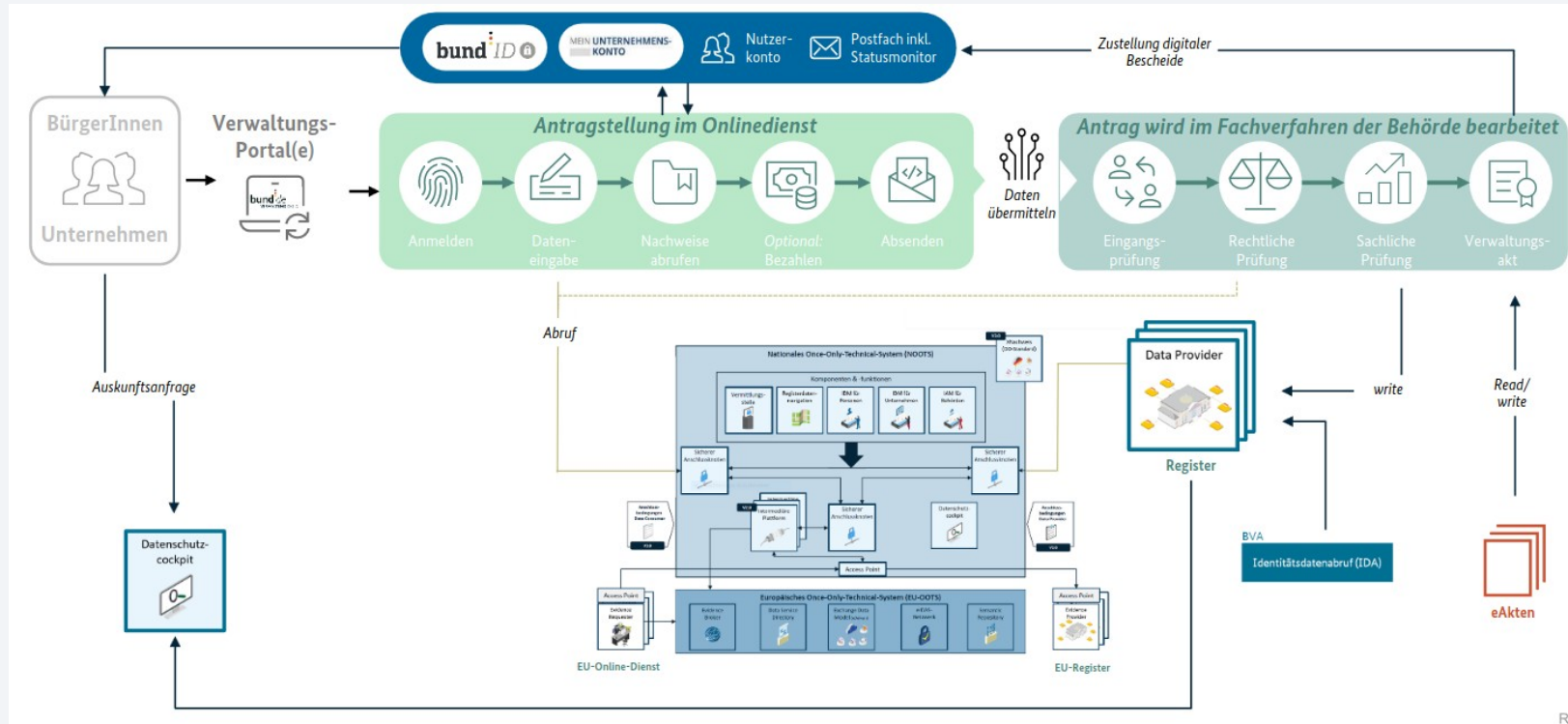
Einsatzbereich 1: OZG 2.0

- XRoad als **standardisierter Weg zur Fachverfahrensanbindung**
- **Fachverfahren** müssen hierfür REST-Schnittstelle anbieten
- Alternativ: Nutzung eines **API-Gateways** für Wandlung von REST-Anfragen in herstellerspezifische Schnittstelle
- Online-Dienste binden **Fachverfahren über XRoad** per REST an
- **Zentrales Entwicklungsportal** für Land und Kommunen zur Dokumentation bekannter und geplanter Schnittstellen
- Ziel: **relevante Fachverfahren** öffentlicher Stellen **per XRoad** erreichbar

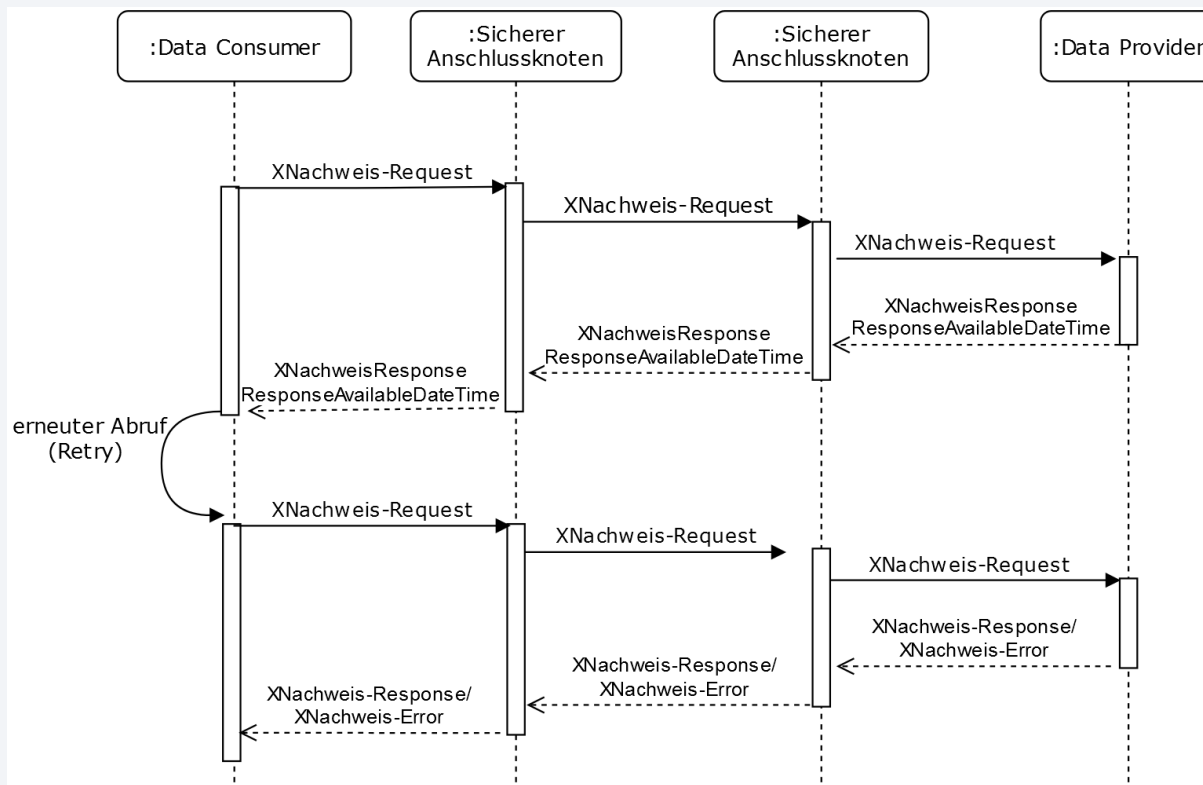
Einsatzbereich 2: eGovernment-Plattform API

- Alle Komponenten der **eGovernment-Plattform Schleswig-Holstein** und ihre Funktionen werden **per REST-Schnittstelle über XRoad** erreichbar
- Beispiele: Zustellung eines Bescheids, Auslösen eines Paymentvorgangs
- Beispiel: **OZG-Cloud** erhält bidirektionale XRoad-Schnittstelle zu Fachverfahren
- Beispiel: kommende **Registerplattform** des ITVSH und des Landes
- Kommende Komponenten werden **standardmäßig mit nativer XRoad-Anbindung** implementiert
- Ziel: **API first**

Einsatzbereich 3: Registermodernisierung



Einsatzbereich 3: Registermodernisierung



Einsatzbereich 3: Registermodernisierung

- NOOTS-Anbindung von Registern per „sicherem Anschlussknoten“ (SAK)
- „Register“ häufig gleichzeitig auch „Fachverfahren“
- Fachverfahren häufig noch nicht auf „Registerbetrieb“ nicht vorbereitet
- einige Fachverfahren verfügen noch nicht über externe Schnittstellen
- NOOTS/RegMo/SAK dienen nur dem Nachweisabruf, keine Geschäftsprozesskomponente

Einsatzbereich 3: Registermodernisierung

- SH bindet **Fachverfahren** ohnehin zentral per XRoad an, nicht nur für Registerdatenabrufe sondern für Voll-Integration
- ITVSH und Land entwickeln **zentrale Registerplattform**
- Registerplattform wird per **XRoad** angebunden
- „**Register-as-a-Service**“: Anbindung dezentraler Register / Fachverfahren..
 - ...per PUSH: Plattform arbeitet gegenüber NOOTS als Spiegelregister
 - ...per PULL: Plattform arbeitet gegenüber NOOTS als Stellvertretung

Einsatzbereich 3: Registermodernisierung

- Anbindung einzelner Kommunen an NOOTS per „sicherem Anschlussknoten“ weiterhin in dezentraler Finanzierung möglich
- Land finanziert **Registerplattform und XRoad** inkl. kommunaler Anbindung
- Kommunen als registerführende Stelle bestimmen das „**Was-Wie-Wo**“
- Kommunen und Land setzen mit XRoad **Datenvernetzung** um
- Ziel: **gemeinsame, zentrale Umsetzung der Registermodernisierung**
 - ..zentral auf gemeinsamer Registerplattform
 - ..dezentrale Anbindung erfolgt per XRoad

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Umsetzung: Landesdatennetz

- Land entwickelt auf Basis des Landesnetzes ein **Landesdatennetz auf Grundlage von XRoad**
- Land stellt Kommunen **Anschlussadapter zum Landesdatennetz** bereit
 - XRoad-Anbindung
 - API-Gateway
 - Fachverfahrensanbindung über gemeinsame Schnittstellenvorlagen
 - Entwickelt als OpenSource auf OpenCoDE
 - Bereitgestellt als Paket, Container und VM-Image

Vorgehen: UseCases XRoad

- **Tourismus-Abgabe** (OZG2.0-fokussierter Onlinedienst inkl. Payment und Anbindung von Privatwirtschaft, Test neuer Plattformkomponenten)
- **Anbindung Register-Plattform** (Anbindung eines E-Government-Basisdienstes der digitalen Plattform Schleswig-Holstein)
- **Anbindung von NOOTS, Datenschutzcockpit und Identitätsdatenabgleich** (RegMo-Implementierung)
- **rein kommunaler UseCase**, der durch den ITVSH definiert wird (direkte kommunale Vernetzung ohne Landesbeteiligung)
- **Föderation mit anderen XRoad-Anwendern**, insbesondere Estland
Schwerpunkt auf Transport und Nachweise beruflicher Qualifikation (Cross-Border E-Government im Ostsee-Raum)