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NHS STU3 Capability Statement Profile Design

Document management

Revision History

Version	Date	Summary of Changes
0.1	2017-09-19	Initial comments
0.2	2017-10-03	P14 Review comments
0.3	2017-12-13	Multiple 'capabilitystatement-expectation' extensions added to represent complete REST conformance context.

Reviewers

This document must be reviewed by the following people:

Reviewer name	Title / Responsibility	Date	Version
Richard Kavanagh	Head of Interoperability Standards Development		0.1
Programme 14 – Interoperability & Architecture			0.2

Approved by

This document must be approved by the following people:

Name	Signature	Title	Date	Version

Glossary of Terms

Term / Abbreviation	What it stands for

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Contents

1. Introduction

1.1. Purpose of Document

This document defines the best practice rules that must be followed by technical and interoperability architects when profiling NHS Digital national FHIR Capability Statements.

It is published as a 'work in progress' version and as such is subject to change.

It has been published to show the direction of travel and to serve as a discussion document for parties involved in the creation of NHS Digital national API Capability Statements and how these Capability Statements will be used in national NHS FHIR API Implementation Guides.

1.2. Background

The conformance layer[1] is used within FHIR implementation guides to provide a computable statement about how FHIR resources and FHIR exchange paradigms are used to solve particular healthcare interoperability use cases. The conformance layer is implemented using a number of key resources including StructureDefinition, CapabilityStatement and ImplementationGuide.

This document is only concerned with profiling the STU3 CapabilityStatement resource.

The long term objective of this document is to ensure a consistency in design of NHS Digital Capability Statements for use within NHS Digital FHIR API Implementation Guides.

1.3. In Scope

For this version of the NHS STU3 Capability Statement Profile Design the following is considered in scope:

- NHS Digital FHIR API projects delivered on Spine
- Capability Statement resource Metadata
- FHIR RESTful mode
- FHIR query mechanism

1.4. Out of Scope

For this version of the NHS STU3 Capability Statement Profile Design out of scope items include:

- Peer to Peer FHIR API projects e.g. CareConnect API
- Capability Statement elements:
  - CapabilityStatement.rest.mode – 'Client'
  - CapabilityStatement.rest.interaction
  - CapabilityStatement.rest.operation
  - CapabilityStatement.rest.compartment
  - CapablityStatement.messaging
  - CapabilityStatement.document

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[1] http://hl7.org/fhir/STU3/profiling.html

1.5. Target Audience

This document is intended for NHS Digital technical teams involved in the development of FHIR API Implementation Guides using the STU3 FHIR standard.

It is assumed that the reader is familiar with the FHIR standard and all of technologies detailed within this document.

1.6. References

#	Name	Version
1	https://nhsconnect.github.io/fhir-policy/index.html	0.0.1-alpha
2	http://hl7.org/fhir/STU3/capabilitystatement.html	FHIR Release 3 (STU)

2. CapabilityStatement

A FHIR STU3 Capability Statement documents a set of capabilities (behaviours) of a FHIR Server that may be used as a statement of actual server functionality or a statement of required or desired server implementation. The context of FHIR Server capability MUST not be confused with technical architecture solution capability.

2.1. Design Principles

A Capability Statement is a key part of the FHIR conformance framework. It is used as a statement of actual software capability features or as a set of conformance rules that a system should adhere to.

For NHS Digital there are 2 'relevant' ways to profile the Capability Statement:

1. A specification of 'requirements' profile - describes a desired solution
2. An implementation 'instance' profile - describes an actual implementation

NOTE	An 'instance' profile is a statement of conformance to a 'requirements' profile.
	FHIR restful solutions are expected to make available an 'instance' profile on invocation of the capabilities operation. It is also the type of statement that forms a basis for the testing, certification or commissioning of specific software installations.

The Capability Statement profile detailed in this section applies to all NHS Digital FHIR API development projects delivered on Spine. The only way to provide consistent and standard

FHIR API Definitions is if all FHIR API Implementation Guides abide by these common Capability Statement design principles.

2.2.   NHSDigital-CapabilityStatement-1 Profile Design

The following table shows the NHSDigital-CapabilityStatement-1 StructureDefinition profile, which constrains the CapabilityStatement resource. Constraints applied to the CapabilityStatement base resource by this profile are shown in bold.

For some CapabilityStatement elements, the comments column details the expected 'instance' statement of conformance to a 'requirements' profile.

Name	Card.	Description & Constraints	Comments
CapabilityStatement		A statement of system capabilities	
CapabilityStatement.url	1..1	**URL** that is used to identify this capability statement when it is referenced in a specification, model, design or an instance. MUST be globally unique, and MUST be an address at which this capability statement is (or will be) published. The URL MAY **[TBC]** include the major version of the capability statement.	**This version of the profile requires a URL element.** **FHIR-CONF-01:** All FHIR ReST endpoints MUST publish their conformance **FHIR-VER-02:** HL7 FHIR version in FHIR Endpoint URL **FHIR-VER-04:** Major Profile Version in Resource ID **Capability statements of kind 'requirements' example:** **https://fhir.nhs.uk/STU3/CapabilityStatement/ODSAPI-CapabilityStatement-1** **Capability statements of kind 'instance' example [TBC]:** **https://directory.spineservices.nhs.uk /STU3/SpineDirectory-CapabilityStatement-1**
CapabilityStatement.version	0..1	The identifier that is used to identify this version of the capability statement when it is referenced in a specification. NB: This is a business versionId, not a resource version id.	**Capability statements of kind 'requirements' MUST support the version element.** **FHIR-VER-05:** Minor and Patch Profile Version will use FHIR versioning **The version element within the resource will contain the full semantic version of the resource, and will look like this:** <version value="1.1.3"/>
CapabilityStatement.name	1..1	Name for this capability statement (computer friendly)	**This version of the profile requires a name element.** **FHIR-VER-04:** Major Profile Version in Resource ID **National NHS Digital capability statements MUST support the**

			NHS Digital agreed pattern. Refer to: • NHS-Digital-FHIR-Artefact-Naming.docx[2].
CapabilityStatement.title	0..1	Name for this capability statement (human friendly)	
CapabilityStatement.status	1..1	draft | active | retired | unknown PublicationStatus (Required)	**For all under development CapabilityStatement profiles the status MUST be 'draft'.**
CapabilityStatement.experimental	0..1	For testing purposes, not real usage	
CapabilityStatement.date	1..1	Date this was last changed	
CapabilityStatement.publisher	**1**..1	Name of the publisher (organization or individual)	**This version of the profile requires a publisher element.** **National Spine REST API capability statements of kind 'requirements' and server 'instances' MUST populate this element with 'NHS Digital'.**
CapabilityStatement.contact	1..*	Contact details for the publisher	**This version of the profile requires a contact details element.**
CapabilityStatement.contact.name	1..1	**Name of a service that would provide first line support.**	**This version of the profile requires a contact name element.** **National capability statements of kind 'requirements' MUST populate this element with 'Interoperability Team'.** **Capability statements of kind 'instance' SHOULD populate this element with relevant service desk details.**
CapabilityStatement.contact.telecom	1..*	**Contact details of the service**	**This version of the profile requires at least one telecom element.** **Capability statements of kind 'requirements' MUST populate the telecom child elements as follows:** **System: email** **Value: interoperabilityteam@nhs.net** **Use: work** **Capability statements of kind 'instance' SHOULD populate the telecom child elements with relevant service desk**

			contact details.
CapabilityStatement.description	0..1	Natural language description of the capability statement	**Capability statements of kind 'requirements' MUST support the description element.** **The description of the capability statement will be described and published within the NHS Digital Jekyll API Implementation Guide publication.**
CapabilityStatement.useContext	0..*	Context the content is intended to support	
CapabilityStatement.jurisdiction	0.. *	Intended jurisdiction for capability statement (if applicable) Jurisdiction ValueSet (Extensible)	
CapabilityStatement.purpose	0..1	Why this capability statement is defined	
CapabilityStatement.copyright	0..1	Use and/or publishing restrictions	**All NHS Digital national REST API Capability statements of kind 'requirements' and server 'instances' MUST support the copyright element.** **Example:** Copyright © 2017 NHS Digital.
CapabilityStatement.kind	1..1	instance | capability | requirements CapabilityStatementKind (Required)	**The 'requirements' code MUST be used for all capability statements profiles defined by national API IGs - it sets out what systems should do rather than what a particular system does do.** **A server implementation MUST use the code 'instance'. It describes what a particular system does do.**
CapabilityStatement.instantiates	0.. *	Canonical URL of another capability statement this implements	**A server 'instance' of a national Capability Statement MUST reference the 'requirements' CapabilityStatement.**
CapabilityStatement.software	0..1	Software that is covered by this capability statement	**cpb-2: Capability statements of kind 'requirements' do not have software or implementation elements.**
CapabilityStatement.implementation	0..1	If this describes a specific instance	**cpb-2: Capability statements of kind 'requirements' do not have software or implementation elements.**
CapabilityStatement.fhirversion	1..1	FHIR Version the system uses	**STU3 Capability Statements MUST support "3.0.1".**
CapabilityStatement.acceptUnknown	1..1	no | extensions | elements | both UnknownContentCode (Required)	**A national 'requirements' profile MUST use the code 'no'.** **A server 'instance' MUST use**

			the code 'no'.
CapabilityStatement.format	1.. *	formats supported (xml | json | ttl | mime type) MimeType (Required)	**National REST APIs MUST support one of JSON, XML or both formats.** **This element MUST be populated to meet this requirement.** **Spine mime-type conformance:** • Spine SHALL support the formal mime-type for STU3 XML + JSON FHIR resources: 'application/fhir+xml' or 'application/fhir+json' • Spine MAY support the formal mime-types for DSTU2 XML +JSON FHIR resources: 'application/xml+fhir' or 'application/json+fhir' • Spine MAY support generic mime-types e.g. 'text/html', 'xml', 'text/xml', 'application/xml', 'json' and 'application/json' Spine SHOULD support the FHIR STU3 implementation note: https://www.hl7.org/fhir/http.html #mime-type
CapabilityStatement.patchFormat	0.. *	Patch formats supported MimeType (Required)	
CapabilityStatement.Implementatio nGuide	0.. *	Implementation guides supported	**A national 'requirements' profile MUST link to the NHS Developer site for FINAL releases of national API IG specifications.** **A server 'instance' MUST list the implementation guides that the server does (or should) support in their entirety.**
CapabilityStatement.profile	0.. *	Profiles for use cases supported	**A national 'requirements' profile MAY specify a list of profiles that represent different use cases that are required to be supported by a system.** **A server 'instance' MAY list all profiles that represent different use cases that are required to be supported by a system.**
CapabilityStatement.profile.profil e-link	**0..***	**'Extension-NHSDigital-Profile-Link-1' extension.** **A code that references a resource listed in**	**The 'Extension-NHSDigital-Profile-Link-1' extension links profiles to the resources they are based upon for the purpose of 'describing' profile specific capabilities such as**

| | | | CapabilityStatement.rest.resource. | specific search criteria or operations which are supported on a profile by profile bases.

The 'Extension-NHSDigital-Profile-Link-1' extension binds to the HL7 'resource-types' value set.

This value set includes codes from the following code systems:

http://hl7.org/fhir/resource-types |
|---|---|---|---|---|
| CapabilityStatement.rest | 0.. * | A definition of the restful capabilities of the solution.

Multiple repetitions allow definition of both client and/or server behaviours.

+ A given resource can only be described once per RESTful mode. | MUST be supported for all national Spine RESTful APIs |
| CapabilityStatement.rest.mode | 1..1 | client \| server

RestfulCapabilityMode (Required)

Identifies whether this portion of the statement is describing the ability to initiate or receive restful operations. | This version of the profile MUST support 'server' mode.

The Client mode is out of scope for this version of the profile. |
| CapabilityStatement.rest.documentation | 0..1 | General description of implementation | |
| CapabilityStatement.rest.security | 0..1 | Information about security of implementation | |
| CapabilityStatement.rest.security.cors | 1..1 | Adds CORS Headers (http://enable-cors.org/)

MUST Mandate boolean value. [TBC] | This version of the profile MUST support 'cors' Boolean element.

All National API FHIR servers SHOULD support CORS.

CORS support is highly recommended - mandatory if using SMART on FHIR. |
| CapabilityStatement.rest.security.service | 0.. * | OAuth \| SMART-on-FHIR \| NTLM \| Basic \| Kerberos \| Certificates

RestfulSecurityService (Extensible) | |
| CapabilityStatement.rest.security.description | 0..1 | General description of how security works | |
| CapabilityStatement.rest.security.certificate | 0.. * | Certificates associated with security profiles | |
| CapabilityStatement.rest.security.certificate.type | 0..1 | Mime type for certificates

MimeType (Required) | |
| CapabilityStatement.rest.security.certificate.blob | 0..1 | Actual certificate | |
| CapabilityStatement.rest.resource | 0.. * | Resource served on the REST interface

Max of one repetition per resource type. | A national 'requirements' profile MUST specify the restful capabilities of the solution for a specific resource type.

A server 'instance' MUST |

			support all resources served on the REST interface.
CapabilityStatement.rest.resource.capabilitystatement-search-parameter-combination	**0.. ***	**CapabilityStatement resource search combinations MUST be specified using the HL7 maintained 'capabilityStatement -search-parameter-combination' common extension which is a container for a single allowable parameter combination.** **The extension supports required and optional parameter combinations.** **http://hl7.org/fhir/STU3/extension-capabilitystatement-search-parameter-combination.html**	**If a search combination is specified, clients should expect that they must submit that required combination or the search will be unsuccessful.** **If multiple search parameter combinations are specified, a client may pick between them, and supply the minimal required parameters for any of the combinations.**
CapabilityStatement.rest.resource.type	1..1	A type of resource exposed via the restful interface e.g. CarePlan ResourceType (Required)	
CapabilityStatement.rest.resource.profile	0..1	Base System profile for all uses of resource The profile applies to all resources of this type - i.e. it is the superset of what is supported by the system.	**A national 'requirements' profile MUST specify the profile that describes the solution's overall support for the resource.** **A server 'instance' MUST support the profile that describes the solution's overall support for the resource.**
CapabilityStatement.rest.resource.documentation	0..1	Additional information about the use of the resource type	
CapabilityStatement.rest.resource.interaction	1..*	What operations are supported?	
CapabilityStatement.rest.resource.interaction. capabilitystatement-expectation	**1..1**	**FHIR endpoint capability must be specified within the CapabilityStatement resource using the HL7 maintained 'capabilitystatement-expectation' common extension.** **It defines the level of expectation associated with a given system capability.** http://hl7.org/fhir/STU3/extension-capabilitystatement-expectation.html	**The 'capabilitystatement-expectation' extension is bound to the 'conformance-expectation' value set.** **This value set defines the following codes which must be used when publishing a FHIR capability statement:** http://hl7.org/fhir/STU3/valueset-conformance-expectation.html
CapabilityStatement.rest.resource.interaction.code	1..1	read | vread | update | patch | delete | history-instance | history-type | create | search-type TypeRestfulInteraction (Required)	**A national 'requirements' profile MUST specify coded identifiers of the interaction codes supported by the national system.** **A server 'instance' MUST support coded identifiers of the interaction codes supported by the national system.**
CapabilityStatement.rest.resource.interaction.documentation	0..1	Anything special about operation behaviour	
CapabilityStatement.rest.resource.v	0..1	no-version | versioned | versioned-	**NHS Digital national REST API Capability Statements of kind**

ersioning		update ResourceVersionPolicy (Required)	'requirements' and server 'instances' MAY support versioning for a resource type. If the capability statement does not explicitly support this field the default code = 'no-version'. This indicates that the server does not support versioning for a resource type.
CapabilityStatement.rest.resource.readHistory	0..1	Whether vRead can return past versions	NHS Digital national REST API Capability Statements of kind 'requirements' and server 'instances' MAY support returning past versions of a resource as part of the vRead operation. If the capability statement does not explicitly support this field the default flag = 'false'. This indicates that the server is NOT able to return past versions of the resource as part of the vRead operation.
CapabilityStatement.rest.resource.updateCreate	0..1	If update can commit to a new identity	NHS Digital national REST API Capability Statements of kind 'requirements' and server 'instances' MAY allow clients to create new identities on the server using the updateCreate operation for a resource type. If the capability statement does not explicitly support this field the default flag = 'false'. This indicates that the server does NOT allow clients to create new identities on the server.
CapabilityStatement.rest.resource.conditionalCreate	0..1	If allows/uses conditional create	NHS Digital national REST API Capability Statements of kind 'requirements' and server 'instances' MAY support the conditionalCreate operation for a resource type. If the capability statement does not explicitly support this field the default flag = 'false'. This indicates that the server does NOT support conditional create.
CapabilityStatement.rest.resource.conditionalRead	0..1	not-supported | modified-since | not-match | full-support ConditionalReadStatus (Required)	NHS Digital national REST API Capability Statements of kind 'requirements' and server 'instances' MAY support the conditionalRead operation for a resource type. If the capability statement does not explicitly support this field the default code = 'not-supported'. This indicates that the server does not support conditional read for a resource type.

CapabilityStatement.rest.resource.conditionalUpdate	0..1	If allows/uses conditional update	**NHS Digital national REST API Capability Statements of kind 'requirements' and server 'instances' MAY support the conditionalUpdate operation for a resource type.** **If the capability statement does not explicitly support this field the default flag = 'false'. This indicates that the server does NOT support conditional update.**
CapabilityStatement.rest.resource.conditionalDelete	0..1	not-supported | single | multiple - how conditional delete is supported ConditionalDeleteStatus (Required)	**NHS Digital national REST API Capability Statements of kind 'requirements' and server 'instances' MAY support the conditionalDelete operation for a resource type.** **If the capability statement does not explicitly support this field the default code = 'not-supported'. This indicates that the server does not support conditional delete for a resource type.**
CapabilityStatement.rest.resource.referencePolicy	0.. *	literal | logical | resolves | enforced | local ReferenceHandlingPolicy (Required)	
CapabilityStatement.rest.resource.searchInclude	0.. *	_include values supported by the server	**A national 'requirements' profile MUST specify the list of _include values supported by the system.** **A server 'instance' MUST support the list of _include values supported by the system.**
CapabilityStatement.rest.resource.searchInclude. capabilitystatement-expectation	1..1	**FHIR endpoint capability must be specified within the CapabilityStatement resource using the HL7 maintained 'capabilitystatement-expectation' common extension.** **It defines the level of expectation associated with a given system capability.** http://hl7.org/fhir/STU3/extension-capabilitystatement-expectation.html	**The 'capabilitystatement-expectation' extension is bound to the 'conformance-expectation' value set.** **This value set defines the following codes which must be used when publishing a FHIR capability statement:** http://hl7.org/fhir/STU3/valueset-conformance-expectation.html
CapabilityStatement.rest.resource.searchRevInclude	0.. *	_revinclude values supported by the server	**A national 'requirements' profile MUST specify the list of _revinclude values supported by the system.** **A server 'instance' MUST support the list of _revinclude values supported by the system.**
CapabilityStatement.rest.resource.searchRevInclude.	1..1	**FHIR endpoint capability must be specified within the CapabilityStatement resource**	**The 'capabilitystatement-expectation' extension is bound to the 'conformance-**

capabilitystatement-expectation		using the HL7 maintained 'capabilitystatement-expectation' common extension. It defines the level of expectation associated with a given system capability. http://hl7.org/fhir/STU3/extension-capabilitystatement-expectation.html	expectation' value set. **This value set defines the following codes which must be used when publishing a FHIR capability statement:** http://hl7.org/fhir/STU3/valueset-conformance-expectation.html
CapabilityStatement.rest.resource.searchParam	0.. *	Search parameters supported by implementation	**MUST reference either search parameters defined in the specification, or additional ones defined for/by the implementation.** **MAY reference search parameters for all resources or search result parameters.**
CapabilityStatement.rest.resource.searchParam. capabilitystatement-expectation	**1..1**	**FHIR endpoint capability must be specified within the CapabilityStatement resource using the HL7 maintained 'capabilitystatement-expectation' common extension.** **It defines the level of expectation associated with a given system capability.** http://hl7.org/fhir/STU3/extension-capabilitystatement-expectation.html	**The 'capabilitystatement-expectation' extension is bound to the 'conformance-expectation' value set.** **This value set defines the following codes which must be used when publishing a FHIR capability statement:** http://hl7.org/fhir/STU3/valueset-conformance-expectation.html
CapabilityStatement.rest.resource.searchParam.name	1..1	Name of search parameter	**When specified, MUST match Name of search parameter in STU3 Resource definitions.**
CapabilityStatement.rest.resource.searchParam.definition	0..1	Source of definition for parameter	**MUST be URI that is a formal reference to where this parameter was first defined.** **Definition SHOULD be present in both 'requirements' and'instance' capability statements.**
CapabilityStatement.rest.resource.searchParam.type	1..1	number | date | string | token | reference | composite | quantity | uri SearchParamType (Required)	
CapabilityStatement.rest.resource.searchParam.documentation	0..1	Server-specific usage	
CapabilityStatement.rest.interaction	0.. *	What system operations are supported?	**Out of scope for this version of profile**
CapabilityStatement.rest. interaction.capabilitystatement-expectation	**1..1**	**FHIR endpoint capability must be specified within the CapabilityStatement resource using the HL7 maintained 'capabilitystatement-expectation' common extension.** **It defines the level of expectation associated with a given system capability.** http://hl7.org/fhir/STU3/extension-	**The 'capabilitystatement-expectation' extension is bound to the 'conformance-expectation' value set.** **This value set defines the following codes which must be used when publishing a FHIR capability statement:** http://hl7.org/fhir/STU3/valueset-

		capabilitystatement-expectation.html	conformance-expectation.html
CapabilityStatement.rest.interaction.code	1..1	transaction | batch | search-system | history-system SystemRestfulInteraction (Required)	**Out of scope for this version of profile**
CapabilityStatement.rest.interaction.documentation	0..1	Anything special about operation behaviour	**Out of scope for this version of profile**
CapabilityStatement.rest.searchParam	0.. *	Search parameters for searching all resources	**MUST reference search parameters that apply to all resources - tags, profiles, text search etc.**
CapabilityStatement.rest.operation	0.. *	Definition of an operation or a custom query	**Out of scope for this version of profile**
CapabilityStatement.rest.operation.capabilitystatement-expectation	**1..1**	**FHIR endpoint capability must be specified within the CapabilityStatement resource using the HL7 maintained 'capabilitystatement-expectation' common extension.** **It defines the level of expectation associated with a given system capability.** http://hl7.org/fhir/STU3/extension-capabilitystatement-expectation.html	**The 'capabilitystatement-expectation' extension is bound to the 'conformance-expectation' value set.** **This value set defines the following codes which must be used when publishing a FHIR capability statement:** http://hl7.org/fhir/STU3/valueset-conformance-expectation.html
CapabilityStatement.rest.operation.name	1..1	Name by which the operation/query is invoked	**Out of scope for this version of profile**
CapabilityStatement.rest.operation.definition	1..1	The defined operation/query	**Out of scope for this version of profile**
CapabilityStatement.rest.compartment	0.. *	Compartments served/used by system	**Out of scope for this version of profile**
CapabilityStatement.messaging	0.. *	A description of the messaging capabilities of the solution.	**Out of scope for this version of profile**
CapabilityStatement.document	0.. *	A document definition.	**Out of scope for this version of profile**