Building a CMS-compliant FHIR R4 Provider Directory API

The Da Vinci PDex Plan Net Implementation Guide defines (HL7 International) **9 FHIR R4 profiles that payers must serve through a public, unauthenticated, read-only API to comply with CMS interoperability rules.** CMS-9115-F first mandated provider directory APIs effective July 2021, and CMS-0057-F expanded these requirements with a full API compliance deadline of **January 1, 2027**. (Firely) The API requires no OAuth or SMART on FHIR—it must be openly accessible. (HL7 International) The Firely .NET SDK ((Hl7.Fhir.R4) v6.0.2) is the standard open-source library for building this in .NET 9/ASP.NET Core, (NuGet) and bulk data export ($export) is **not required** for provider directories.

This report covers every profile, data element, regulatory requirement, and implementation pattern needed to build this system.

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1. All 9 PDex Plan Net profiles and their data elements

The IG (STU 1.1.0, package (hl7.fhir.us.davinci-pdex-plan-net#1.1.0)) defines 9 resource profiles. Every profile requires (**meta.lastUpdated**) (1..1 mandatory) and patterns (active = true) for all status fields. The API is GET-only—no write operations. (HL7 International)

1.1 PlannetPractitioner

Base resource: US Core Practitioner (R4)
Canonical: (http://hl7.org/fhir/us/davinci-pdex-plan-net/StructureDefinition/plannet-Practitioner)

Element	Type	Cardinality	Notes
meta.lastUpdated	instant	**1..1**	Mandatory
identifier	Identifier	**1..***	Required; NPI slice (system=http://hl7.org/fhir/ sid/us-npi))
identifier.type	CodeableConcept	0..1	MS
identifier.system	uri	**1..1**	Required within identifier
identifier.value	string	**1..1**	Required within identifier
active	boolean	**1..1**	Fixed: true
name	HumanName	**1..***	Required
name.text	string	0..1	MS
name.family	string	**1..1**	Required (US Core)
name.given	string	0..*	MS
telecom	ContactPoint	0..*	MS
telecom extensions	contactpoint-availabletime, via-intermediary	0..*	MS
address	Address	0..*	MS
address extension	geolocation	0..1	Standard FHIR extension
qualification	BackboneElement	0..*	MS
qualification.identifier	Identifier	0..*	MS
qualification.code	CodeableConcept	**1..1**	Binding: IndividualSpecialtyAndDegreeLicenseCertificate

			IndividualSpecialtyAndDegreeLicenseCertificate (extensible)
qualification.period	Period	0..1	MS
qualification.issuer	Reference(Organization)	0..1	MS
qualification extension	practitioner-qualification (status, period, whereValid)	0..1	MS
communication	CodeableConcept	0..*	MS
communication extension	communication-proficiency	0..1	Binding: LanguageProficiencyVS (required)

Search parameters: name , family , given , identifier , qualification-code , qualification-issuer , qualification-status , qualification-wherevalid-code

Interactions: read (SHALL), search-type (SHALL), vread (SHOULD)

1.2 PlannetPractitionerRole

Base resource: PractitionerRole (R4)—intentionally NOT US Core PractitionerRole (which over-constrains for directory use) FHIR

Canonical: http://hl7.org/fhir/us/davinci-pdex-plan-net/StructureDefinition/plannet-PractitionerRole

Element	Type	Cardinality	Notes
meta.lastUpdated	instant	**1..1**	Mandatory
active	boolean	**1..1**	Fixed: true
period	Period	0..1	MS — network participat
practitioner	Reference(PlannetPractitioner)	0..1	MS
organization	Reference(PlannetOrganization)	0..1	MS
code	CodeableConcept	0..*	Binding: PractitionerRol (extensible)
specialty	CodeableConcept	0..*	Binding: **IndividualAndGroupS** (required)
location	Reference(PlannetLocation)	0..*	MS
healthcareService	Reference(PlannetHealthcareService)	0..*	MS
telecom	ContactPoint	0..*	MS (with contactpoint-availabletime and via-intermediary extension
telecom.system	code	0..1	MS
telecom.value	string	0..1	MS
availableTime.daysOfWeek	code	0..*	MS
availableTime.allDay	boolean	0..1	MS
availableTime.availableStartTime	time	0..1	MS
availableTime.availableEndTime	time	0..1	MS

endpoint	Reference(PlannetEndpoint)	0..*	MS
identifier.type / .value	—	0..*	MS
Extension: newpatients	Complex (acceptingPatients, fromNetwork, characteristics)	0..*	MS
Extension: network-reference	Reference(PlannetNetwork)	0..*	**Critical—links practiti network**
Extension: qualification	Complex (code, issuer, status, period, whereValid)	0..*	MS

Search parameters: practitioner, organization, location, service, network, role, specialty, endpoint, practitioner-new-patient, practitioner-new-patient-from-network, practitioner-qualification-code

Interactions: read (SHALL), search-type (SHALL), vread (SHOULD)

1.3 PlannetOrganization

Base resource: US Core Organization

Canonical: http://hl7.org/fhir/us/davinci-pdex-plan-net/StructureDefinition/plannet-Organization