dallas
Architecture Reconciliation

Nigel Dallard

i-focus

7th November 2013

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Background

- Approaching half-way point of the *dallas* programme
- Increasing pressure on *dallas* communities to show progress towards the cross-programme interoperability originally envisaged

and

- Increasing pressure on *i-focus* to produce more normative specifications to support above
  - and to assess compliance against these specs

Current state of play

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Current State of Play

- Five architectures with *dallas*:
  - i-focus *dallas* reference architecture
  - Year Zero architecture
  - More Independent architecture
  - Living It Up architecture
  - Warm Neighbourhoods architecture
- NHS England
  - Health & Social Care Digital Service architecture

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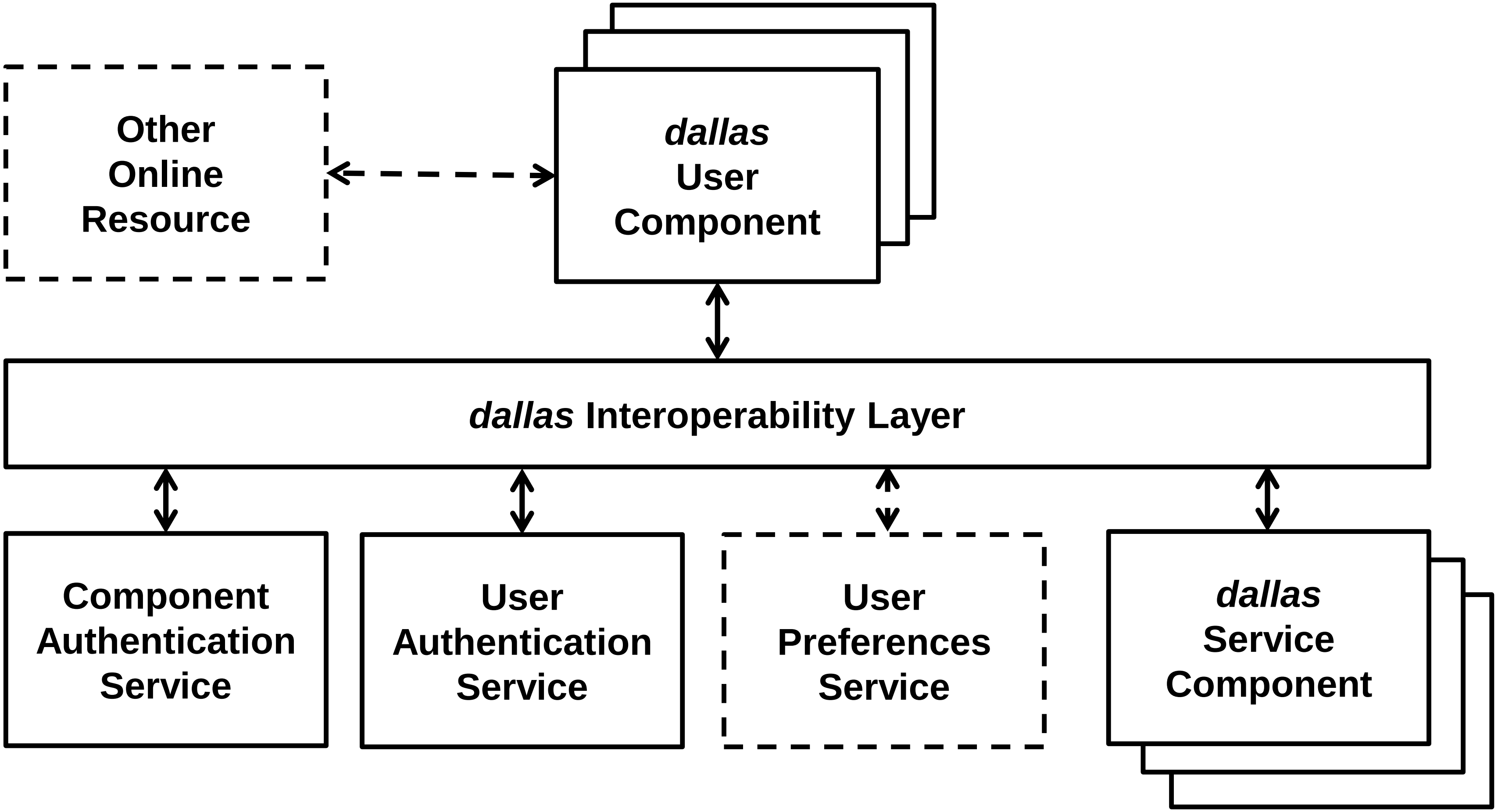
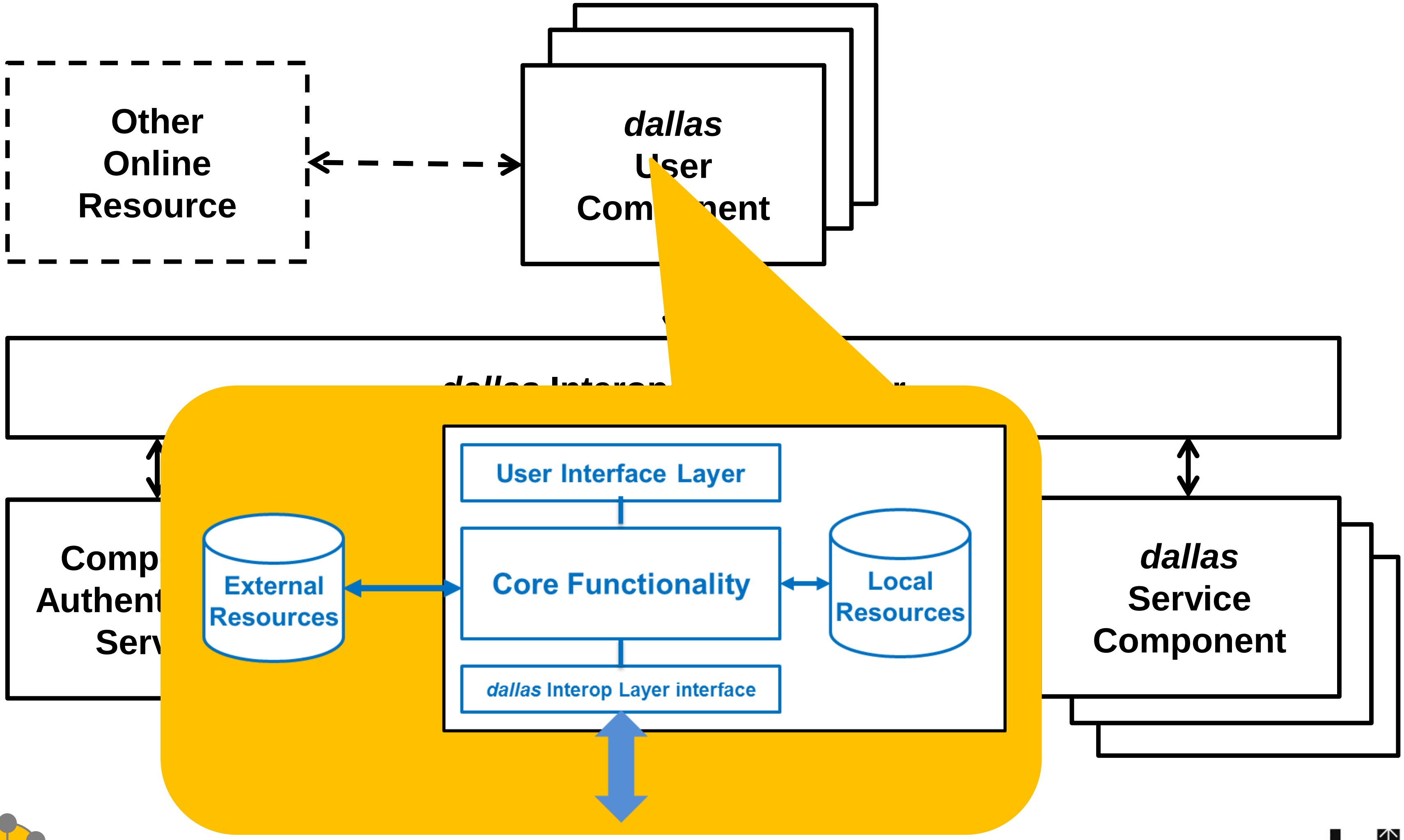
i-focus *dallas* Reference Architecture


Other Online Resource
dallas User Component
dallas Interoperability Layer
Component Authentication Service
User Authentication Service
User Preferences Service
dallas Service Component

i-focus *dallas* Reference Architecture



Other Online Resource

dallas
User
Com nent

***dallas* Interop**

Comp
Authent
Serv

dallas
Service Component

User Interface Layer

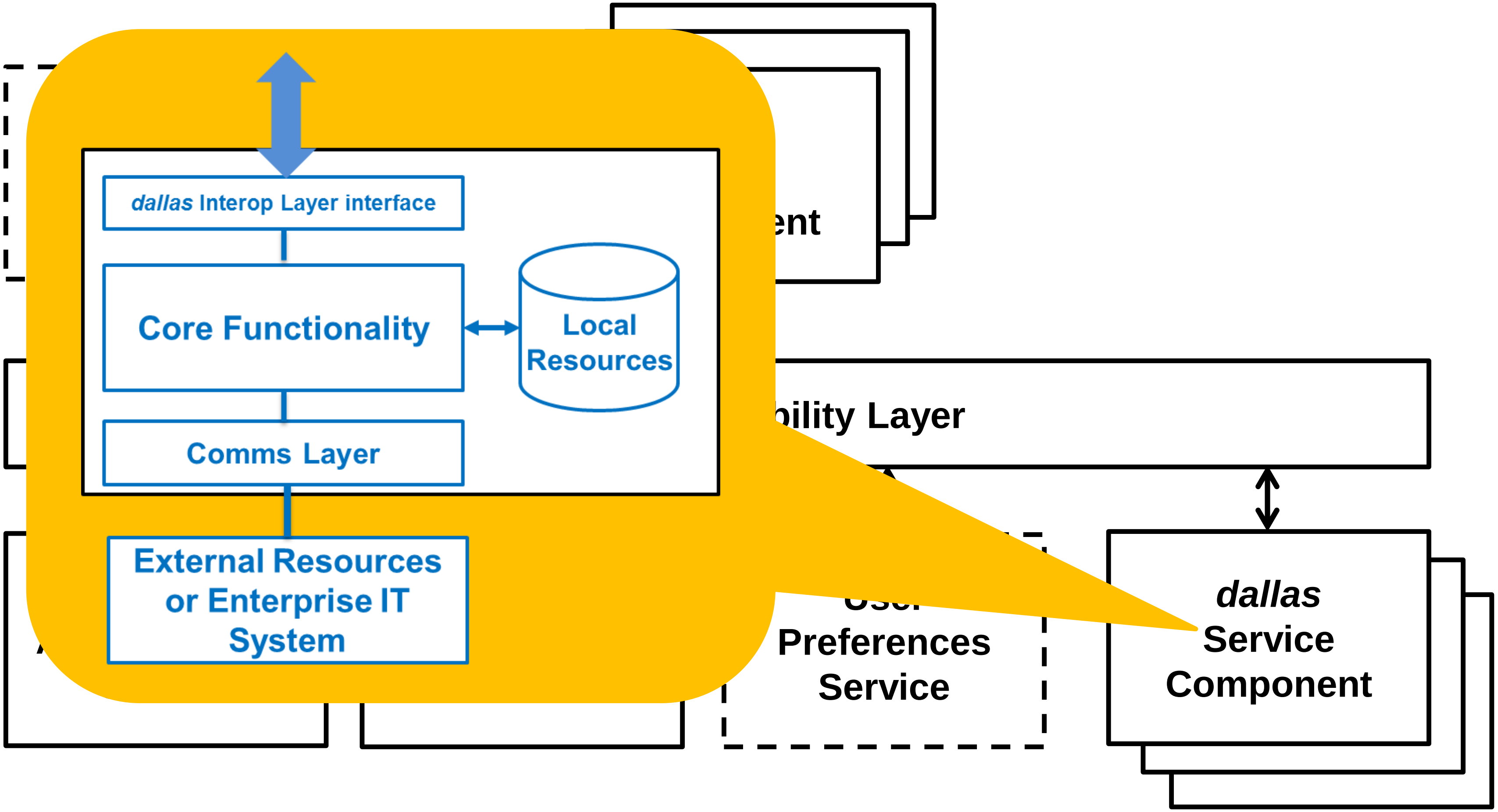
External Resources

Core Functionality

Local Resources

***dallas* Interop Layer interface**

i-focus *dallas* Reference Architecture



ent
bility Layer
User
Preferences
Service
dallas
Service
Component
dallas Interop Layer interface
Core Functionality
Local
Resources
Comms Layer
External Resources
or Enterprise IT
System

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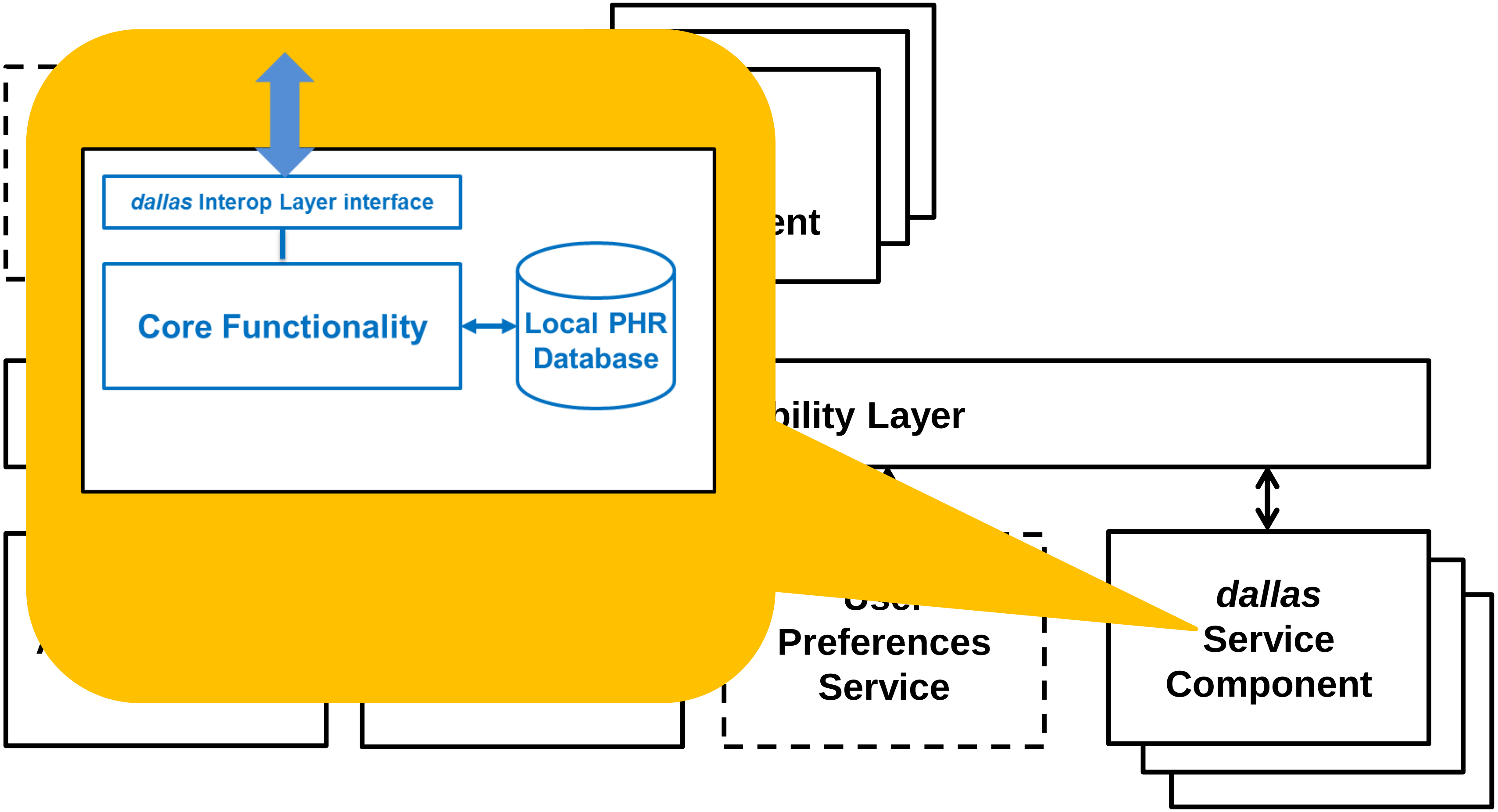
i-focus *dallas* Reference Architecture



dallas Interop Layer interface
Core Functionality
Local PHR Database
ent
bility Layer
Preferences Service
dallas Service Component

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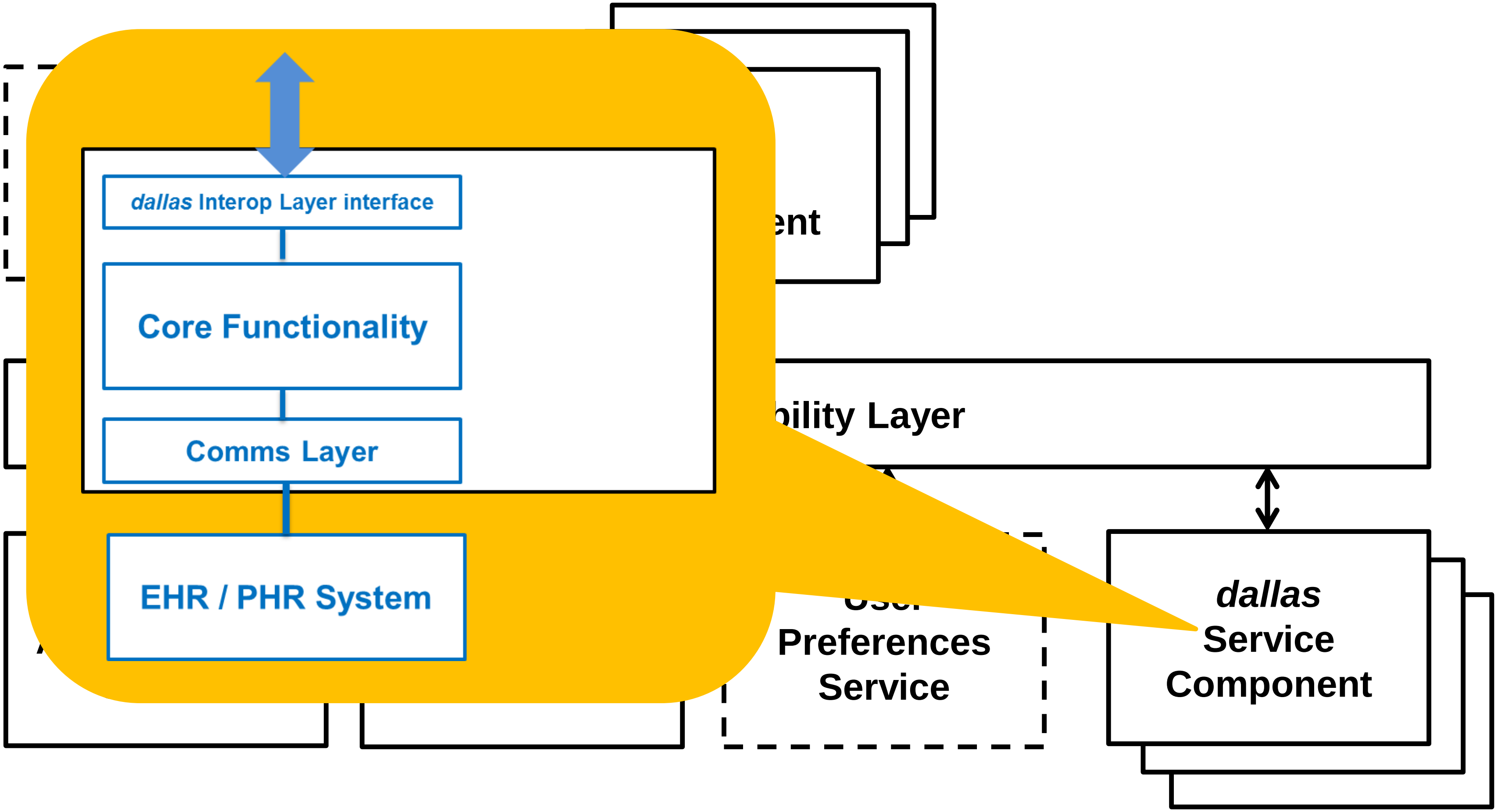
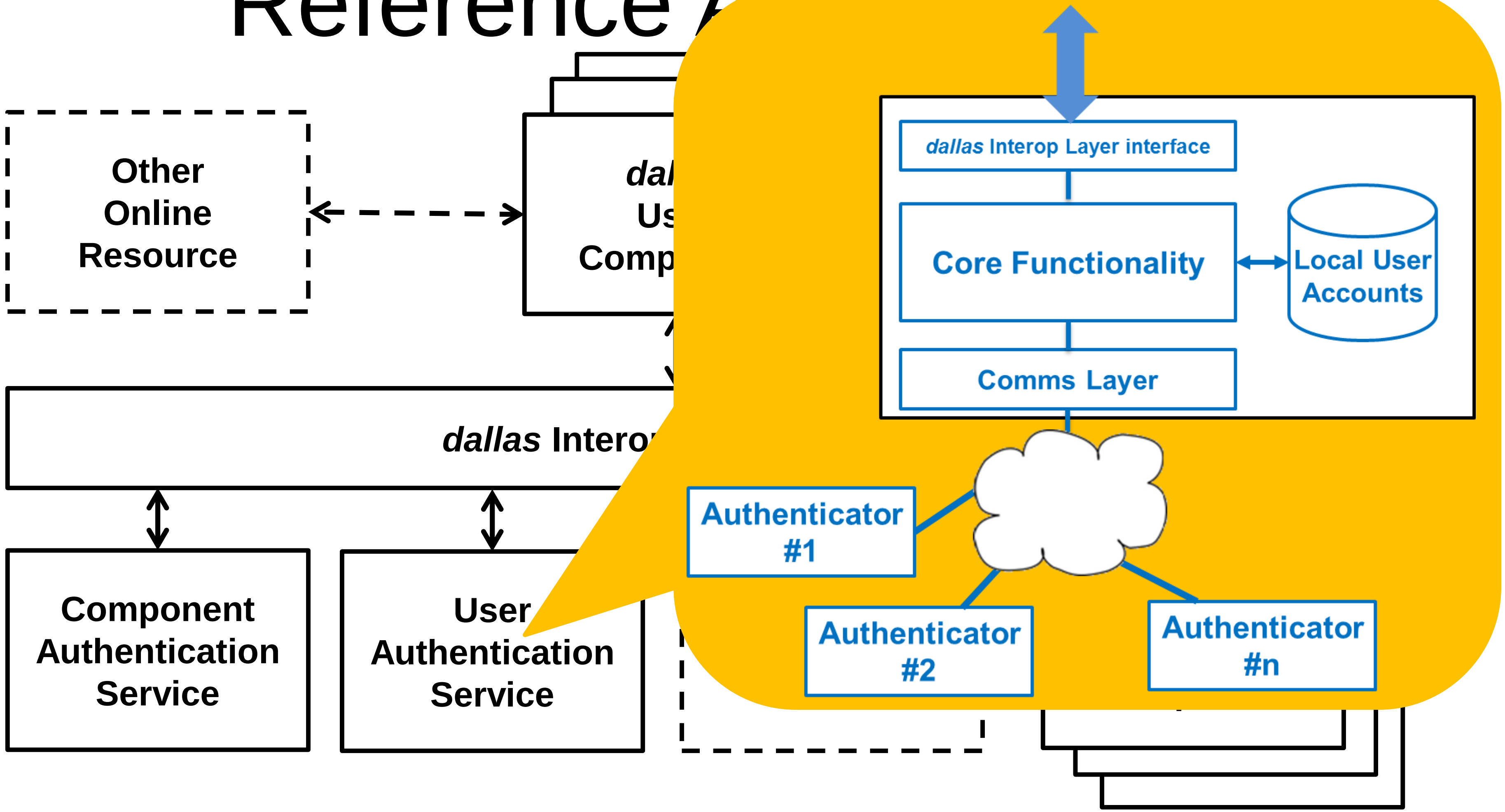
i-focus *dallas* Reference Architecture


dallas Interop Layer interface
Core Functionality
Comms Layer
EHR / PHR System
ent
bility Layer
User Preferences Service
dallas Service Component

© 2013 i-focus

i-focus *dallas* Reference A



Other Online Resource

dal
Us
Comp

dallas Interop

Component Authentication Service

User Authentication Service

dallas Interop Layer interface

Core Functionality

Local User Accounts

Comms Layer

Authenticator #1

Authenticator #2

Authenticator #n

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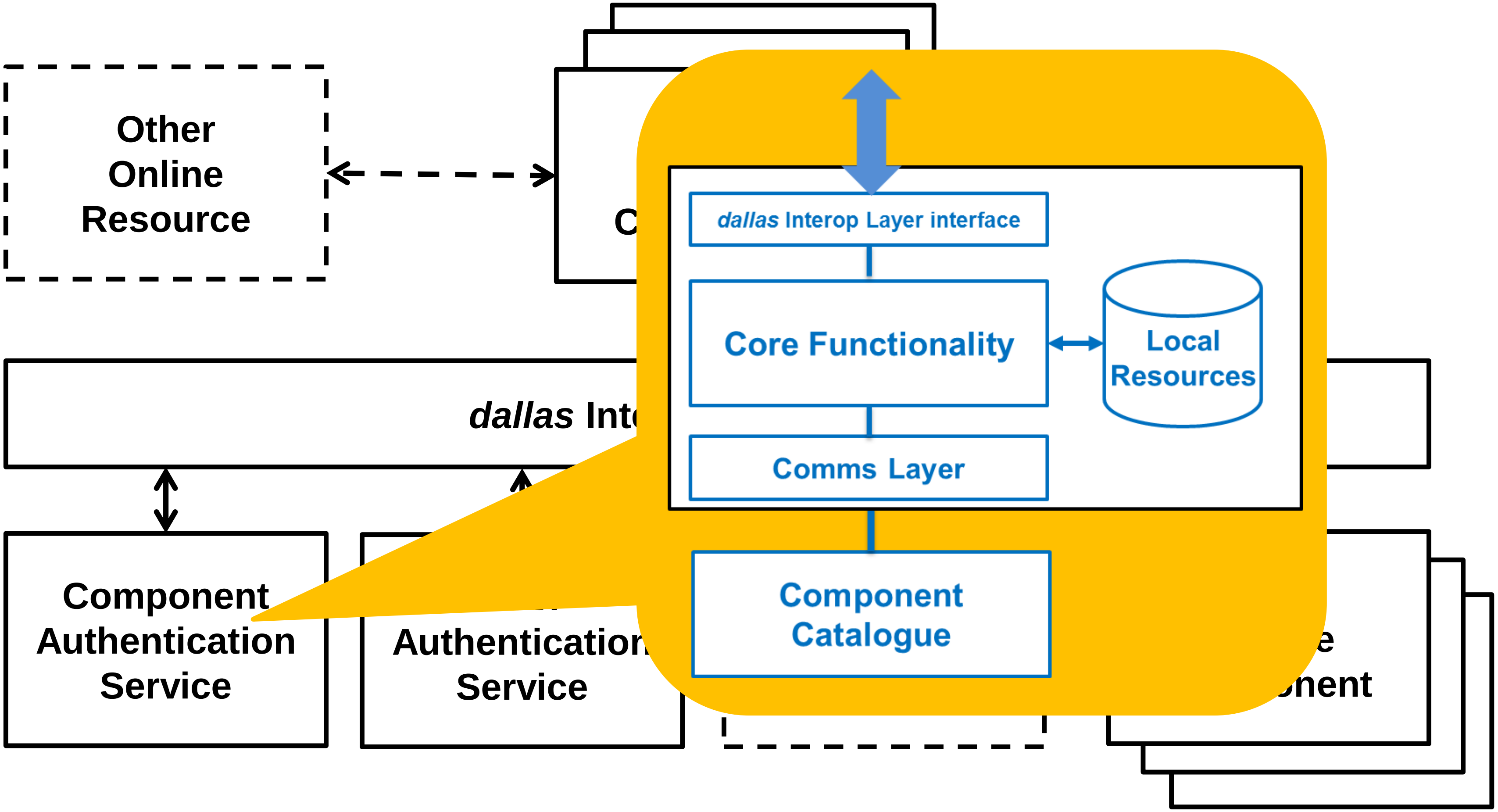
i-focus *dallas* Reference Architecture



Other Online Resource

C

***dallas* Int**

Component Authentication Service

Authenticatio Service

e

onent

dallas Interop Layer interface

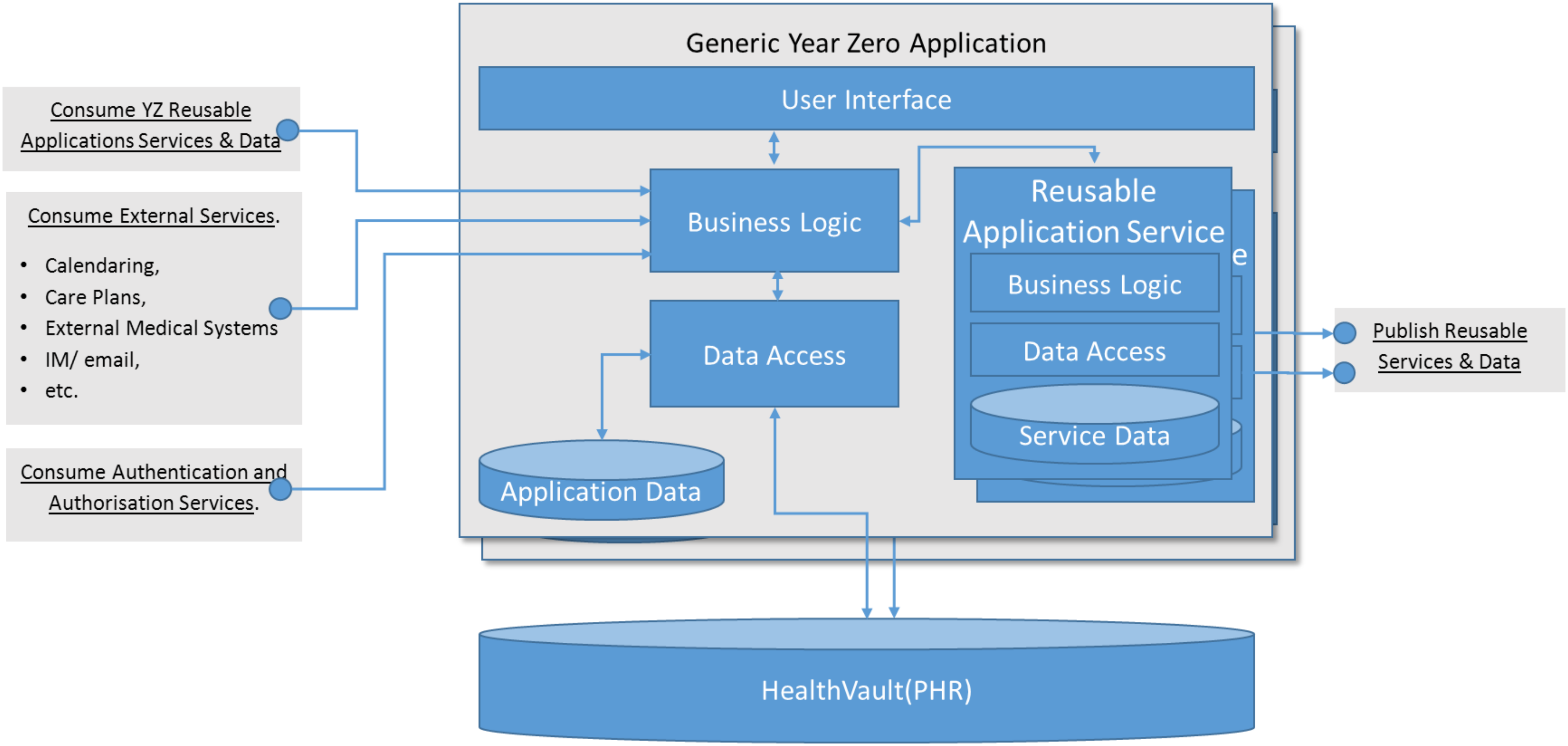
Core Functionality

Local Resources

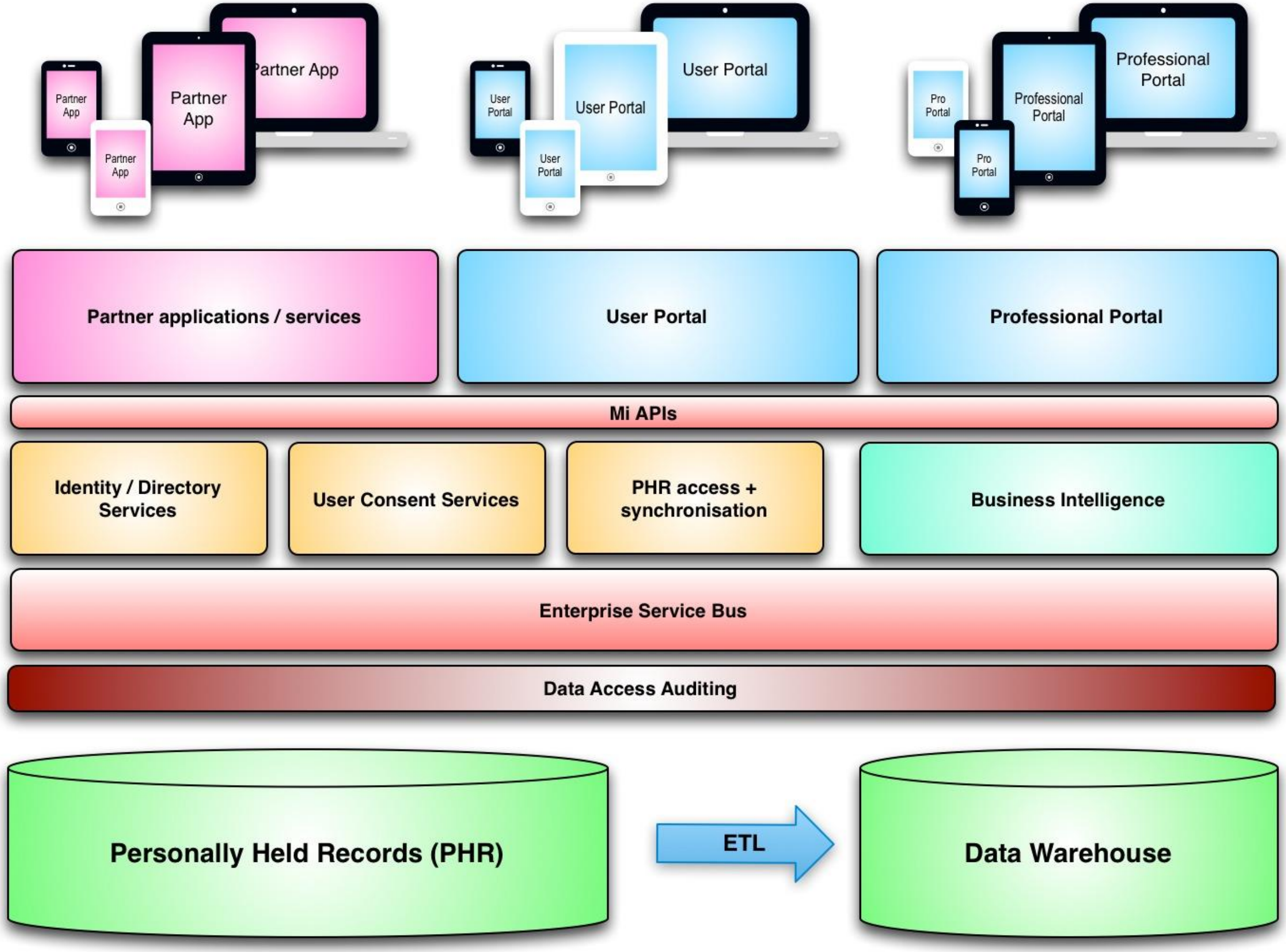
Comms Layer

Component Catalogue

Year Zero Architecture


Generic Year Zero Application
User Interface
Business Logic
Data Access
Application Data
Reusable Application Service
Business Logic
Data Access
Service Data
HealthVault(PHR)
Consume YZ Reusable Applications Services & Data
Consume External Services.
Calendaring,
Care Plans,
External Medical Systems
IM/ email,
etc.
Consume Authentication and Authorisation Services.
Publish Reusable Services & Data

More Independent Architecture


Partner App
Partner App
Partner App
Partner App
User Portal
User Portal
User Portal
User Portal
Professional Portal
Professional Portal
Pro Portal
Pro Portal

Partner applications / services

User Portal

Professional Portal

Mi APIs

Identity / Directory Services

User Consent Services

PHR access + synchronisation

Business Intelligence

Enterprise Service Bus

Data Access Auditing

Personally Held Records (PHR)

ETL

Data Warehouse

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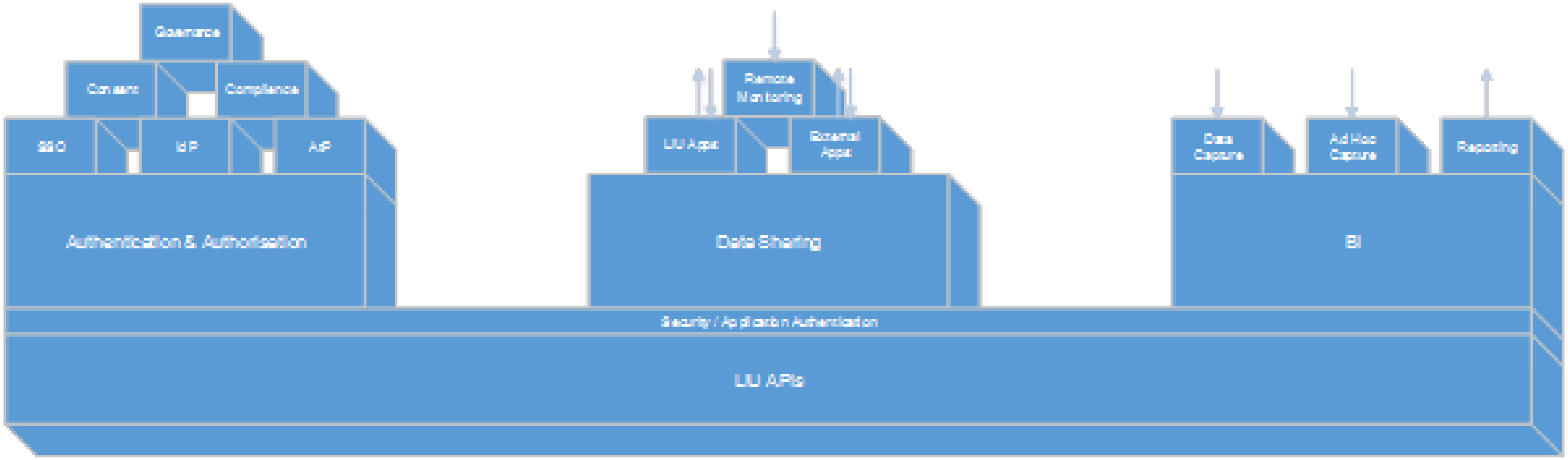
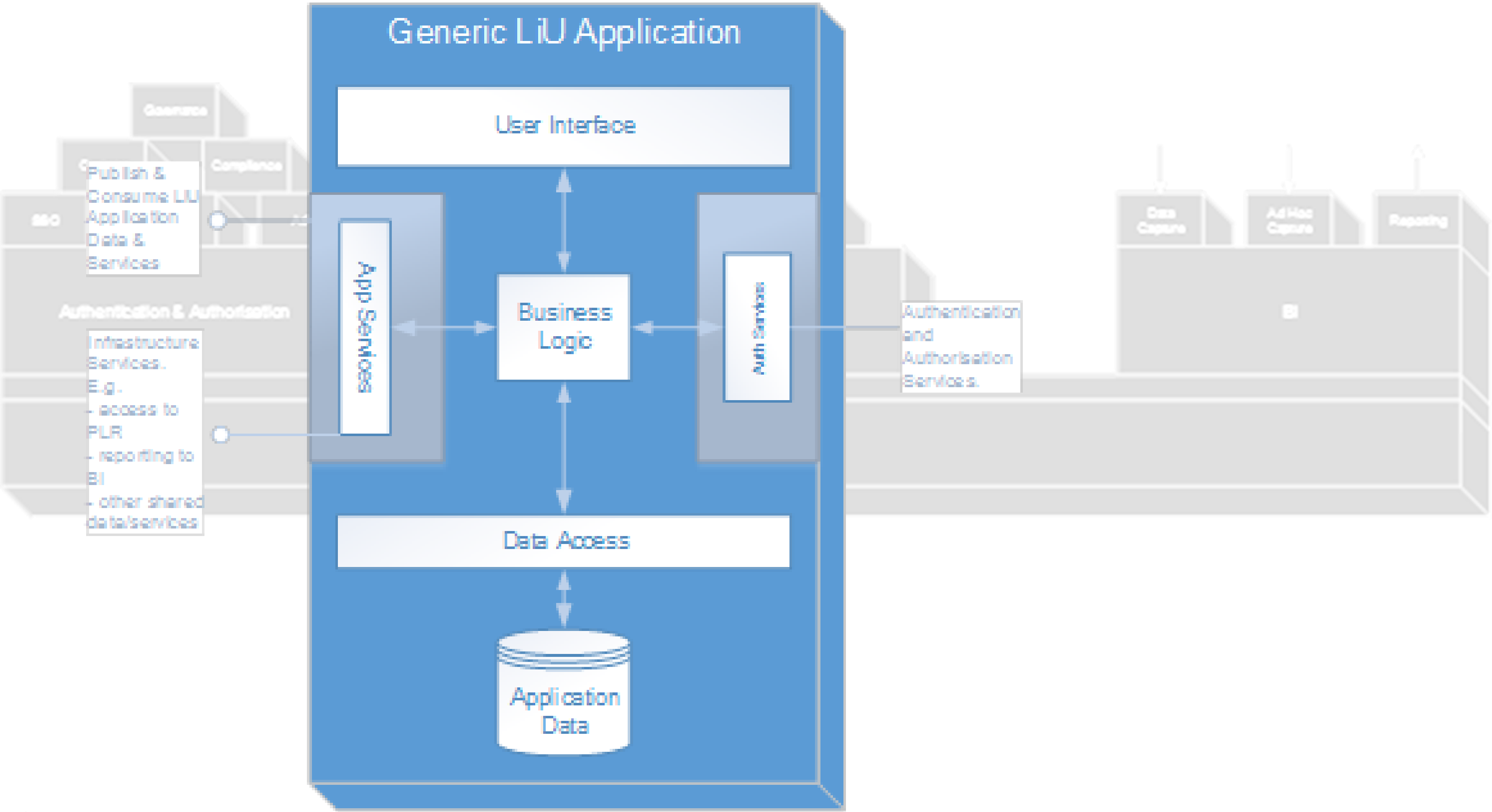
Living It Up Architecture


Governance
Consent
Compliance
SSO
IdP
AtP
Authentication & Authorisation
Remote Monitoring
LIU Apps
External Apps
Data Sharing
Data Capture
Ad Hoc Capture
Reporting
BI
Security / Application Authentication
LIU APIs

Living It Up Architecture

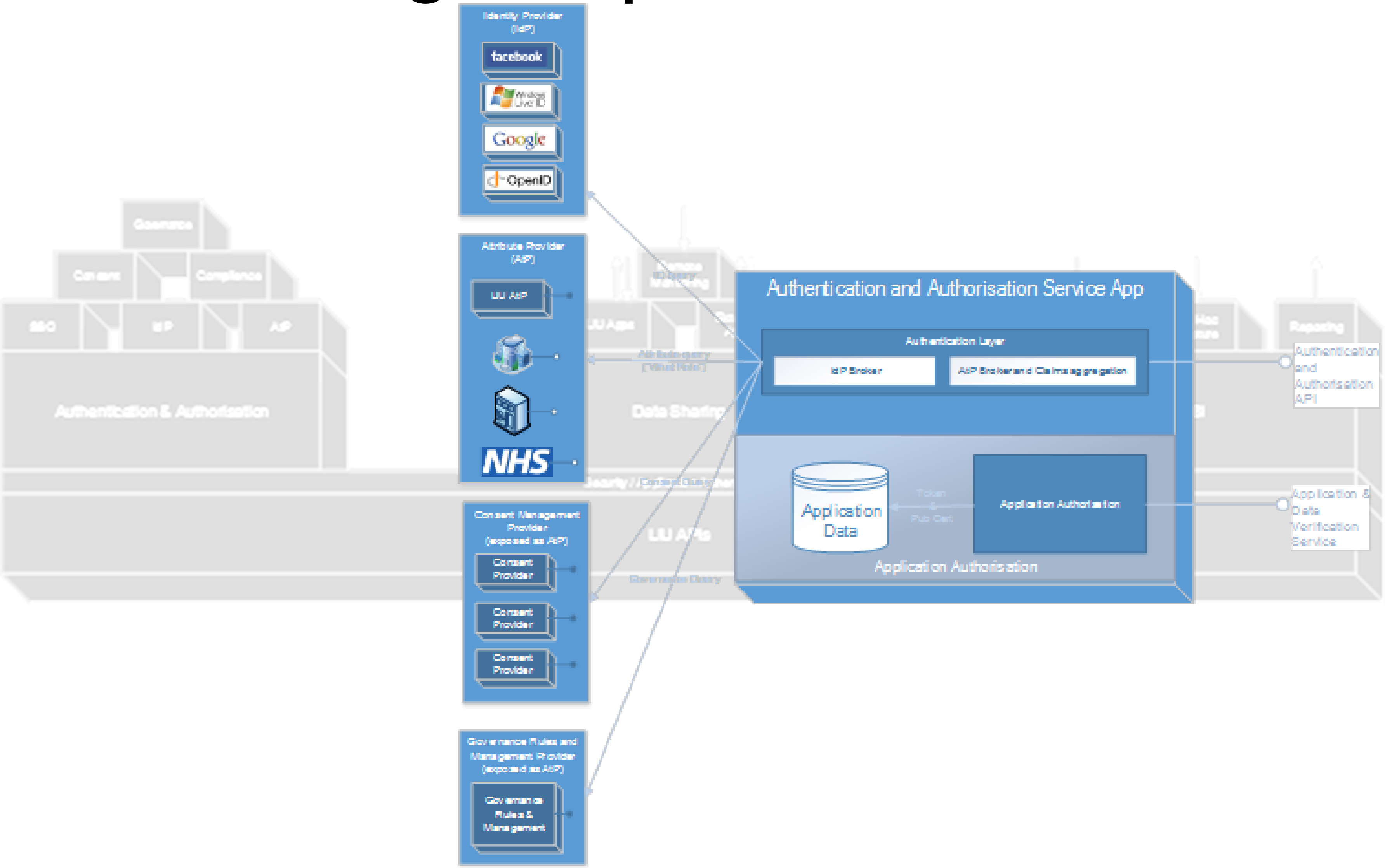

Generic LiU Application
User Interface
App Services
Business Logic
Auth Services
Data Access
Application Data
Governance
Compliance
SSO
Authentication & Authorisation
Data Capture
Ad Hoc Capture
Reporting
BI

Publish & Consume LiU Application Data & Services

Infrastructure Services. E.g.
- access to PLR
- reporting to BI
- other shared data/services

Authentication and Authorisation Services.

Living It Up Architecture


Identity Provider (IdP)
facebook
Windows Live ID
Google
OpenID
Attribute Provider (AtP)
LIU AtP
NHS
Consent Management Provider (exposed as AtP)
Consent Provider
Consent Provider
Consent Provider
Governance Rules and Management Provider (exposed as AtP)
Governance Rules & Management
Governance
Consent
Compliance
SSO
IdP
AtP
Authentication & Authorisation
Data Sharing
LIU APIs
LIU Apps
Reporting
Attribute query (Virtual Role)
Governance Query
Authentication and Authorisation Service App
Authentication Layer
IdP Broker
AtP Broker and Claims aggregation
Application Data
Token & Pub Cert
Application Authorisation
Application Authorisation
Authentication and Authorisation API
Application & Data Verification Service

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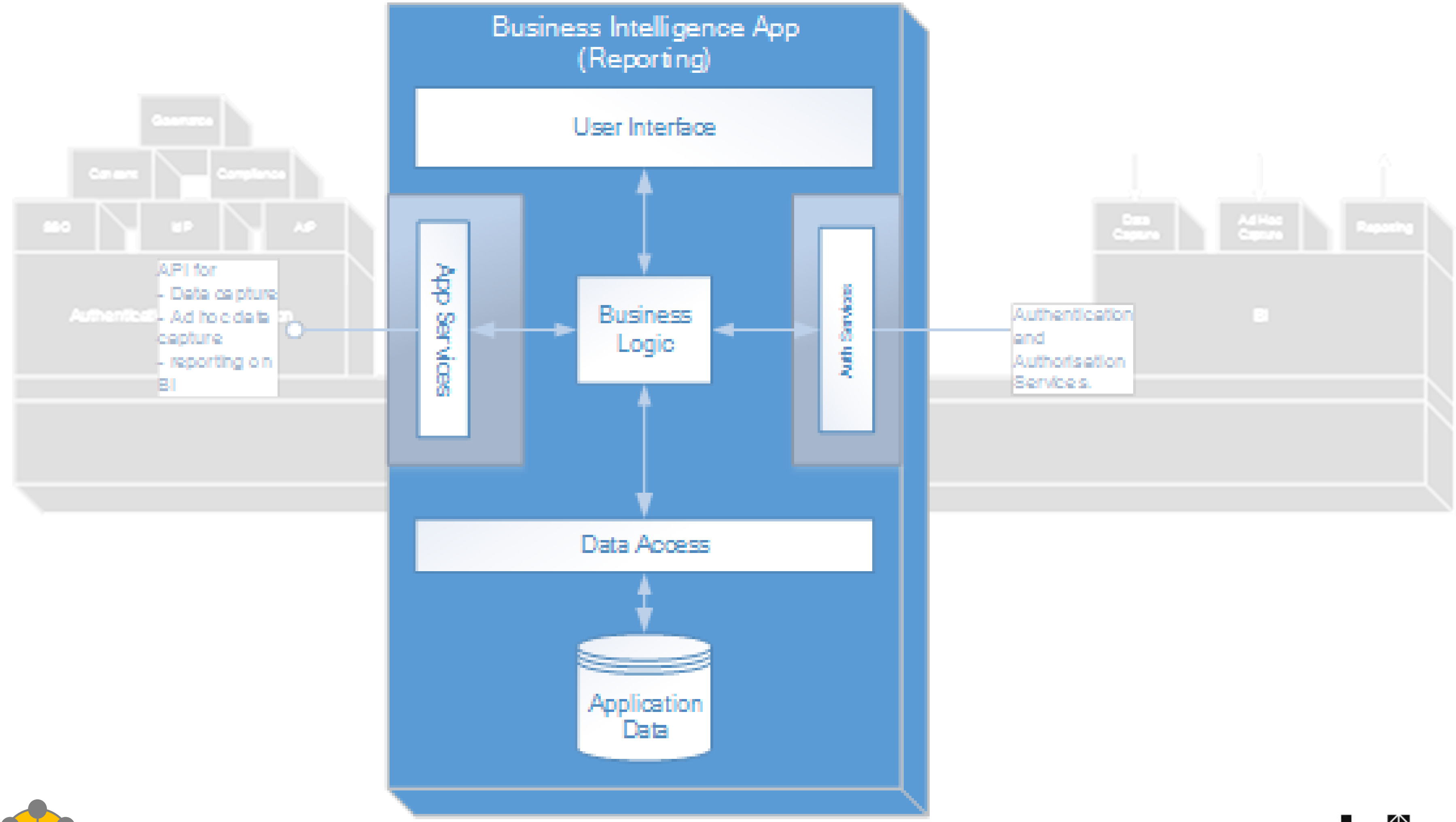
Living It Up Architecture


Business Intelligence App
(Reporting)
User Interface
App Services
Business Logic
Auth Services
Data Access
Application Data
Governance
Content
Compliance
SSO
IdP
AP
Authentication
Data Capture
Ad Hoc Capture
Reporting
BI

API for
- Data capture
- Ad hoc data capture
- reporting on BI

Authentication and Authorisation Services.

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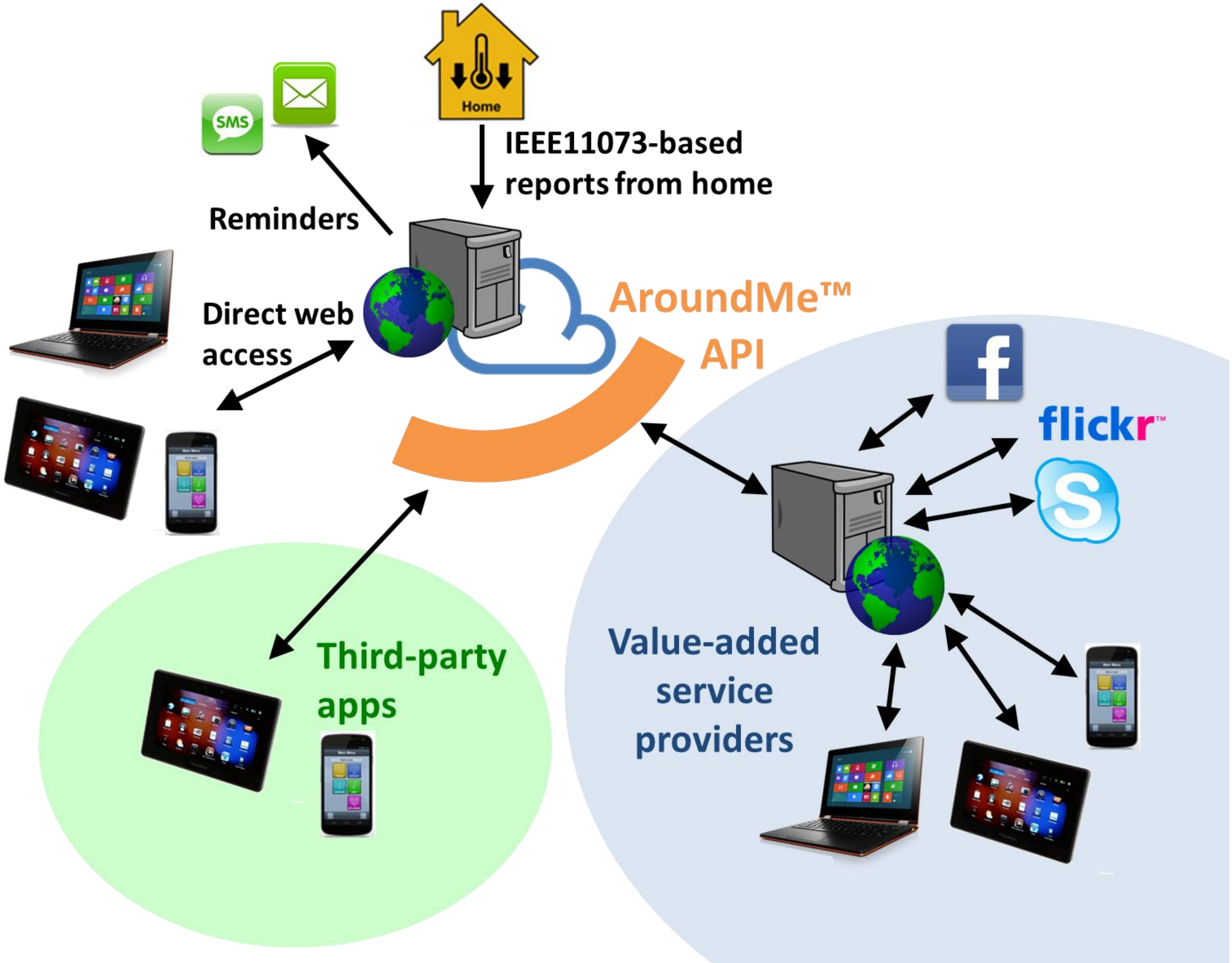
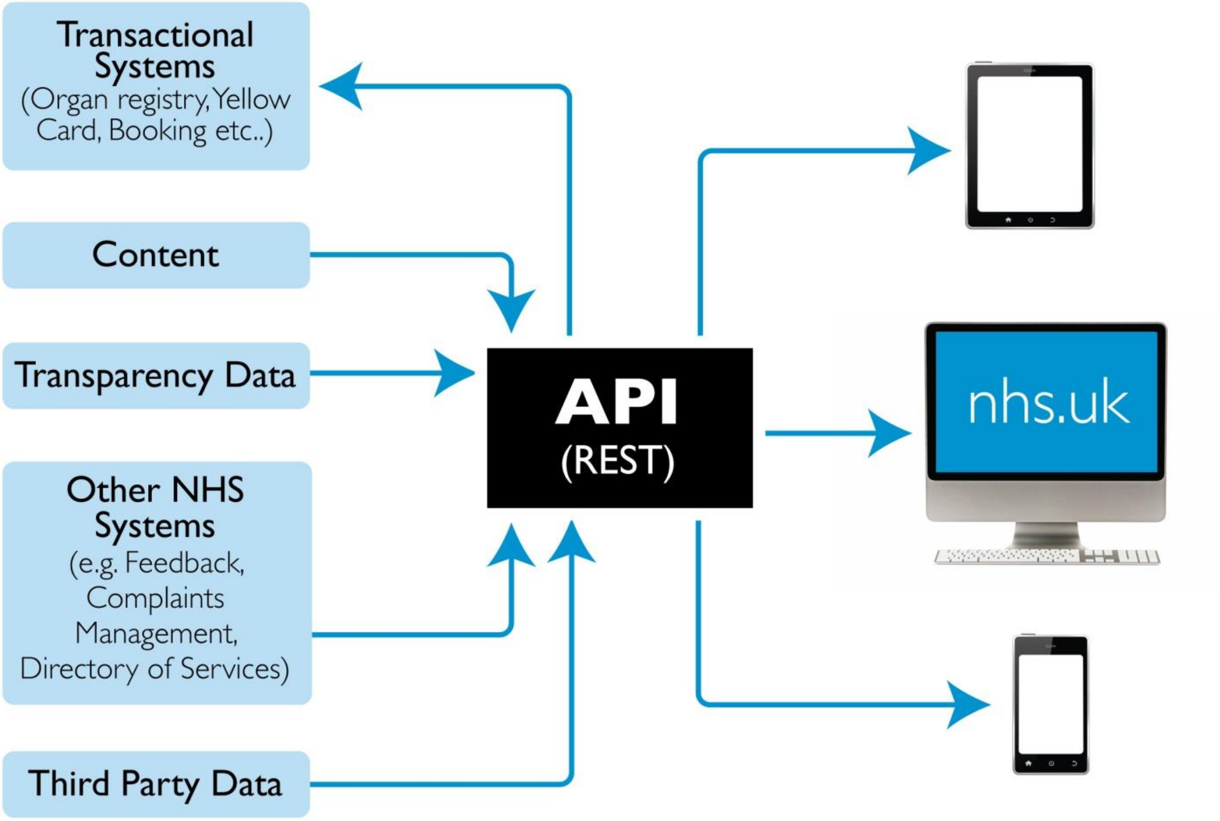
dallas

Warm Neighbourhoods Architecture


SMS
Home
IEEE11073-based
reports from home
Reminders
Direct web
access
AroundMe™
API
flickr™
Third-party
apps
Value-added
service
providers

Health & Social Care Digital Service Architecture



Transactional Systems
(Organ registry, Yellow Card, Booking etc..)

Content

Transparency Data

Other NHS Systems
(e.g. Feedback, Complaints Management, Directory of Services)

Third Party Data

API
(REST)

nhs.uk

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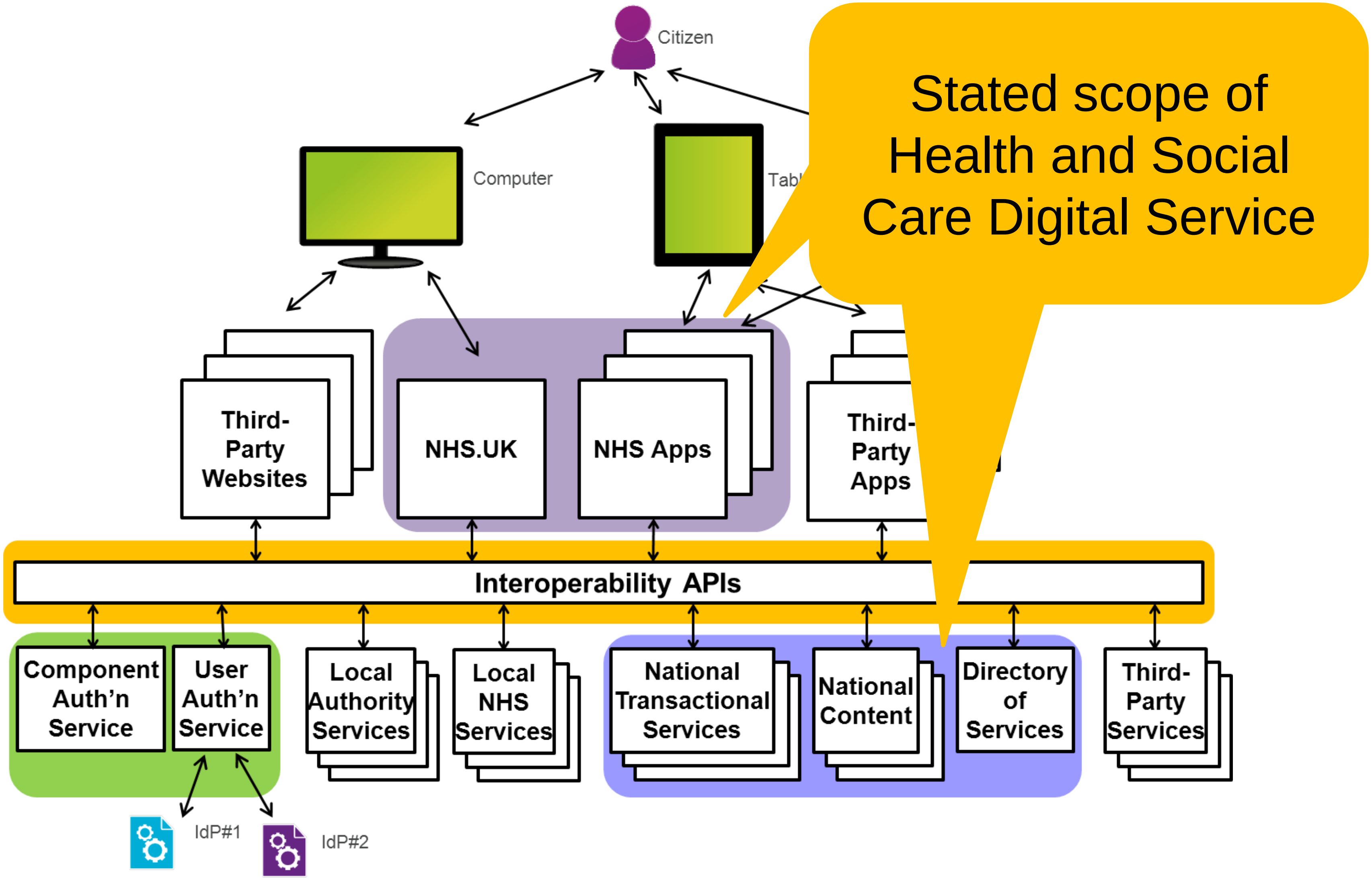
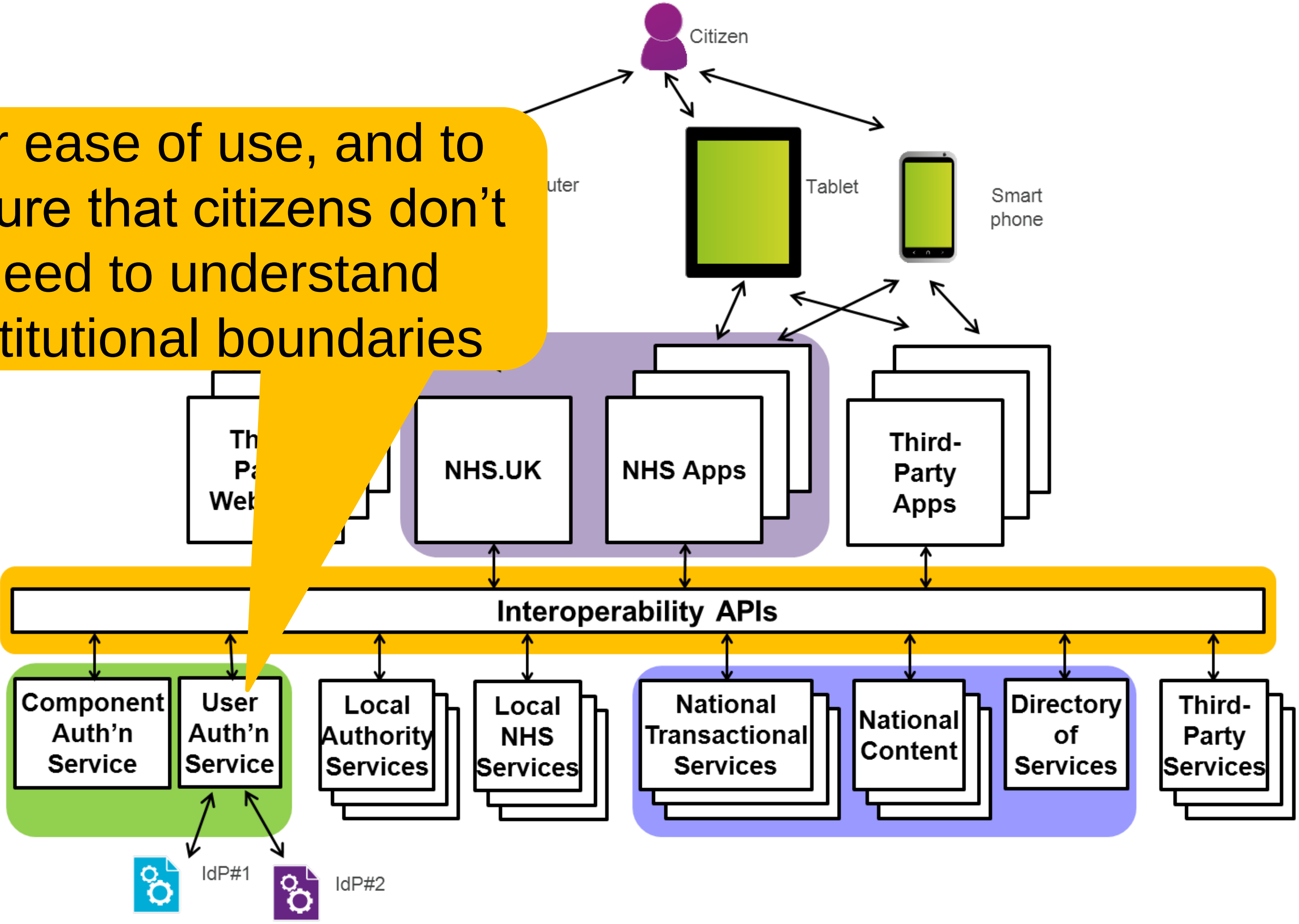
HSCDS within wider environment


Citizen
Computer
Tabl
Third-Party Websites
NHS.UK
NHS Apps
Third-Party Apps
Interoperability APIs
Component Auth'n Service
User Auth'n Service
Local Authority Services
Local NHS Services
National Transactional Services
National Content
Directory of Services
Third-Party Services
IdP#1
IdP#2

Stated scope of Health and Social Care Digital Service

HSCDS within wider environment



For ease of use, and to ensure that citizens don't need to understand institutional boundaries

Citizen
uter
Tablet
Smart phone
Th
Pa
Web
NHS.UK
NHS Apps
Third-Party Apps
Interoperability APIs
Component Auth'n Service
User Auth'n Service
Local Authority Services
Local NHS Services
National Transactional Services
National Content
Directory of Services
Third-Party Services
IdP#1
IdP#2

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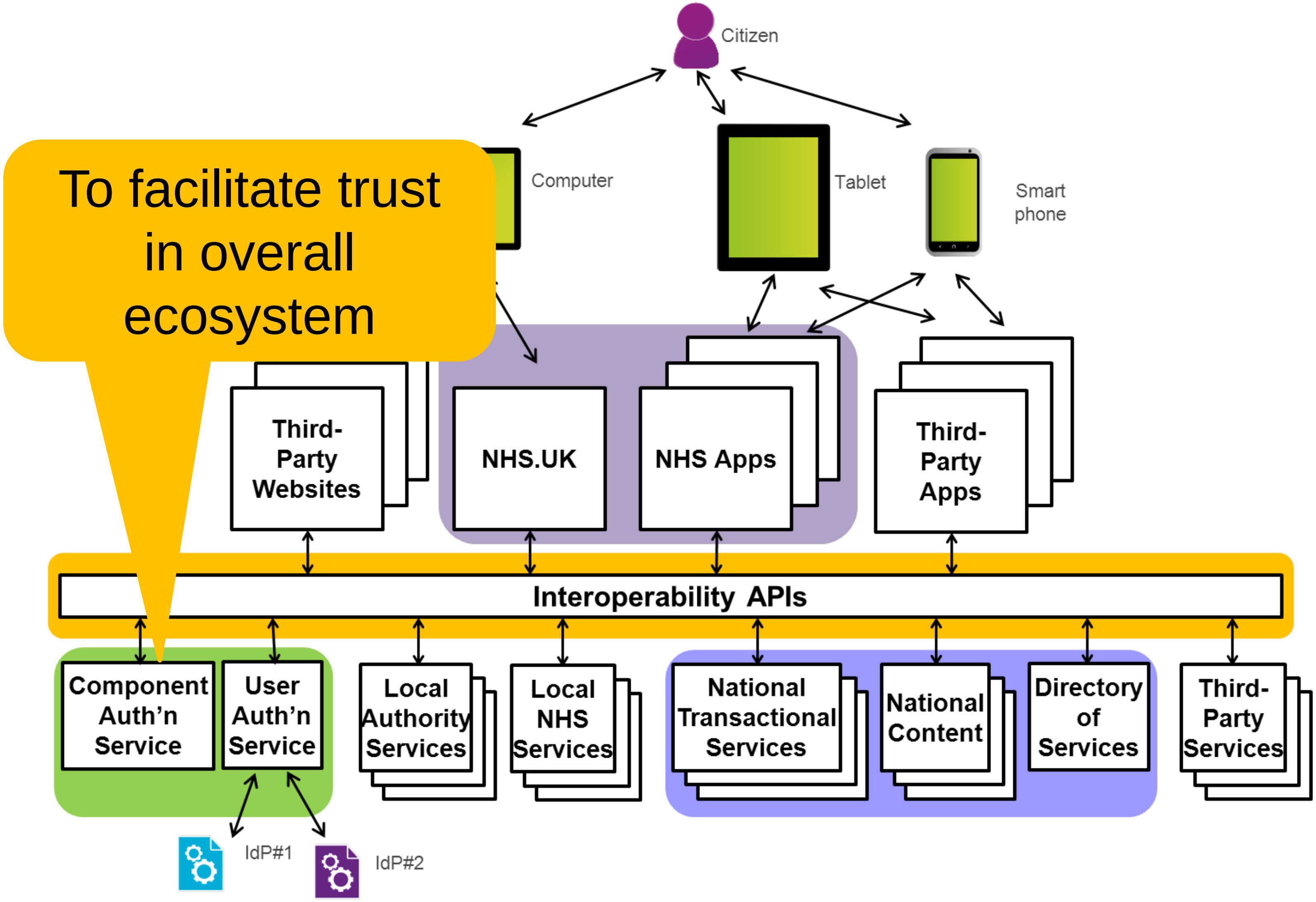
HSCDS within wider environment


To facilitate trust in overall ecosystem

Citizen
Computer
Tablet
Smart phone
Third-Party Websites
NHS.UK
NHS Apps
Third-Party Apps
Interoperability APIs
Component Auth'n Service
User Auth'n Service
Local Authority Services
Local NHS Services
National Transactional Services
National Content
Directory of Services
Third-Party Services
IdP#1
IdP#2

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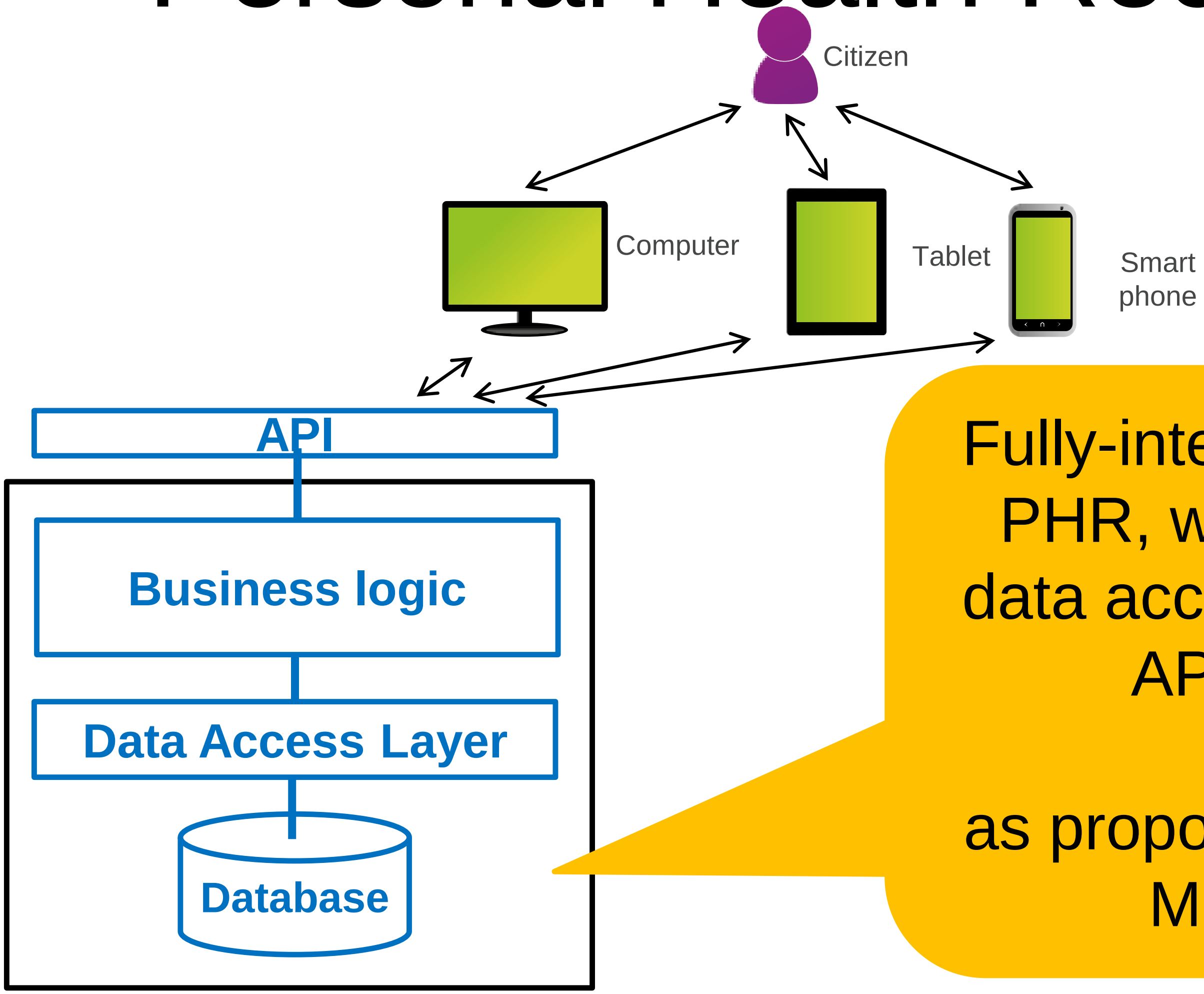
Reconciliation

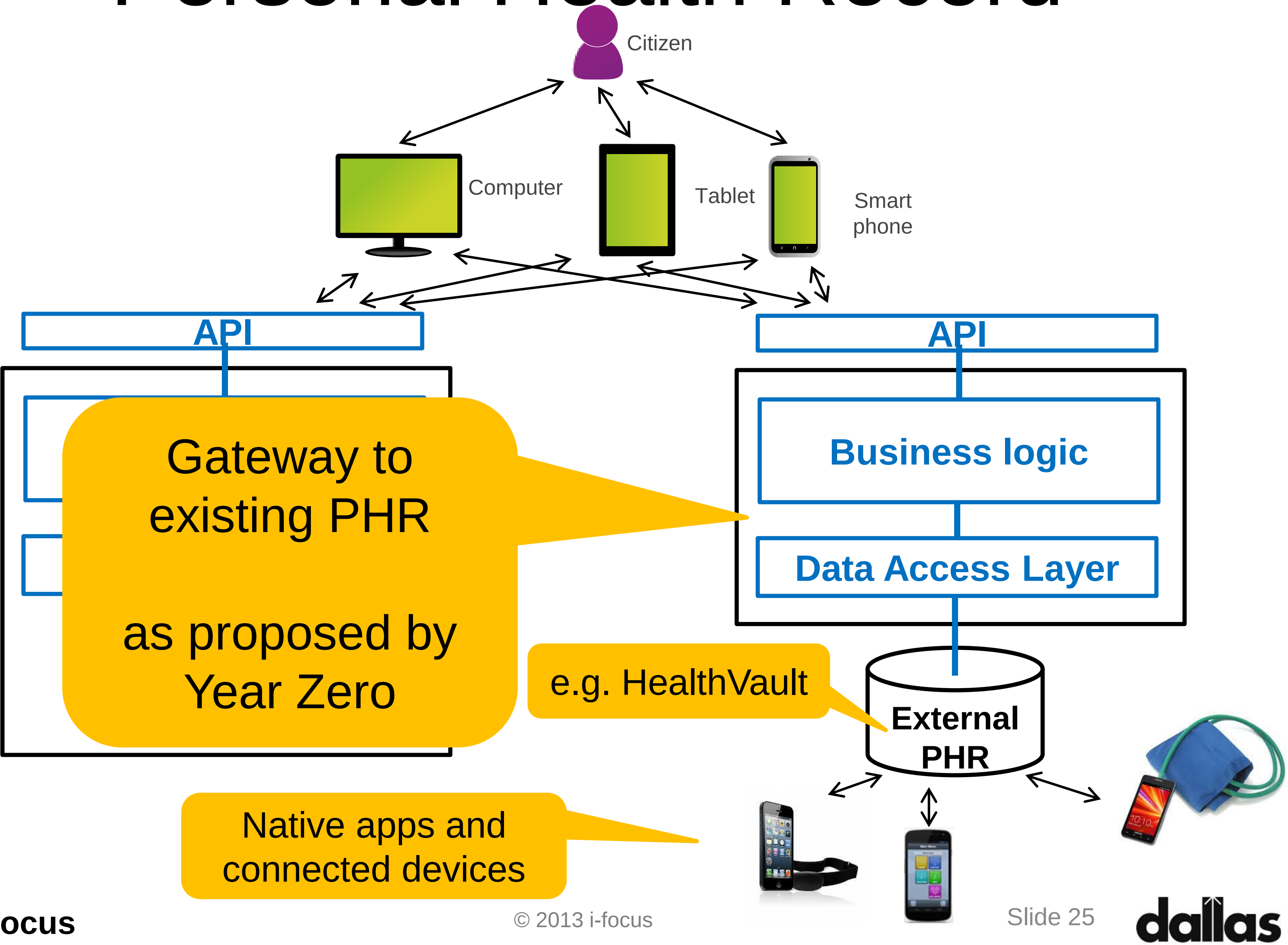
Personal Health Record


Citizen
Computer
Tablet
Smart
phone
API
Business logic
Data Access Layer
Database

Fully-integrated PHR, with all data access via API

as proposed by Mi

Personal Health Record


Citizen
Computer
Tablet
Smart phone
API
API
Business logic
Data Access Layer
External PHR

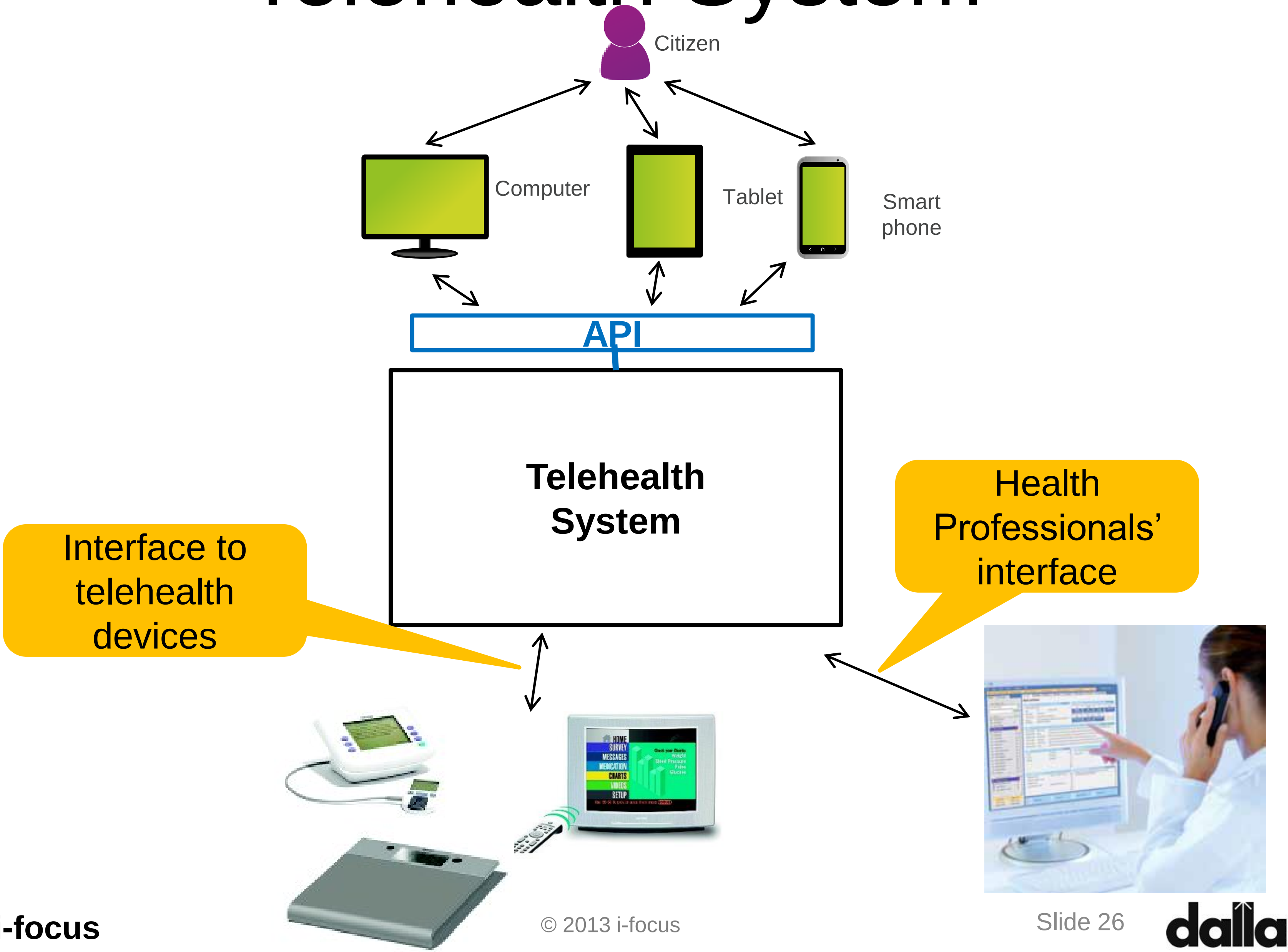
Gateway to existing PHR

as proposed by Year Zero

e.g. HealthVault

Native apps and connected devices

Telehealth System



Citizen

Computer

Tablet

Smart
phone

API

**Telehealth
System**

Interface to
telehealth
devices

Health
Professionals'
interface

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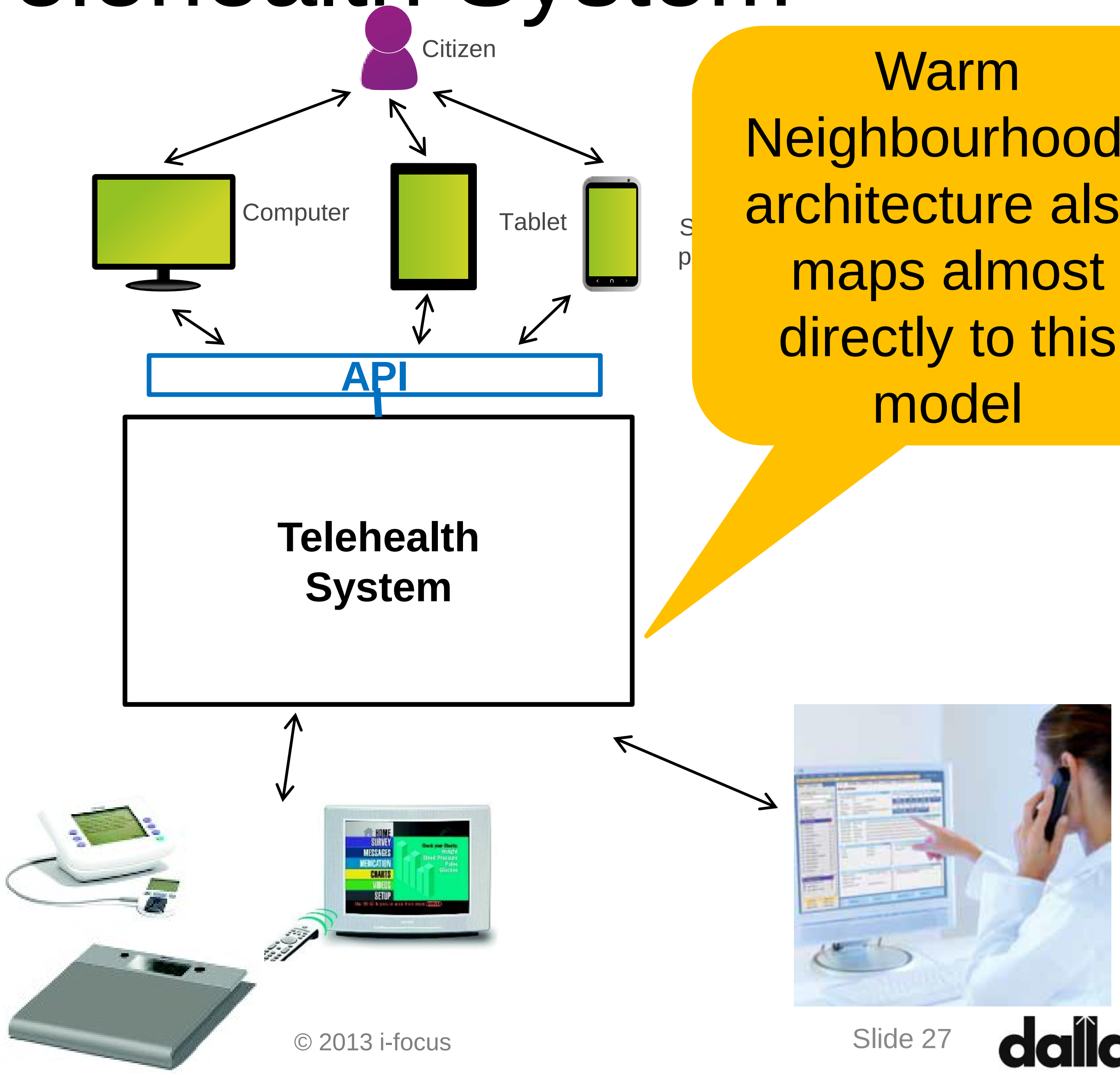
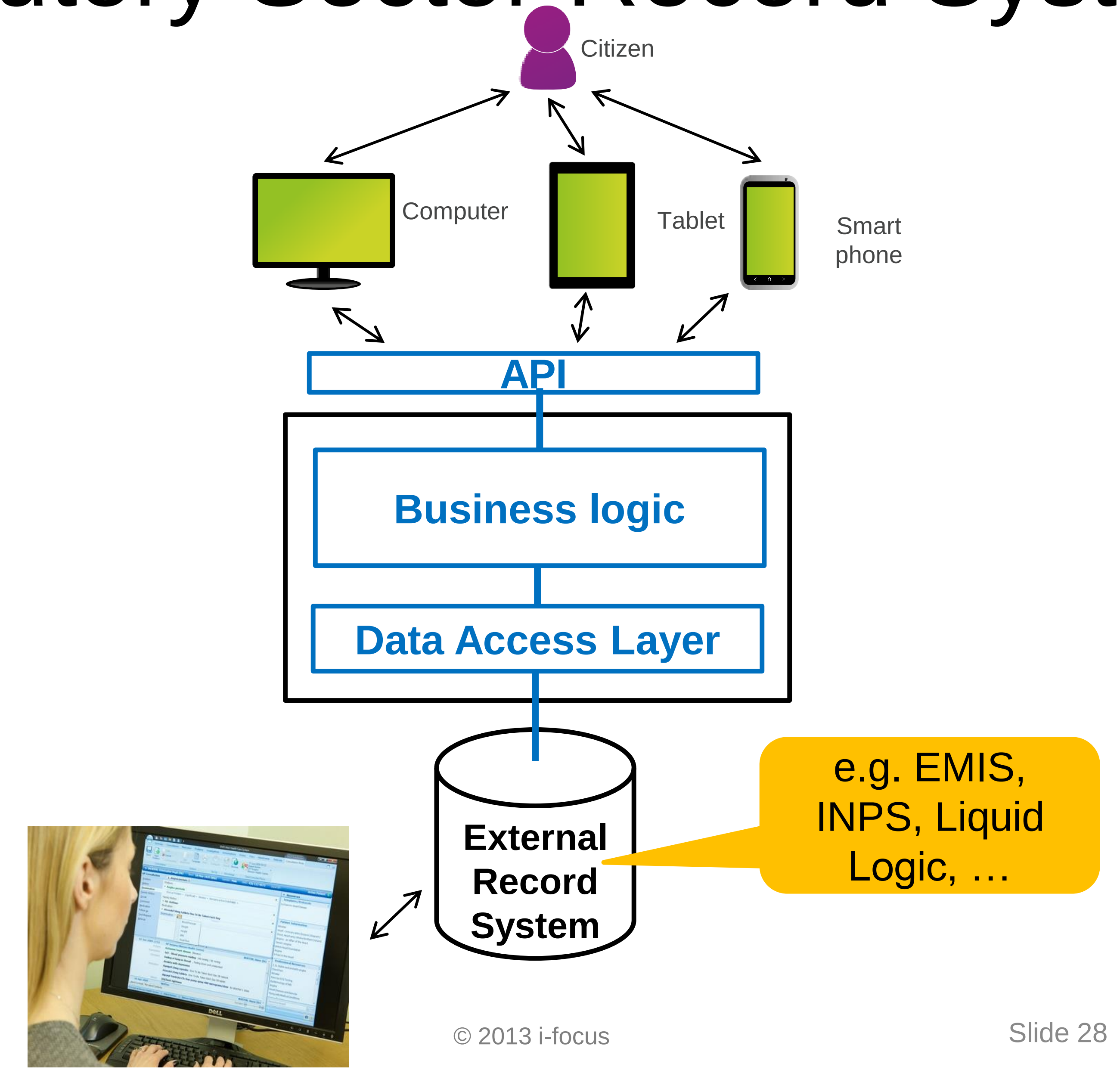
Telehealth System


Citizen
Computer
Tablet
S
p
API
Telehealth System
HOME
SURVEY
MESSAGES
MEDICATION
CHARTS
VIDEOS
SETUP

Warm Neighbourhoods architecture also maps almost directly to this model

Statutory Sector Record System



Citizen

Computer

Tablet

Smart
phone

API

Business logic

Data Access Layer

External
Record
System

e.g. EMIS,
INPS, Liquid
Logic, …

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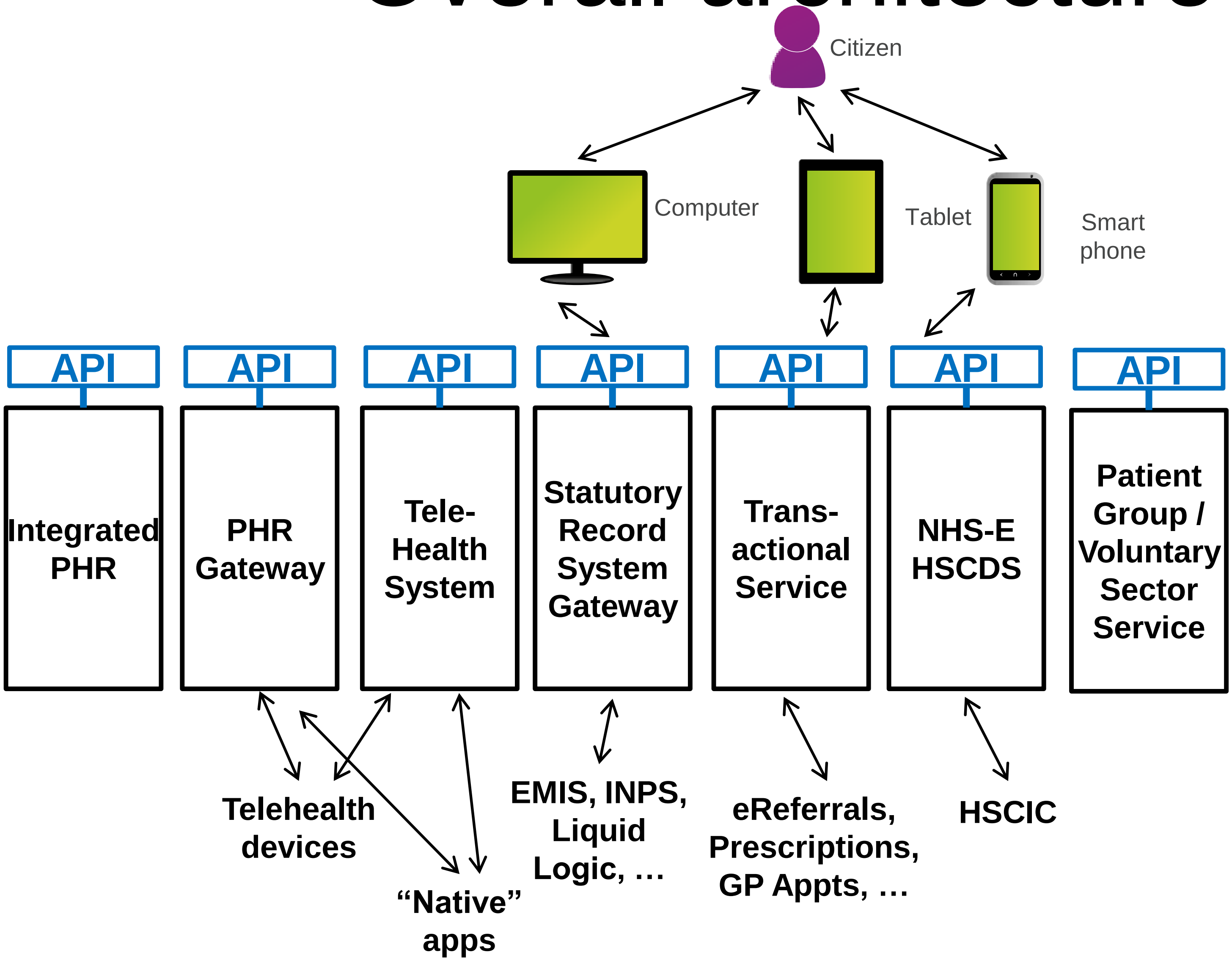
Overall architecture



Citizen

Computer

Tablet

Smart phone

API

API

API

API

API

API

API

Integrated PHR

PHR Gateway

Tele-Health System

Statutory Record System Gateway

Trans-actional Service

NHS-E HSCDS

Patient Group / Voluntary Sector Service

Telehealth devices

"Native" apps

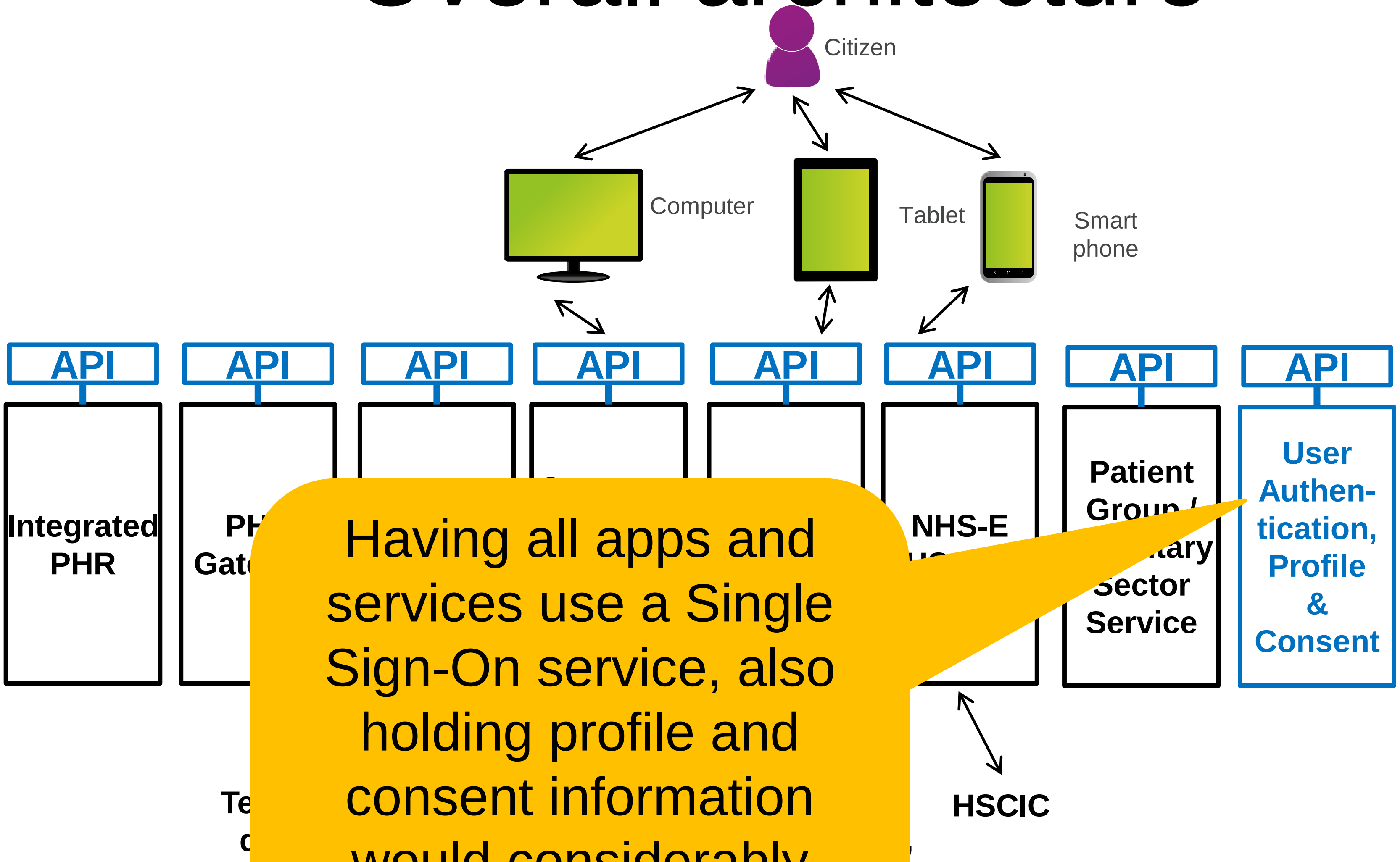
EMIS, INPS, Liquid Logic, …

eReferrals, Prescriptions, GP Appts, …

HSCIC

i-focus

Overall architecture


Citizen
Computer
Tablet
Smart phone
API
API
API
API
API
API
API
API
Integrated PHR
PH
Gat
NHS-E
Patient Group /
tary
Sector
Service
User Authen-tication, Profile & Consent
HSCIC
Te
c

Having all apps and services use a Single Sign-On service, also holding profile and consent information would considerably ease use

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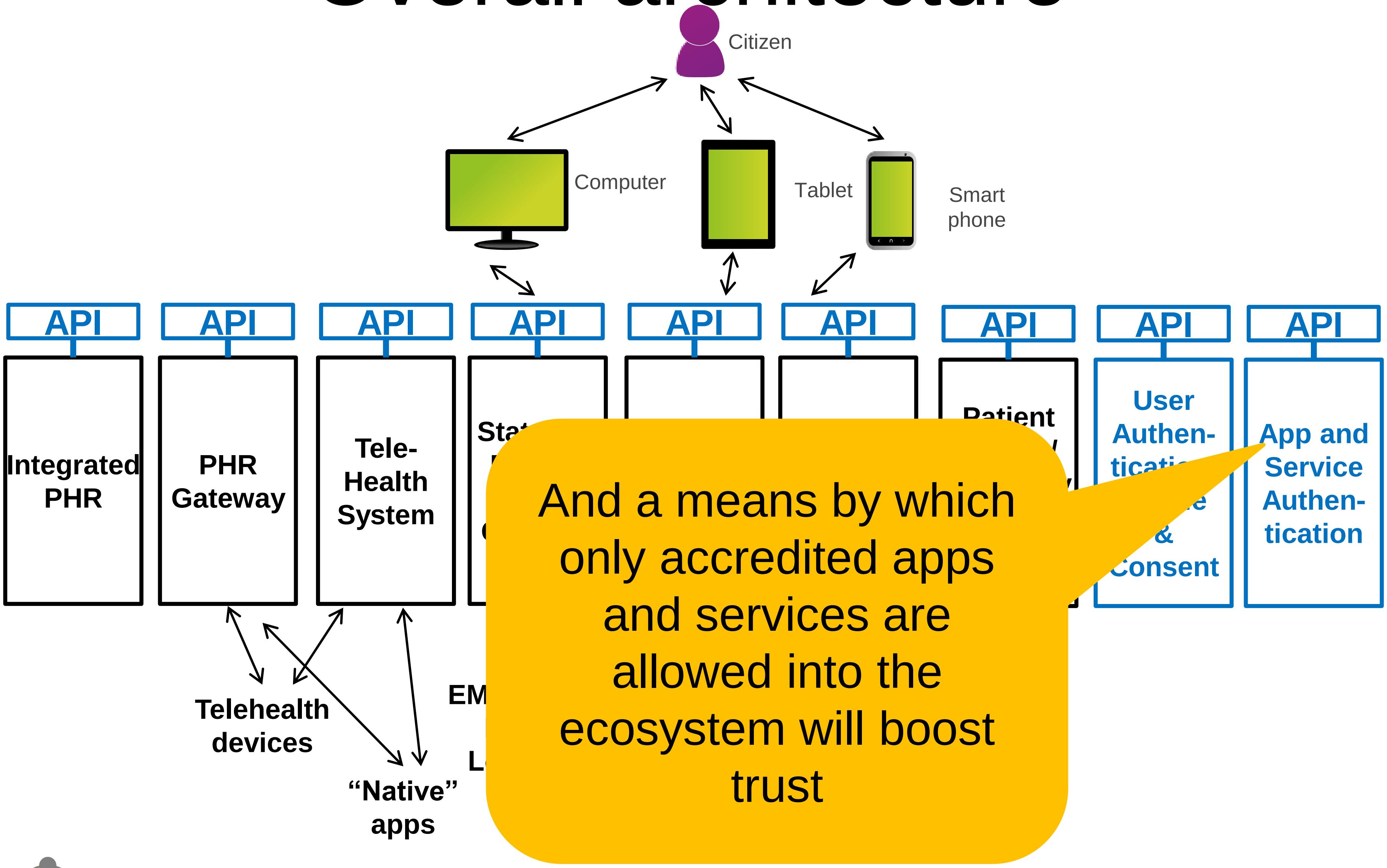
Overall architecture



Citizen

Computer

Tablet

Smart phone

API

Integrated PHR

PHR Gateway

Tele-Health System

Sta

Patient

User Authen-

& Consent

App and Service Authen-tication

Telehealth devices

“Native” apps

EM

L

And a means by which only accredited apps and services are allowed into the ecosystem will boost trust

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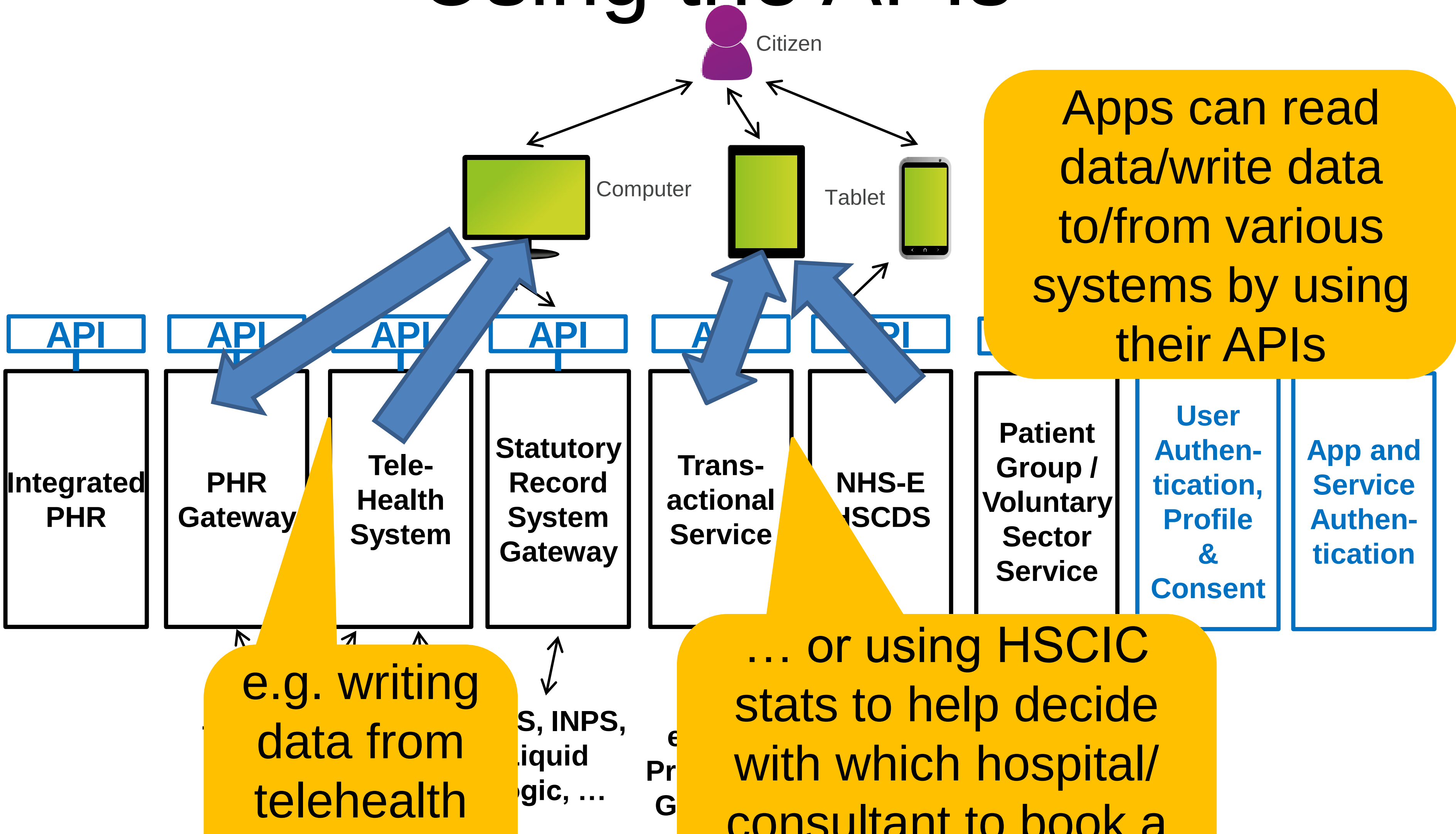
Using the APIs



Citizen

Computer

Tablet

API

API

API

API

Integrated PHR

PHR Gateway

Tele-Health System

Statutory Record System Gateway

Trans-actional Service

NHS-E HSCDS

Patient Group / Voluntary Sector Service

User Authen-tication, Profile & Consent

App and Service Authen-tication

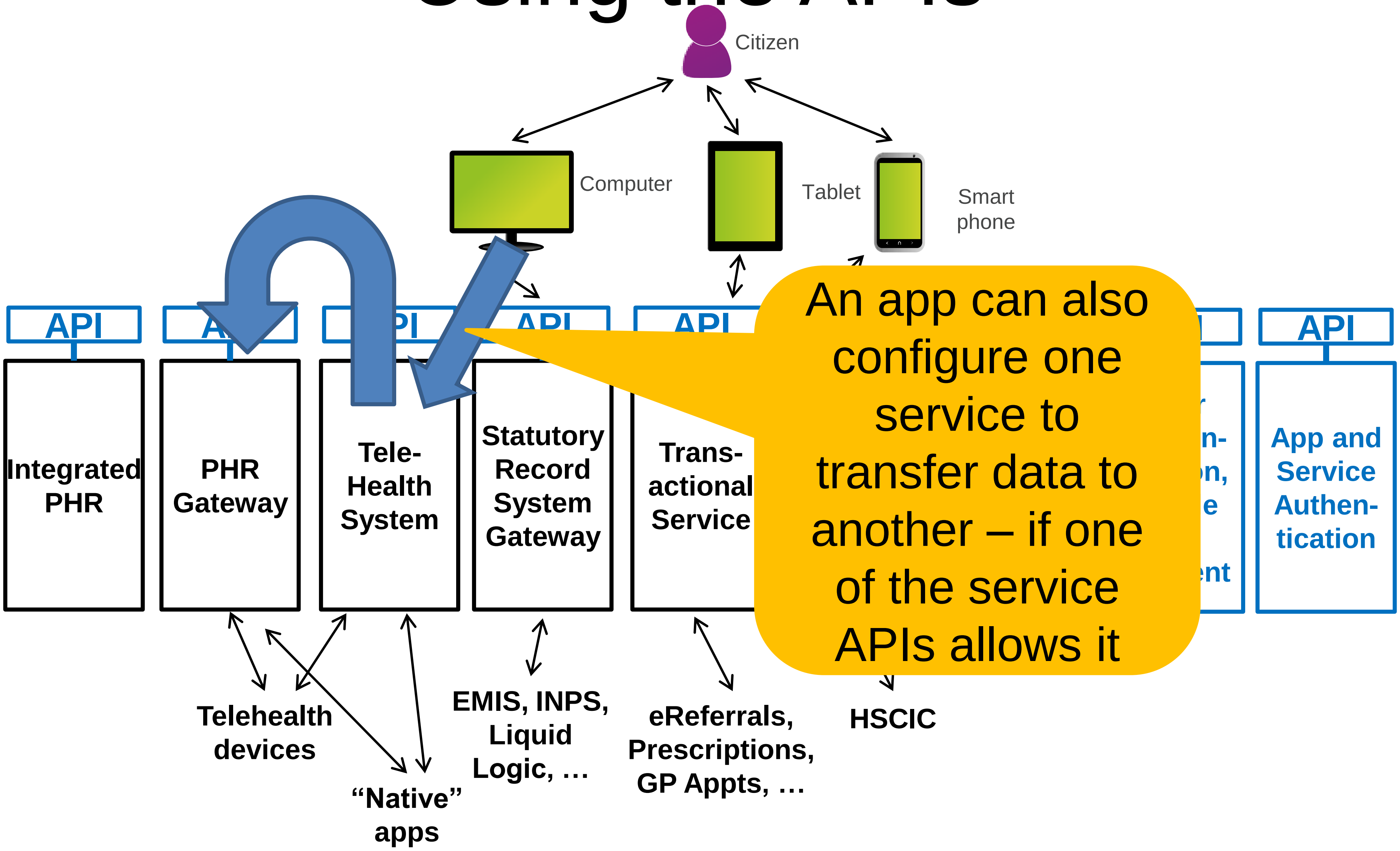
S, INPS,
iquid
gic, …

Apps can read data/write data to/from various systems by using their APIs

e.g. writing data from telehealth system into a PHR …

… or using HSCIC stats to help decide with which hospital/ consultant to book a referral

Using the APIs



Citizen

Computer

Tablet

Smart phone

API

Integrated PHR

PHR Gateway

Tele-Health System

Statutory Record System Gateway

Trans-actional Service

n-
n,
e
ent

App and Service Authen-tication

Telehealth devices

"Native" apps

EMIS, INPS, Liquid Logic, …

eReferrals, Prescriptions, GP Appts, …

HSCIC

An app can also configure one service to transfer data to another – if one of the service APIs allows it

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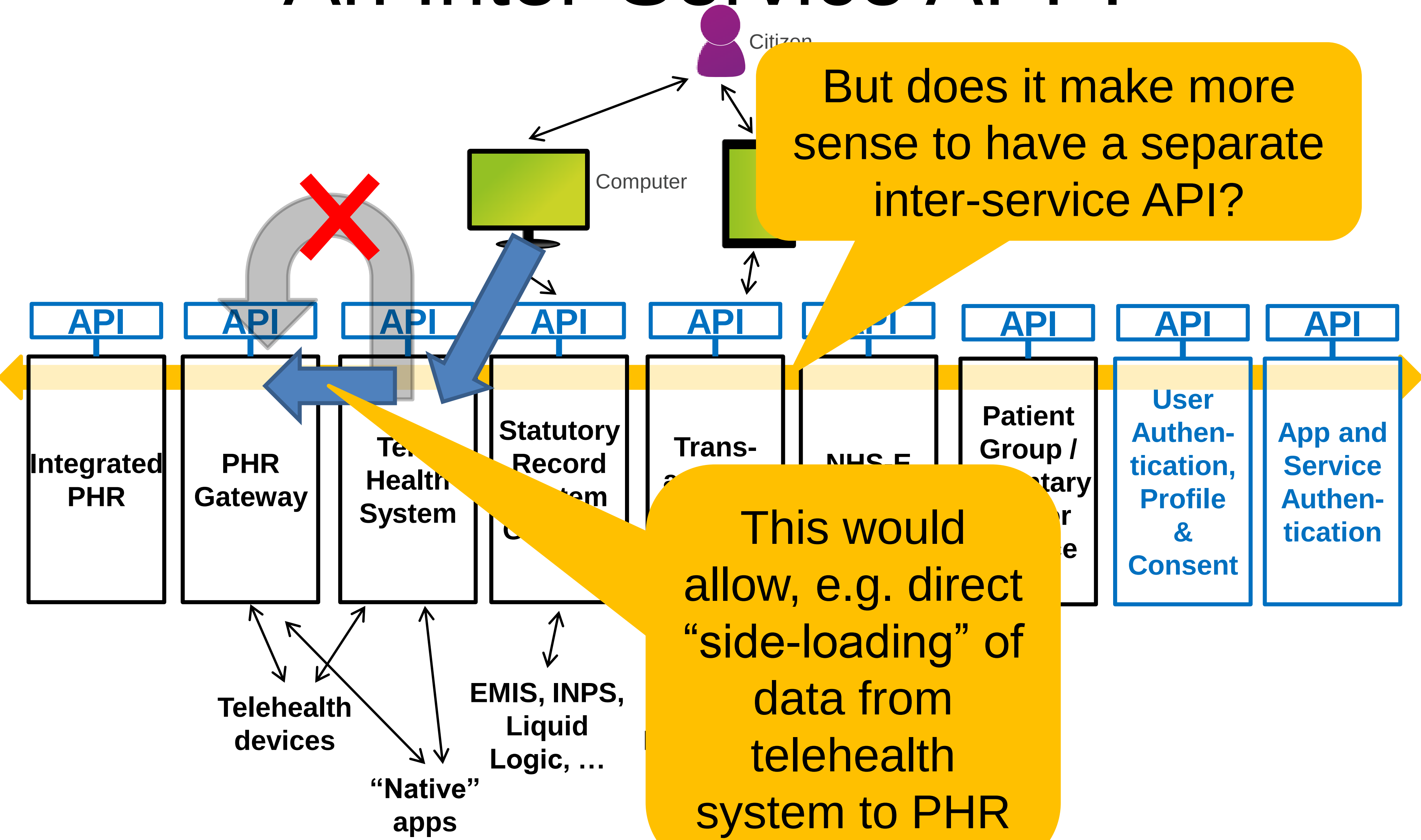
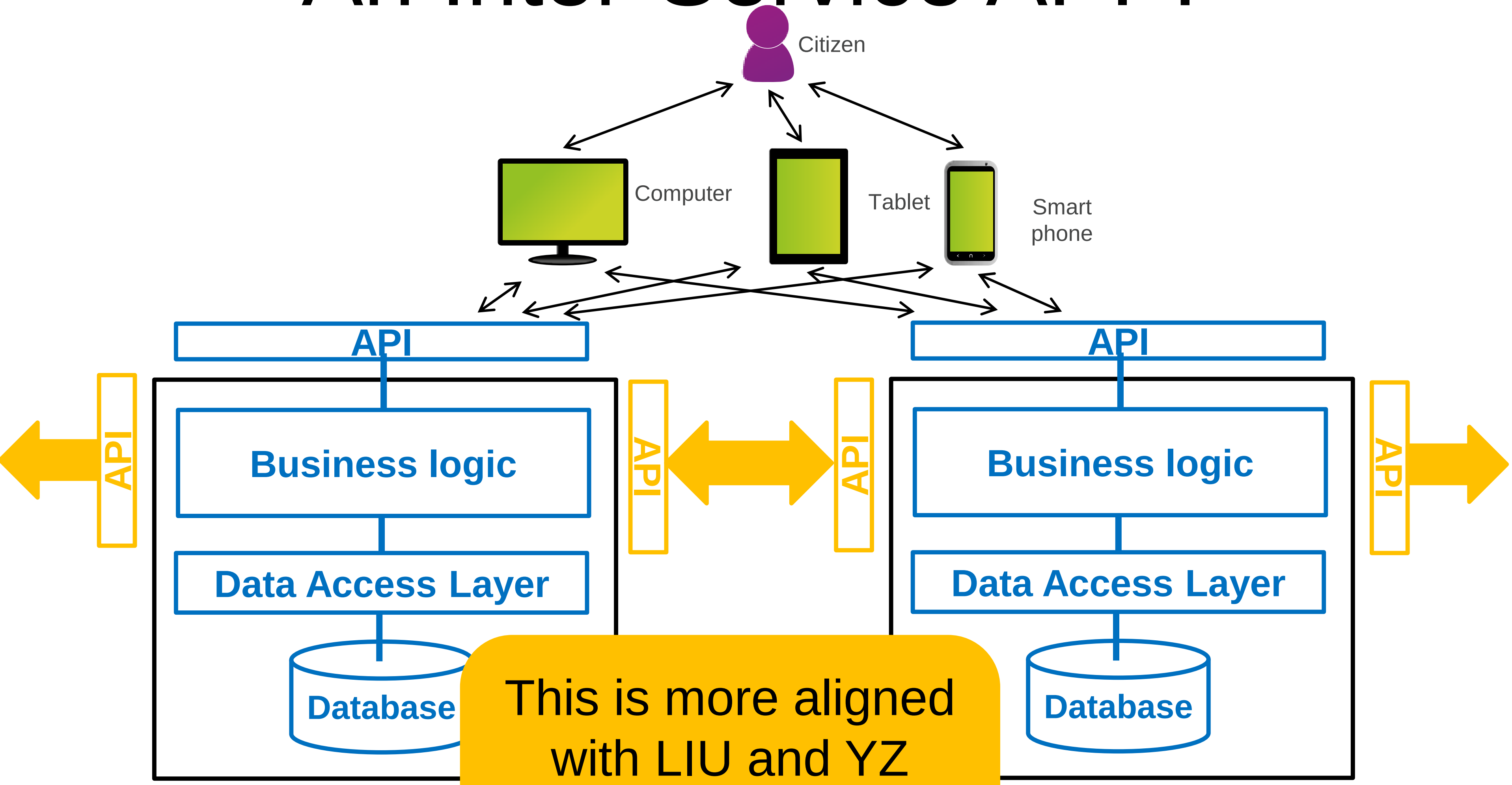
An Inter-Service API ?


Citizen
Computer
API
API
API
API
API
API
API
API
API
Integrated PHR
PHR Gateway
Te
Health
System
Statutory Record
tem
Trans-
NHS E
Patient Group /
tary
r
e
User Authen-tication, Profile & Consent
App and Service Authen-tication
Telehealth devices
"Native" apps
EMIS, INPS, Liquid Logic, …

But does it make more sense to have a separate inter-service API?

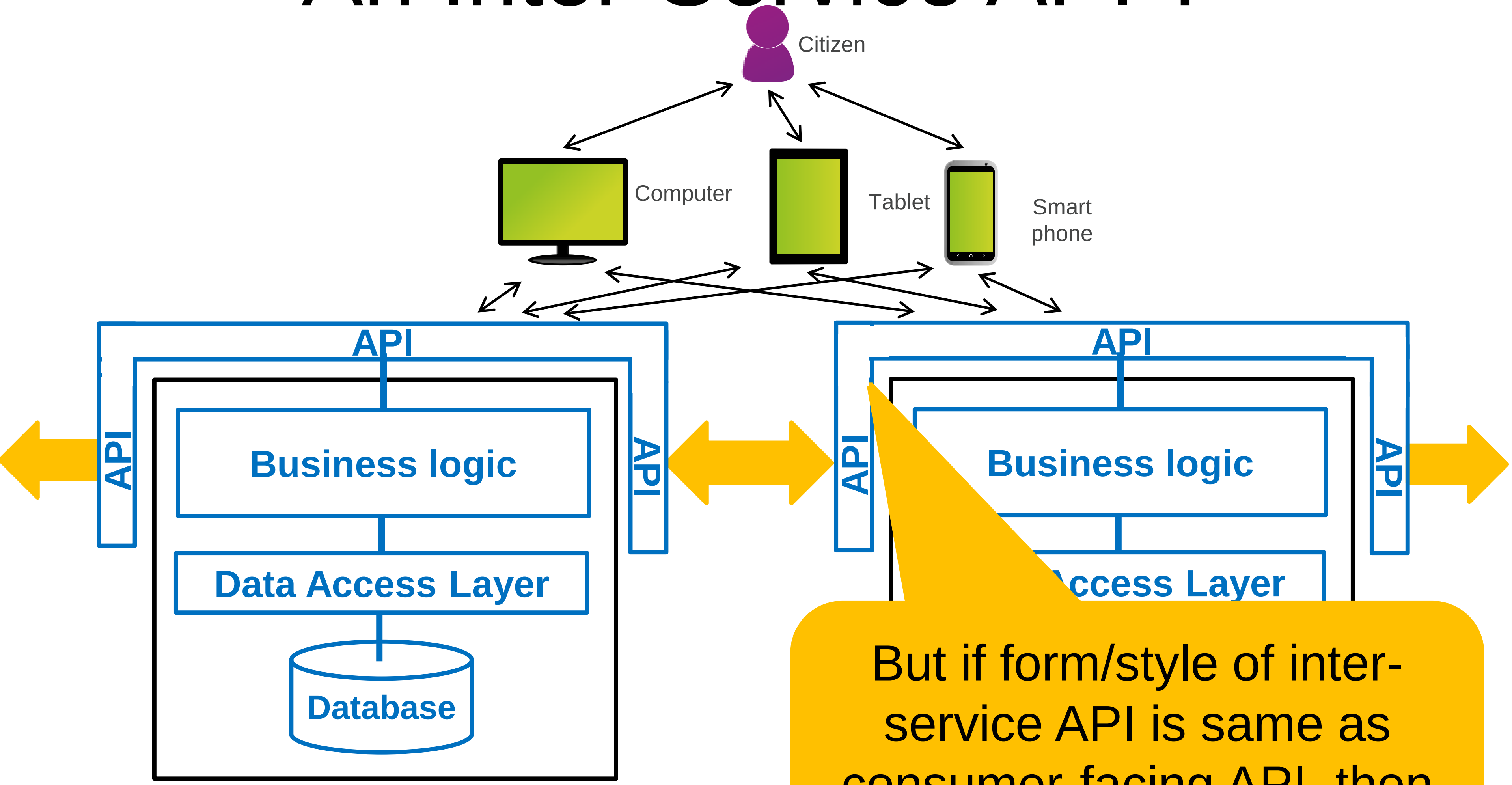
This would allow, e.g. direct "side-loading" of data from telehealth system to PHR

An Inter-Service API ?


Citizen
Computer
Tablet
Smart phone
API
API
API
Business logic
Data Access Layer
Database
API
API
API
Business logic
Data Access Layer
Database
API

This is more aligned with LIU and YZ architectures, but less aligned with Mi

An Inter-Service API ?


Citizen
Computer
Tablet
Smart phone
API
API
API
Business logic
Data Access Layer
Database
API
API
API
Business logic
Access Layer

But if form/style of inter-service API is same as consumer-facing API, then there is no real difference

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Proposed *i-focus* work areas

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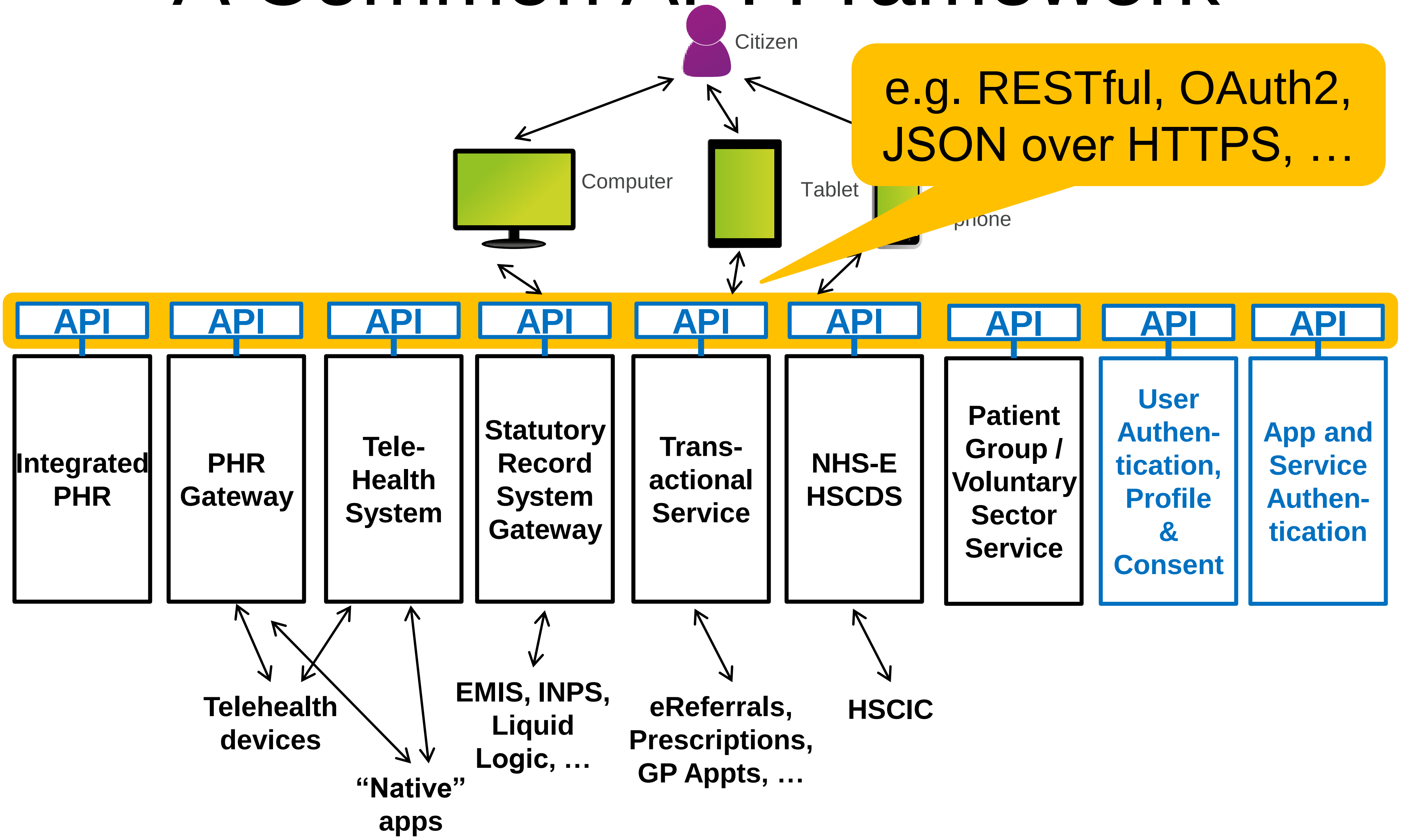
A Common API Framework



Citizen

Computer

Tablet

phone

e.g. RESTful, OAuth2, JSON over HTTPS, …

API

API

API

API

API

API

API

API

API

Integrated PHR

PHR Gateway

Tele-Health System

Statutory Record System Gateway

Trans-actional Service

NHS-E HSCDS

Patient Group / Voluntary Sector Service

User Authen-tication, Profile & Consent

App and Service Authen-tication

Telehealth devices

“Native” apps

EMIS, INPS, Liquid Logic, …

eReferrals, Prescriptions, GP Appts, …

HSCIC

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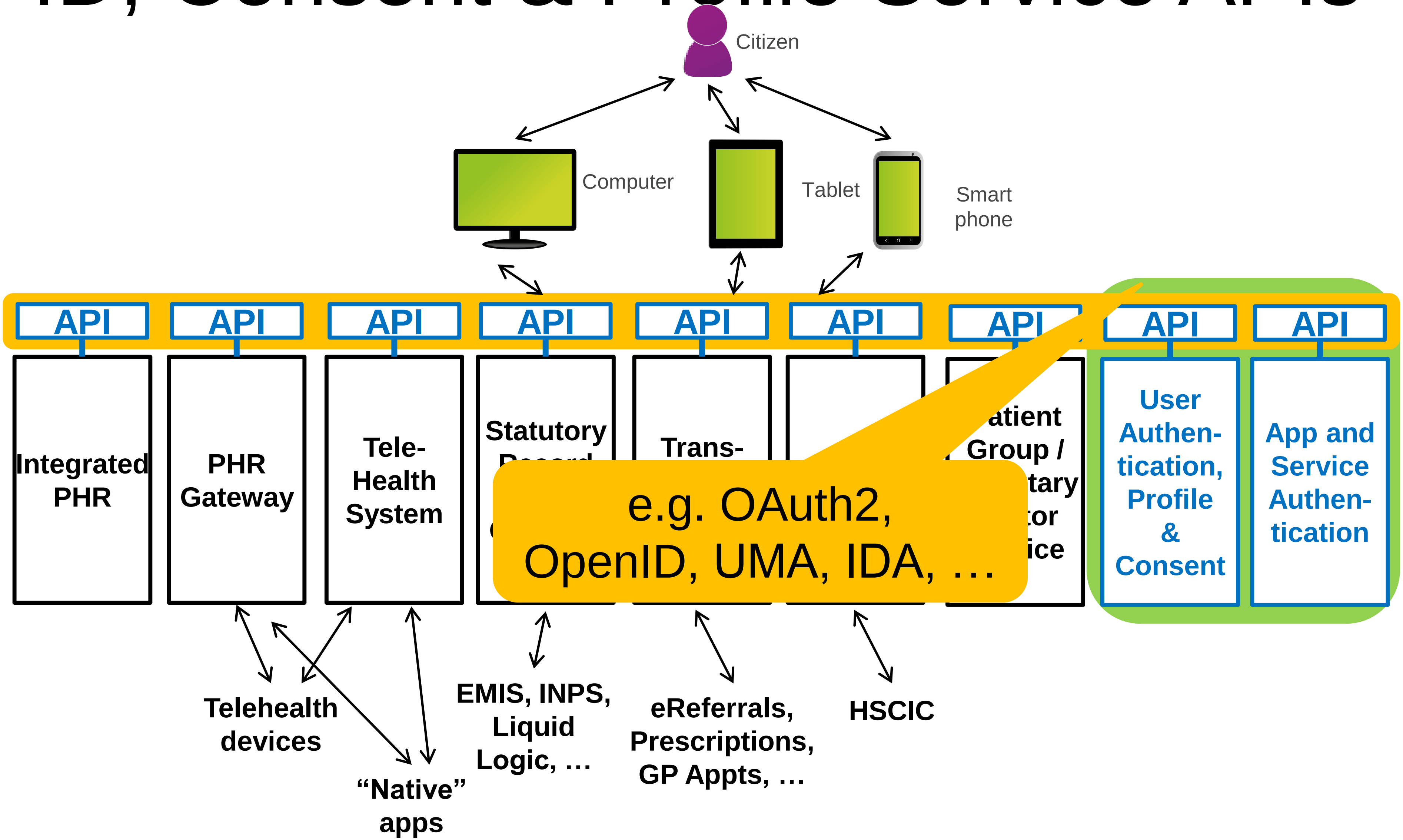
ID, Consent & Profile Service APIs



Citizen

Computer

Tablet

Smart
phone

API

API

API

API

API

API

API

API

API

Integrated
PHR

PHR
Gateway

Tele-
Health
System

Statutory

Trans-

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Group /
tary
tor
ice

User
Authen-
tication,
Profile
&
Consent

App and
Service
Authen-
tication

e.g. OAuth2,
OpenID, UMA, IDA, …

Telehealth
devices

“Native”
apps

EMIS, INPS,
Liquid
Logic, …

eReferrals,
Prescriptions,
GP Appts, …

HSCIC

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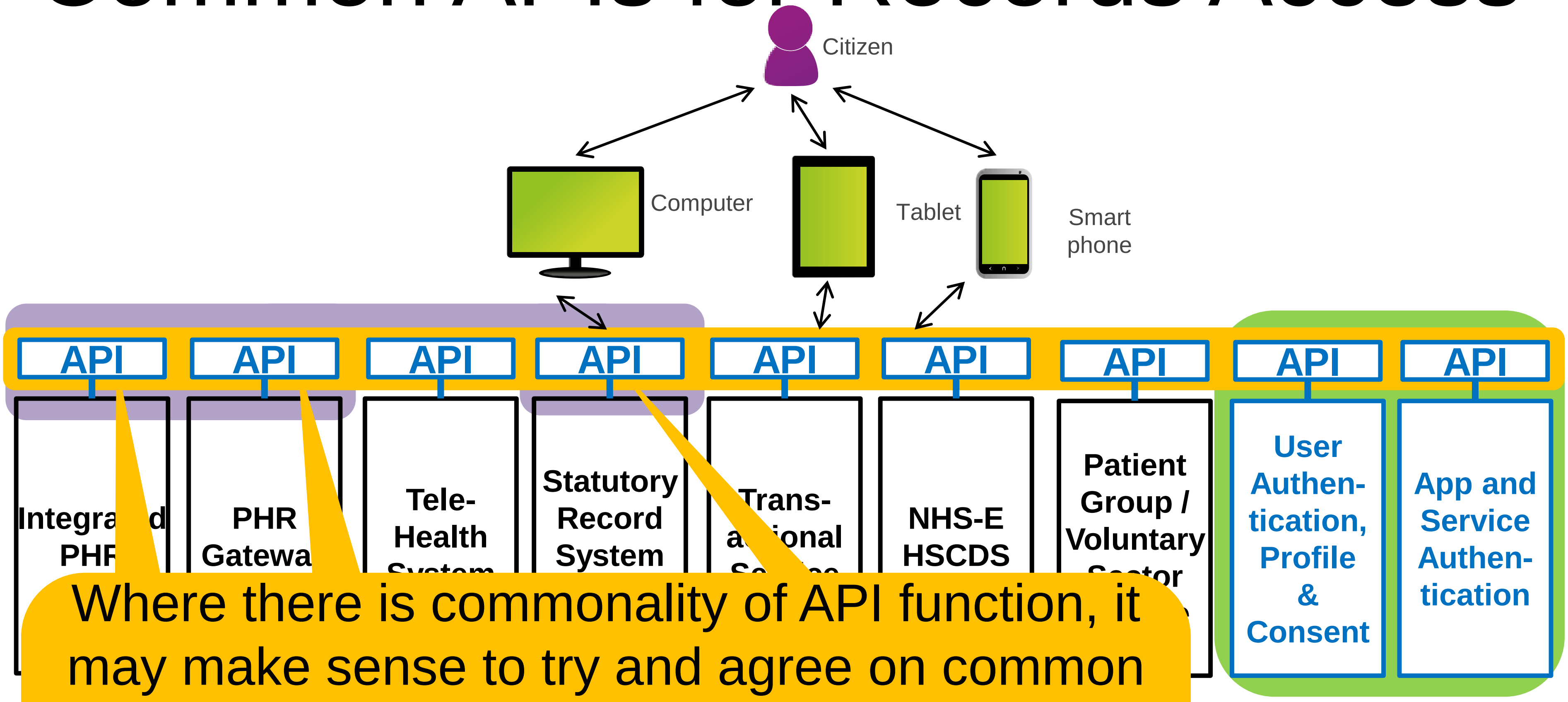
Common APIs for Records Access



Citizen

Computer

Tablet

Smart phone

API API API API API API API API API

Integra d PHR

PHR Gatewa

Tele- Health System

Statutory Record System

Trans- a ional Se

NHS-E HSCDS

Patient Group / Voluntary Sector

User Authen- tication, Profile & Consent

App and Service Authen- tication

Where there is commonality of API function, it may make sense to try and agree on common API

e.g. FHIR for records access

…but must be careful not to stifle innovation

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Proposed *i-focus* work areas

- A common API framework for *dallas*
  - that communities should work towards implementing
- ID, Consent and Profile Service APIs
  - that communities should work towards implementing
- Common APIs for Records Access
  - that communities should consider implementing

The End

Questions? Comments?

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