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Développer avec l'ArcGIS Maps SDK for JavaScript

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Sommaire

01 Les bases du développement web

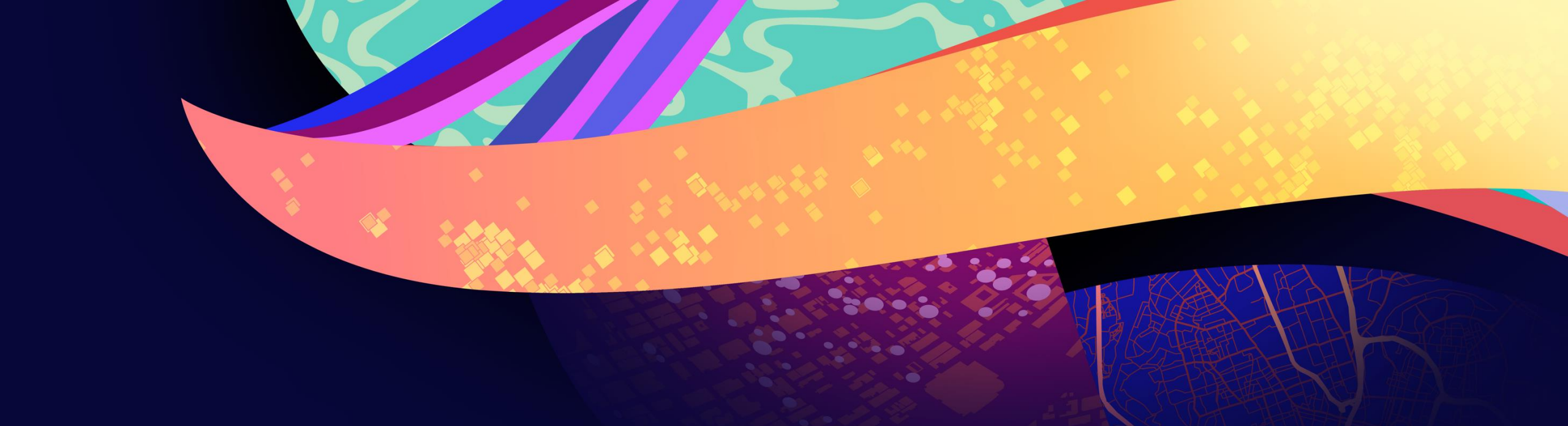
02 Les API clientes d'ArcGIS

03 L'ArcGIS Maps SDK for JavaScript : capacités

04 Utiliser la documentation

05 La consommation de services webs

06 Conseils et ressources



Les bases du développement web

Quels sont les langages du web ? Qu'est-ce qu'une API ? Qu'est-ce qu'un SDK ?

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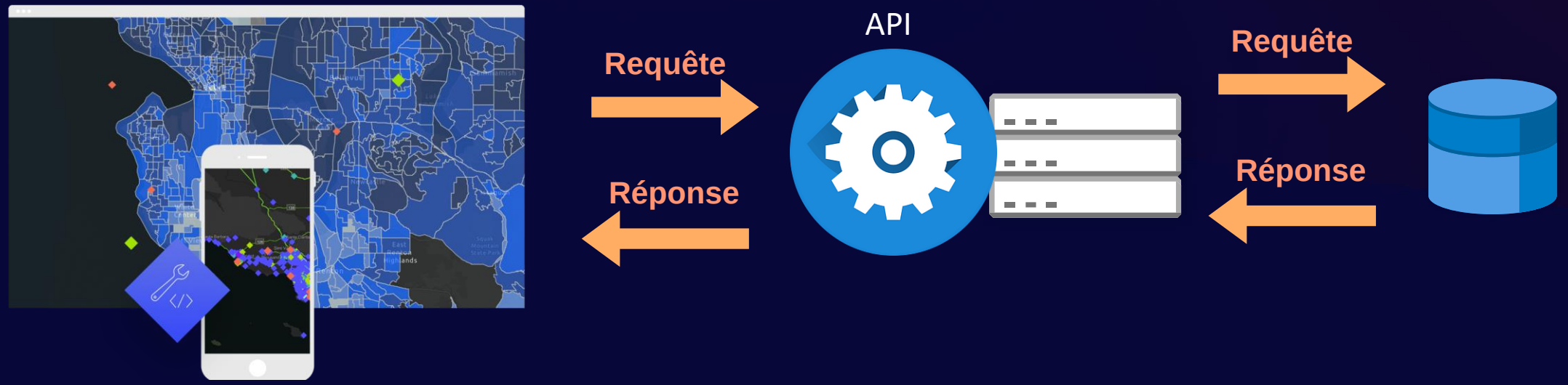
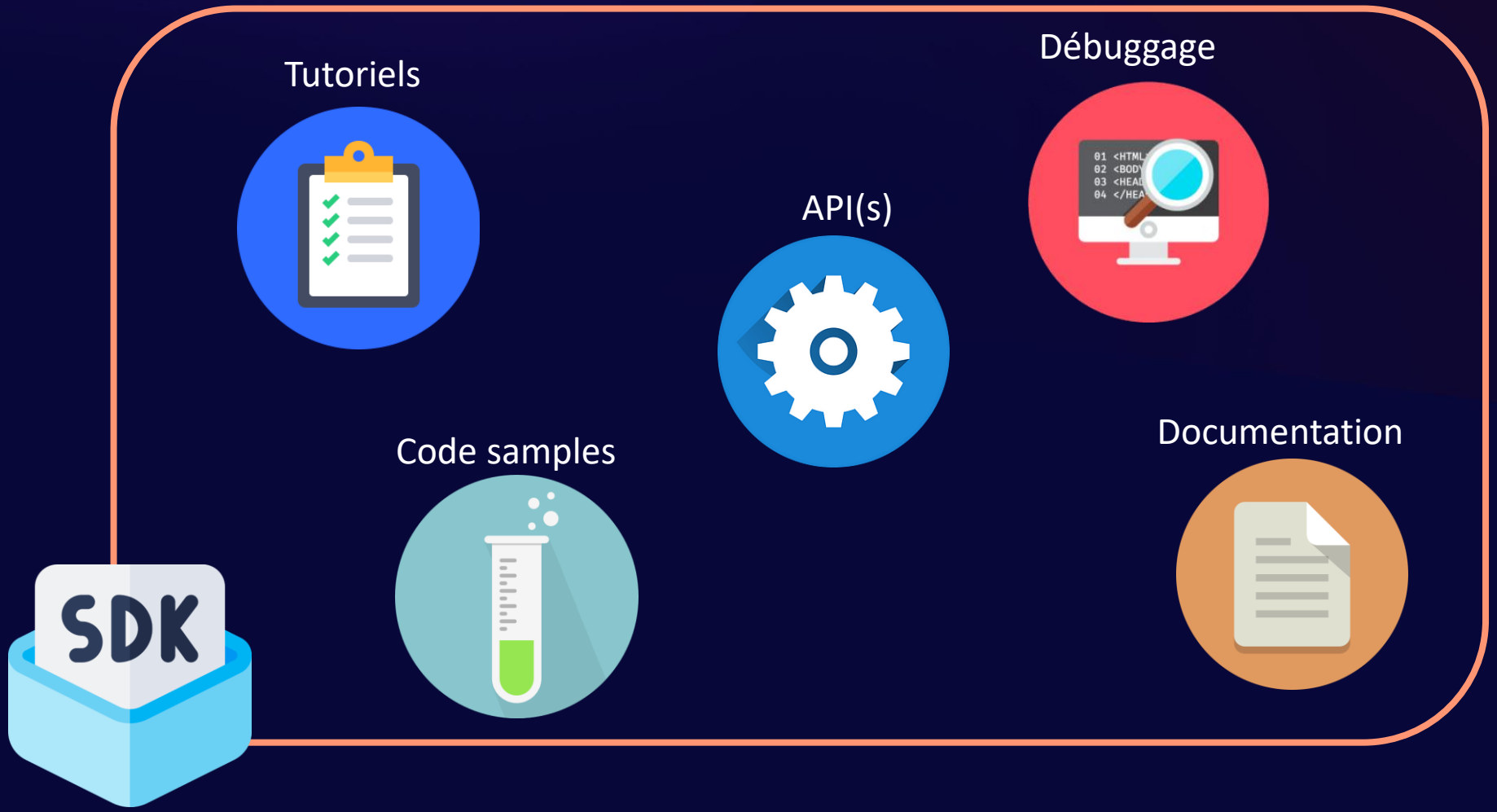
The 3 Horsemen of Web Development

Qu’est-ce qu’une API, qu’est-ce qu’un SDK ?



Qu’est-ce qu’une API, qu’est-ce qu’un SDK ?



Les APIs clientes d'ArcGIS

Qu'est-ce que l'API REST? Quelles sont les APIs disponibles dans le système ArcGIS?

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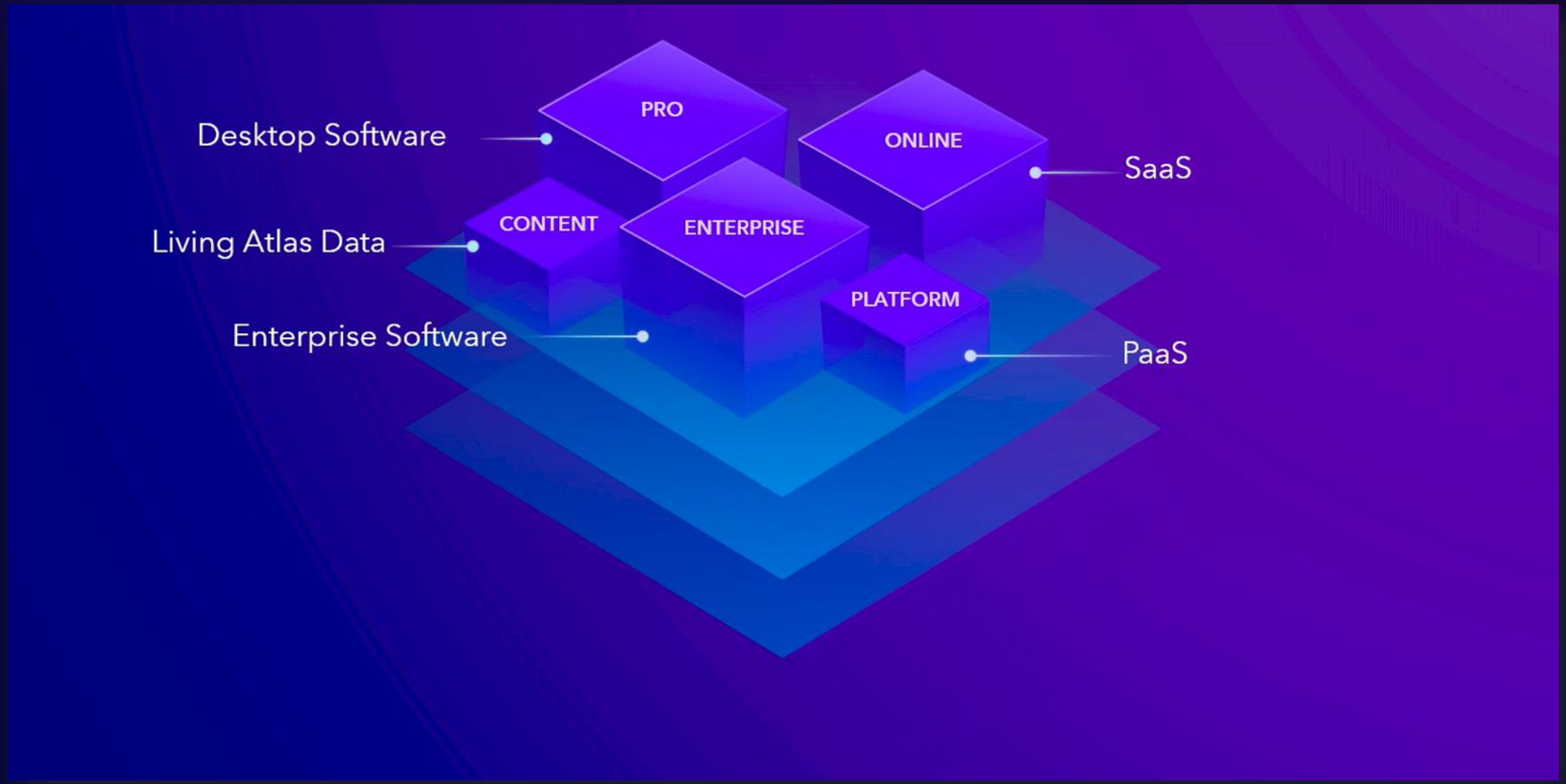
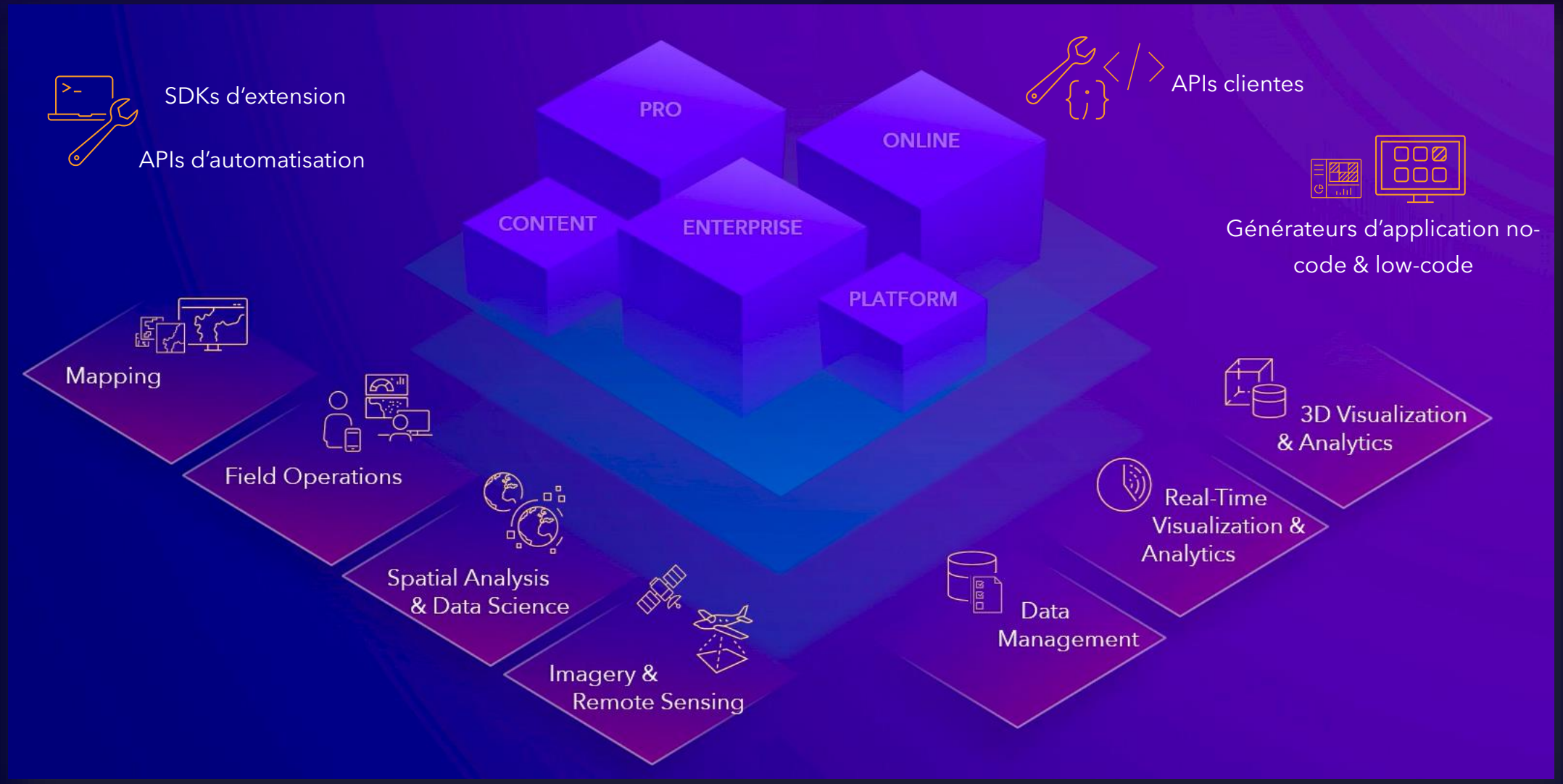
La place du développement dans le système ArcGIS



La place du développement dans le système ArcGIS



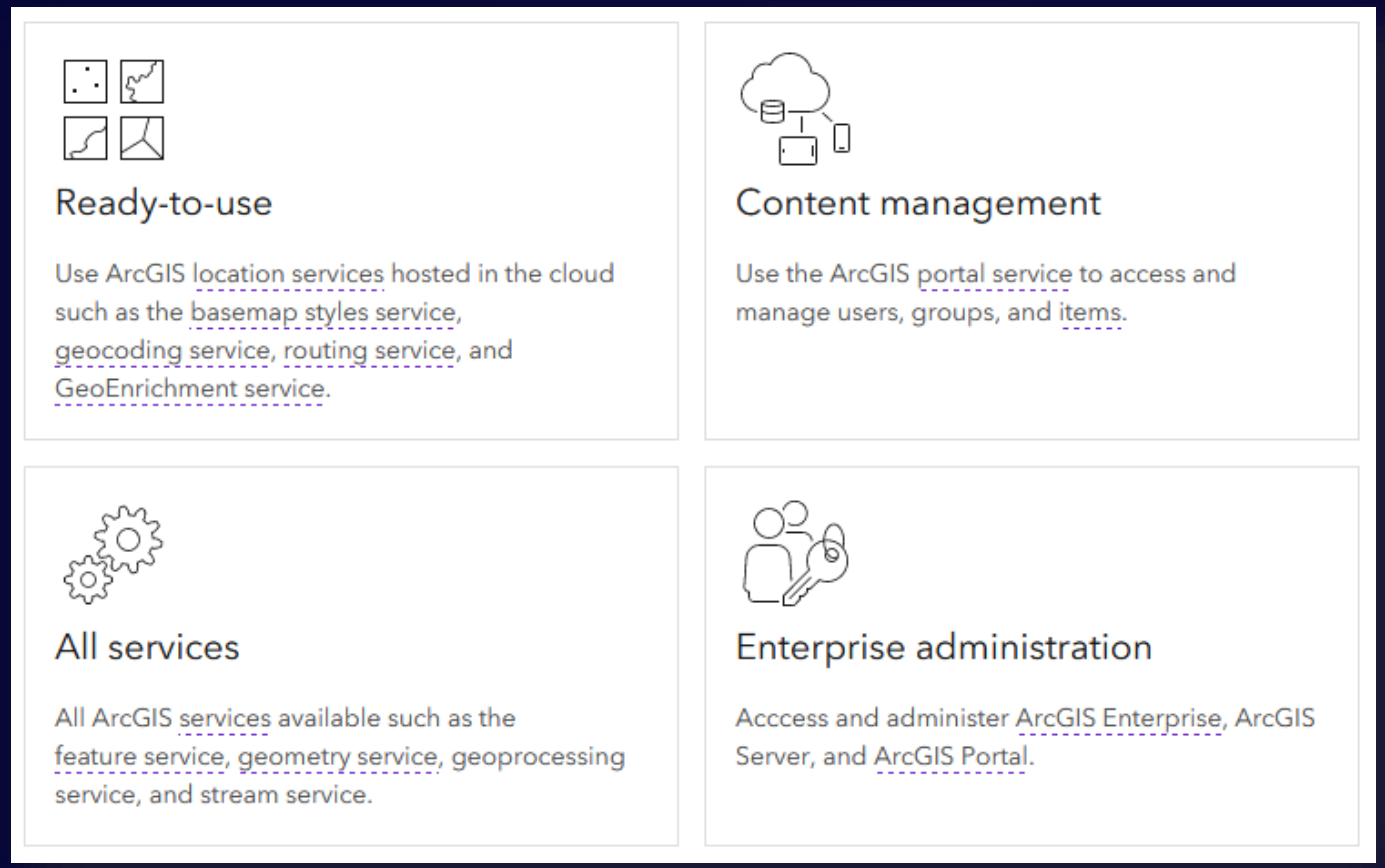
Les APIs clientes du système ArcGIS

Automatiser et étendre les produits du système ArcGIS

Tirer parti de l'intelligence géographique d'ArcGIS pour créer de nouvelles applications (ArcGIS Maps SDK for…)

L'API REST

Clé de **l'interopérabilité** du SIG web d'ArcGIS




```
{
  "serviceName": "Bati",
  "type": "FeatureServer",
  "description": "",
  "capabilities": "Query",
  "provider": "SDS",
  "clusterName": "default",
  "minInstancesPerNode": 0,
  "maxInstancesPerNode": 0,
  "instancesPerContainer": 1,
  "maxWaitTime": 60,
  "maxStartupTime": 300,
  "maxIdleTime": 1800,
  "maxUsageTime": 600,
  "loadBalancing": "ROUND_ROBIN",
  "isolationLevel": "HIGH",
  "configuredState": "STARTED",
  "recycleInterval": 24,
  "recycleStartTime": "00:00",
  "keepAliveInterval": 1800,
  "private": false,
  "isDefault": false,
  "maxUploadFileSize": 0,
  "allowedUploadFileTypes": "",
  "properties": {
    "maxDomainCodeCount": "25000",
    "cacheDir": "",
    "maxImageWidth": "4096",
    "maxRecordCount": "2000",
    "antialiasingMode": "None",
    "enableDynamicLayers": "true",
    "dynamicDataWorkspaces": "",
    "isCached": "false",
    "virtualOutputDir": "/rest/directories/arcgisoutput",
    "exportTilesAllowed": "false",
    "maxImageHeight": "4096",
    "cacheOnDemand": "false",
    "minScale": "",
    "schemaLockingEnabled": "true",
    "useLocalCacheDir": "true",
    "outputDir": "C:\\arcgis\\arcgisserver\\directories\\arcgisoutput",
    "maxScale": "",
    "filePath": "C:\\arcgis\\arcgisserver\\directories\\arcgissystem\\arcgisinp
    "supportedImageReturnTypes": "URL",
    "maxSampleSize": "100000",
    "clientCachingAllowed": "true",
    "textAntialiasingMode": "Force",
    "maxExportTilesCount": "100000",
    "ignoreCache": "false",
    "maxBufferCount": "100",
    "disableIdentifyRelates": "false"
  },
  "jsonProperties": {
```

L'API REST : interface


```
{
  "serviceName": "Bati",
  "type": "FeatureServer",
  "description": "",
  "capabilities": "Query",
  "provider": "SDS",
  "clusterName": "default",
  "minInstancesPerNode": 0,
  "maxInstancesPerNode": 0,
  "instancesPerContainer": 1,
  "maxWaitTime": 60,
```


ArcGIS REST Services Directory

Global ID Field:

Type ID Field:

Fields:

- OBJECTID *(type: esriFieldTypeOID, alias: OBJECTID, SQL Type: sqlTypeOther, length: 0, nullable: false, editable: false)*
- Nom *(type: esriFieldTypeString, alias: Nom, SQL Type: sqlTypeOther, length: 255, nullable: true, editable: true)*
- Altitude *(type: esriFieldTypeSmallInteger, alias: Altitude (m), SQL Type: sqlTypeOther, nullable: true, editable: true)*
- Continent *(type: esriFieldTypeString, alias: Continent, SQL Type: sqlTypeOther, length: 255, nullable: true, editable: true)*
- Description *(type: esriFieldTypeString, alias: Description, SQL Type: sqlTypeOther, length: 255, nullable: true, editable: true)*
- Annee *(type: esriFieldTypeSmallInteger, alias: Année de première ascension, SQL Type: sqlTypeOther, nullable: true, editable: true)*

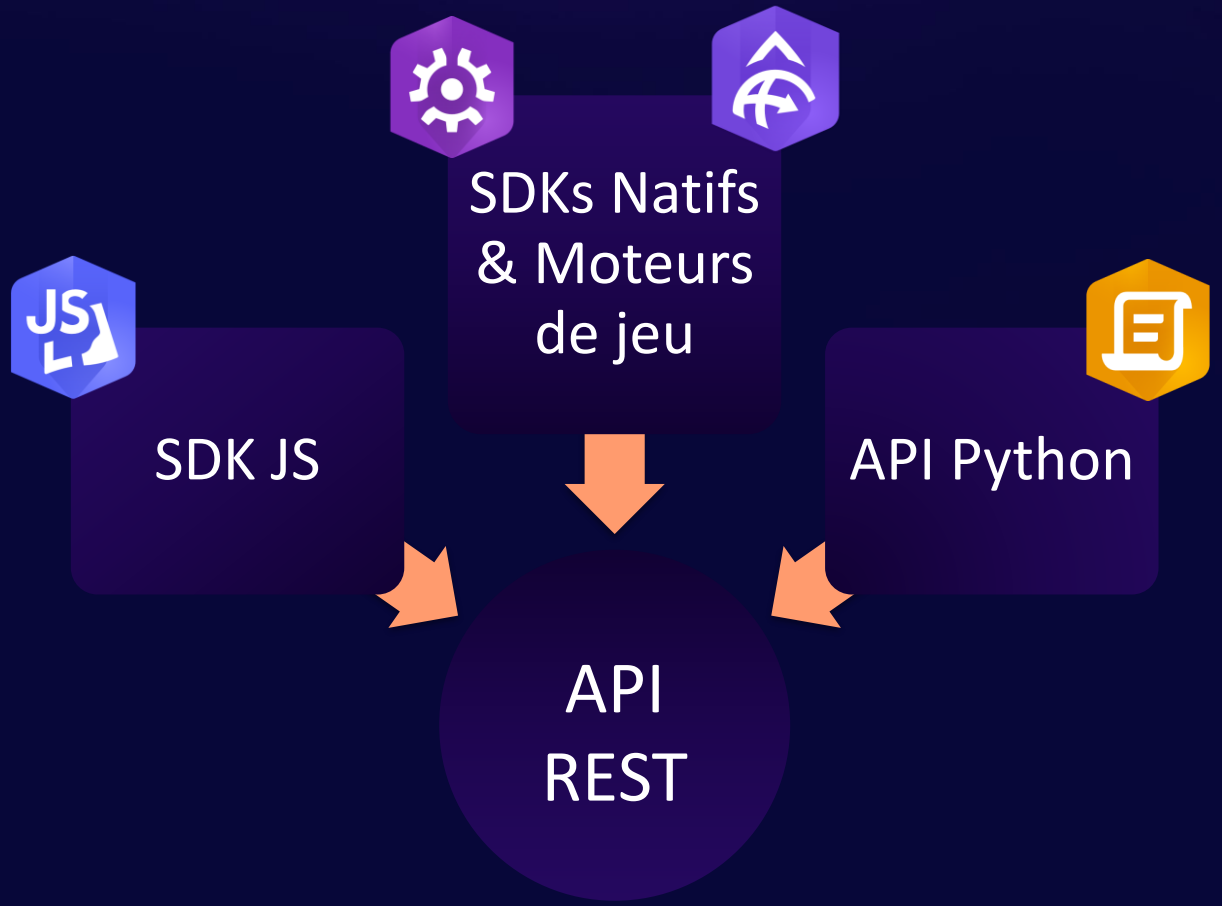
Templates:

Name: SeptSommets
Description:
Drawing Tool: esriFeatureEditToolPoint
Prototype:

Is Data Versioned: false


```
soutput",
system\\arcgisinp
  "disableIdentifyRelates": "false"
},
"jsonProperties": {
```

L’API REST : socle des API de niveau supérieur




```
{
  "serviceName": "Bati",
  "type": "FeatureServer",
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  "capabilities": "Query",
  "provider": "SDS",
  "clusterName": "default",
  "minInstancesPerNode": 0,
  "maxInstancesPerNode": 0,
  "maxInstancesPerContainer": 1,
  "maxWaitTime": 60,
  "maxStartupTime": 300,
  "maxIdleTime": 1800,
  "maxUsageTime": 600,
  "loadBalancing": "ROUND_ROBIN",
  "isolationLevel": "HIGH",
  "configuredState": "STARTED",
  "recycleInterval": 24,
  "recycleStartTime": "00:00",
  "keepAliveInterval": 1800,
  "private": false,
  "isDefault": false,
  "maxUploadFileSize": 0,
  "allowedUploadFileTypes": "",
  "properties": {
    "maxDomainCodeCount": "25000",
    "cacheDir": "",
    "maxImageWidth": "4096",
    "maxRecordCount": "2000",
    "antialiasingMode": "None",
    "enableDynamicLayers": "true",
    "dynamicDataWorkspaces": "",
    "isCached": "false",
    "virtualOutputDir": "/rest/directories/arcgisoutput",
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    "maxImageHeight": "4096",
    "cacheOnDemand": "false",
    "minScale": "",
    "schemaLockingEnabled": "true",
    "useLocalCacheDir": "true",
    "outputDir": "C:\\arcgis\\arcgisserver\\directories\\arcgisoutput",
    "maxScale": "",
    "filePath": "C:\\arcgis\\arcgisserver\\directories\\arcgissystem\\arcgisinp
    "supportedImageReturnTypes": "URL",
    "maxSampleSize": "100000",
    "clientCachingAllowed": "true",
    "textAntialiasingMode": "Force",
    "maxExportTilesCount": "100000",
    "ignoreCache": "false",
    "maxBufferCount": "100",
    "disableIdentifyRelates": "false"
  },
  "jsonProperties": {
```

Les APIs Python

ArcPy

Utiliser, automatiser et étendre le SIG Desktop (ArcMap et ArcGIS Pro) et Server

Principalement pour l'automatisation des géotraitements et des cartes

Bibliothèque puissante pour les analyses spatiales, la gestion des données et les conversions

Les 2

ArcGIS API for Python

Prise en charge du SIG Web

Fonctionne avec un Portail ArcGIS Online ou ArcGIS Enterprise

Administration du portail, la gestion des contenus/groupes/utilisateurs, traitement des données web, analyse Big Data…..

Bibliothèque « légère » pour l'analyse spatiale, gestion d'un SIG web et réaliser des études de données spatiales

Les SDKs ArcGIS Maps for Native Apps

5 SDKs pour les applications natives :

SDK	Plateforme prise en charge	Langage
ArcGIS Maps SDK for Swift	IOS et ses dérivés	Swift
ArcGIS Maps SDK for Kotlin	Android	Kotlin
ArcGIS Maps SDK for .Net	Windows, IOS, Android	C#, VB.Net
ArcGIS Maps SDK for Java	Windows, Linux et MacOS	Java
ArcGIS Maps SDK for Qt	Toutes les plateformes	C++

Les SDKs ArcGIS Maps for Game Engines

2 SDKs sont disponibles pour les moteurs de jeu

- ArcGIS Maps SDK for Unity
- ArcGIS Maps SDK for Unreal Engine

Destinés à développer des solutions pour :

- Des expériences XR/AR/VR
- Des applications SIG ayant besoin d'expériences photoréalistes et d'effets visuels avancés
- Des applications 3D ayant besoin d'incorporer des SIG

L'ArcGIS Maps SDK for JavaScript

Capacités, fonctionnement et démonstrations

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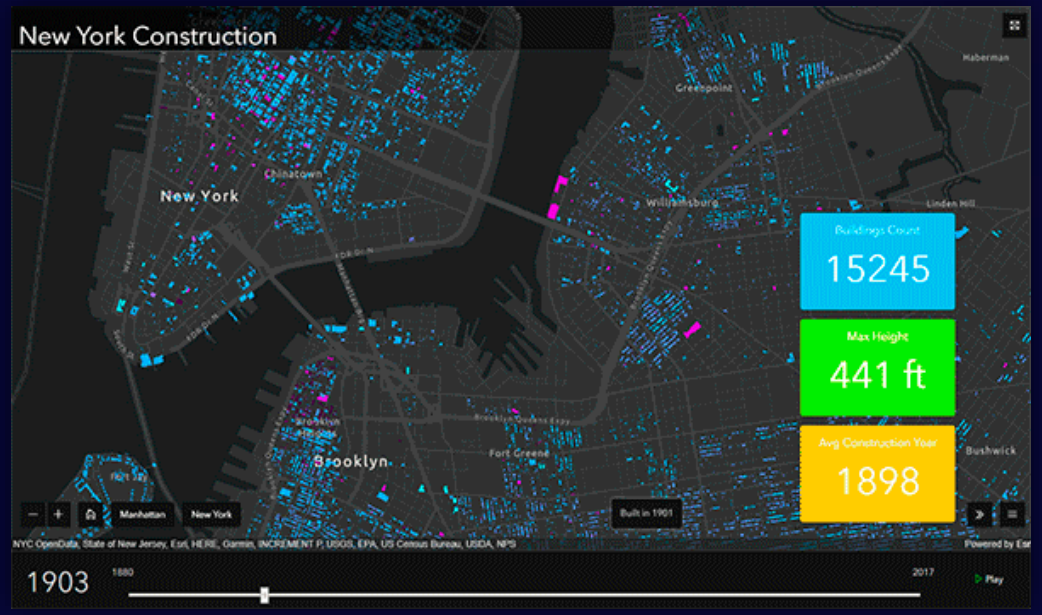
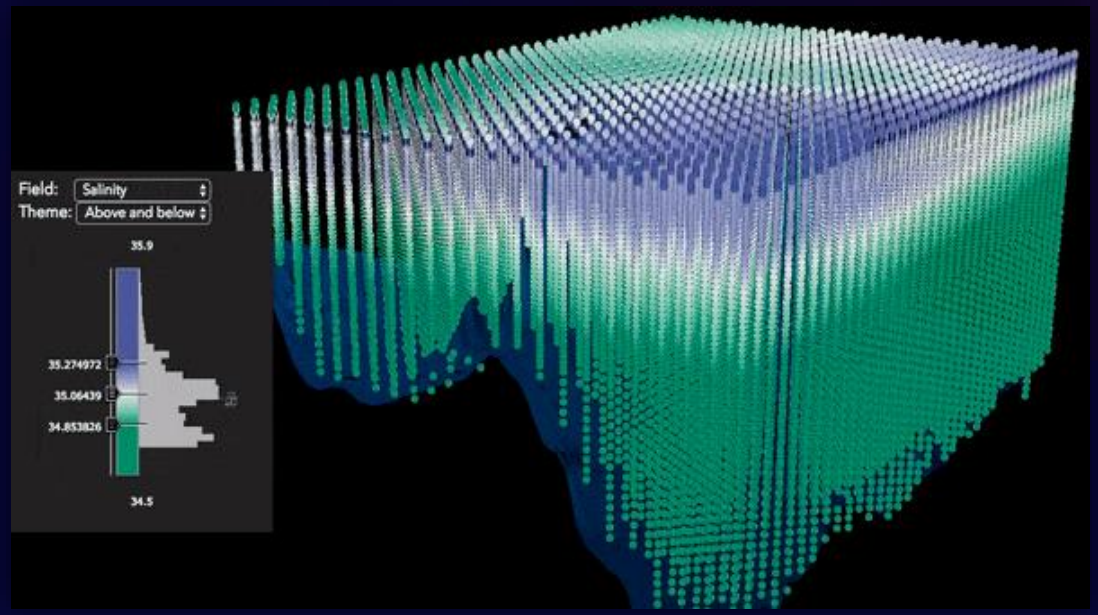
Capacités

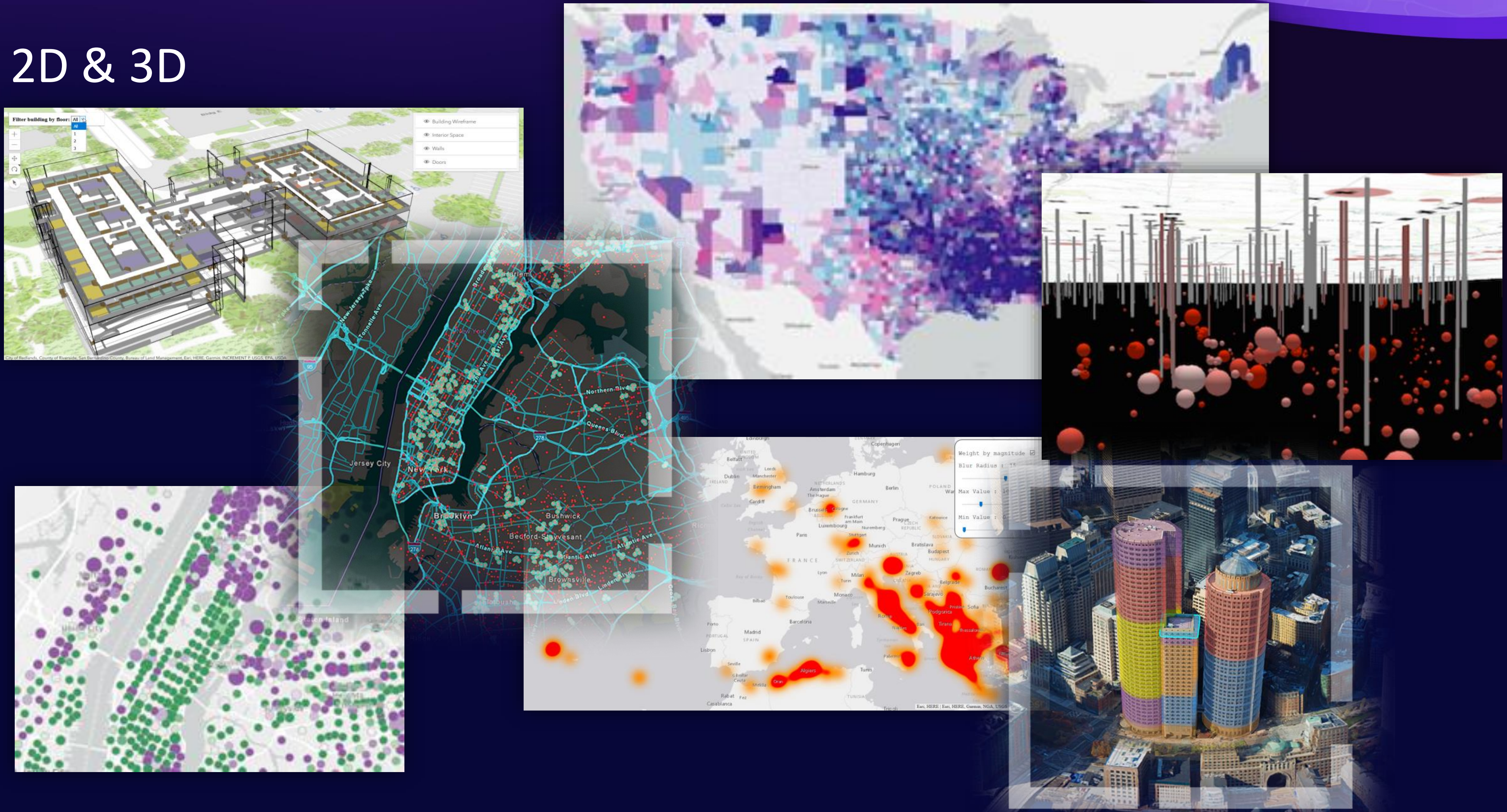
Une API pour le web





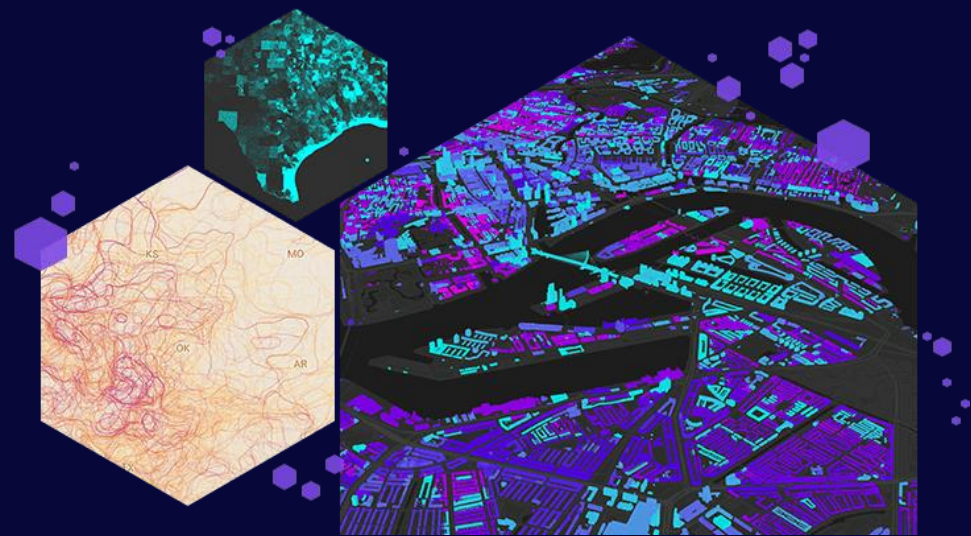
ArcGIS API for JavaScript (3.x) / ArcGIS Maps SDK for JavaScript (4.x)

2D & 3D

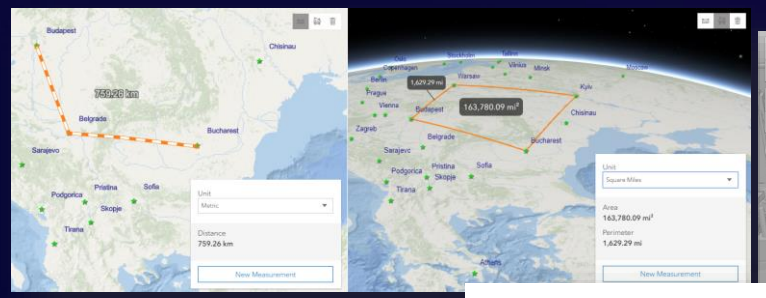


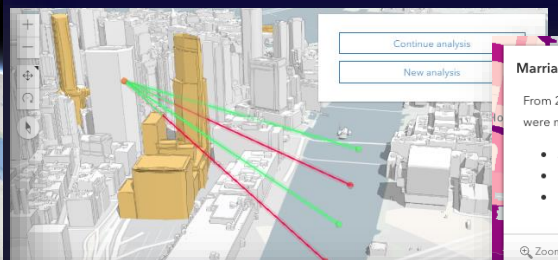
De nombreuses sources de données

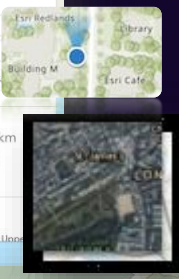
- Tous les items issus d'un portail ArcGIS Online ou ArcGIS Enterprise (couche d'entités, couche de graphique, couche d'image de carte, couche de scène, couche d'imagerie (tuilée ou non),couche de graphe de connaissance (knowledge), couche voxel, couche d'élévation, couche de nuage de points, couche de scène de bâtiment, etc.)
- Services issus d'API tierces (OpenStreetMap, Microsoft Bing, OGC API - Features)
- Services webs et flux OGC (WFS, WMS, WCS, WMTS, GeoRSS)
- Format de données ouverts (GeoJSON, CSV, KML)
- Autres (vidéos, image)

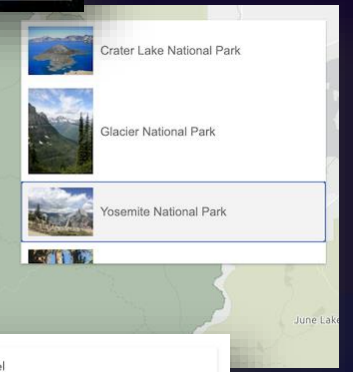


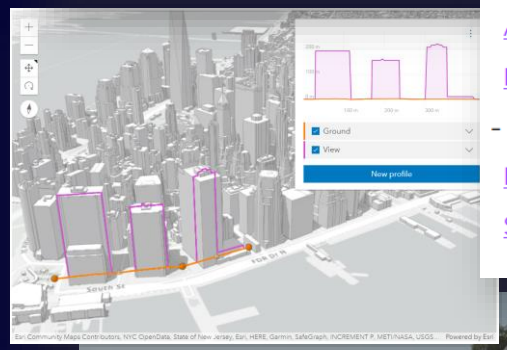
Des widgets pour enrichir les applications



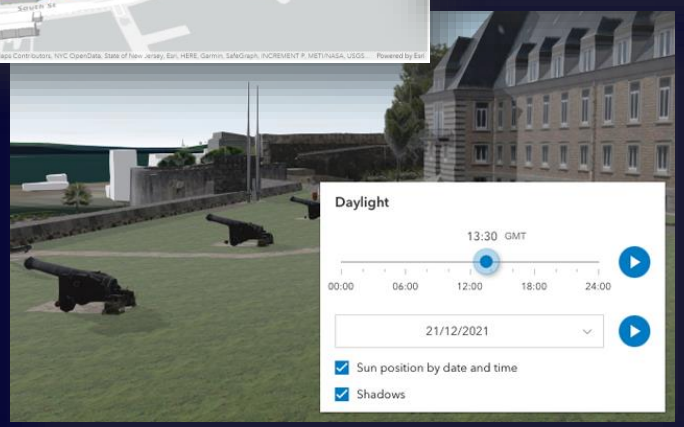


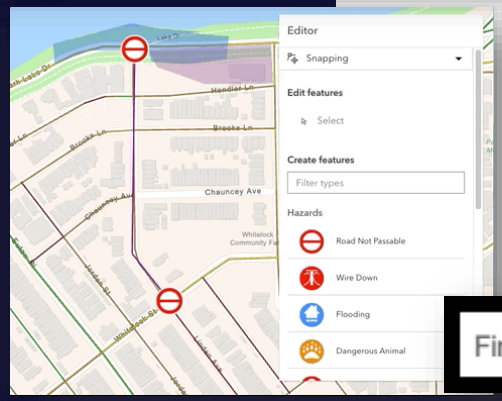


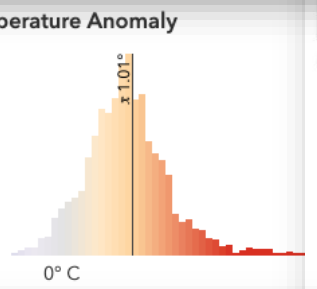


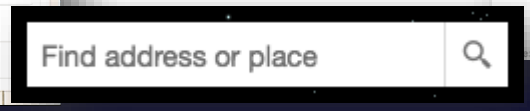


AreaMeasurement2D - AreaMeasurement3D - Attribution - BasemapGallery - BasemapLayerList - BasemapToggle - Bookmarks - BuildingExplorer - Compass - CoordinateConversion - Daylight - Directions - DirectLineMeasurement3D - DistanceMeasurement2D - Editor - ElevationProfile - Feature - FeatureForm - FeatureTable - FeatureTemplates - FloorFilter - Home - LayerList - Legend - LineOfSight - Locate - Measurement - NavigationToggle - Popup - Print - ScaleBar - ScaleRangeSlider - Search - ShadowCast - Sketch - Slice - Swipe - TimeSlider - Track - UtilityNetworkTrace - ValuePicker - Zoom

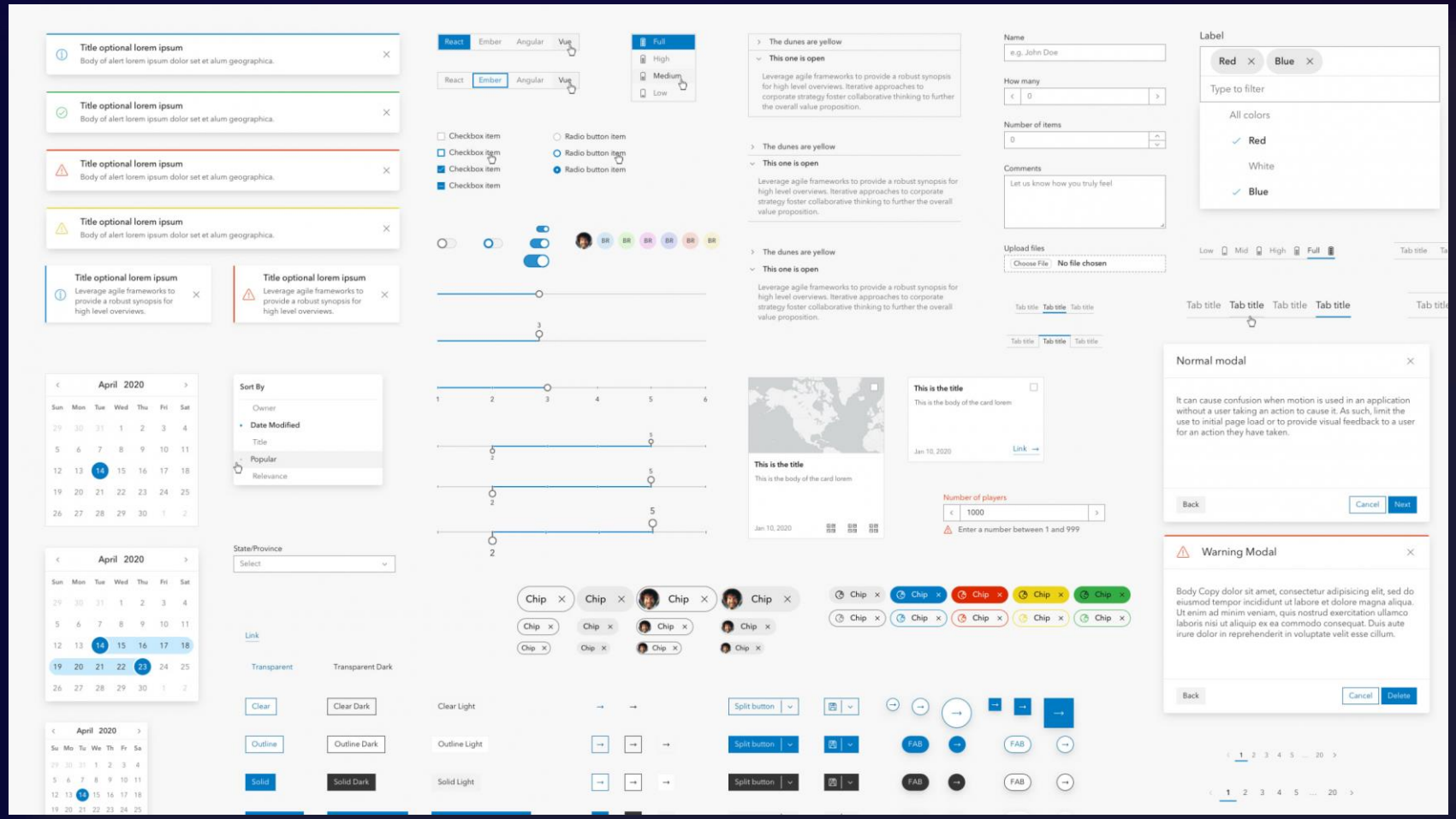




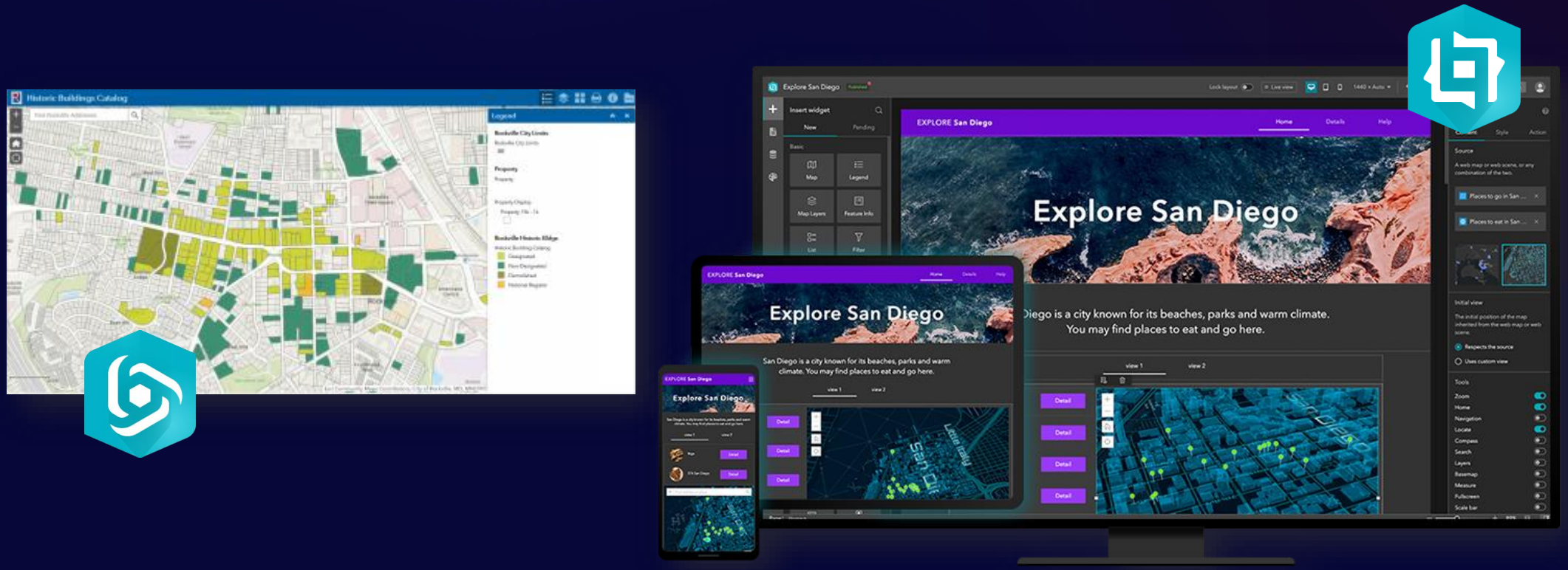




Un style cohérent et personnalisable

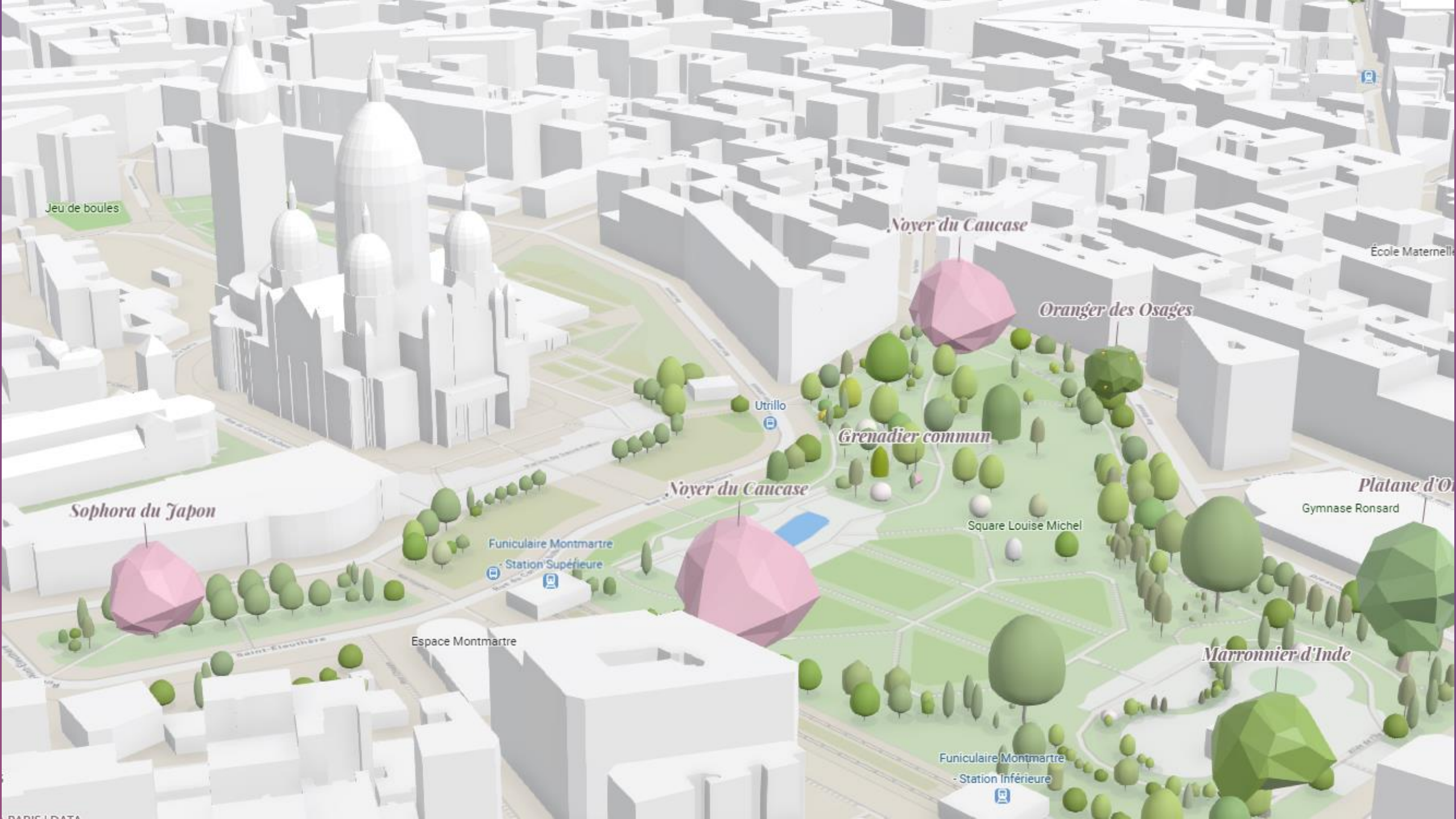


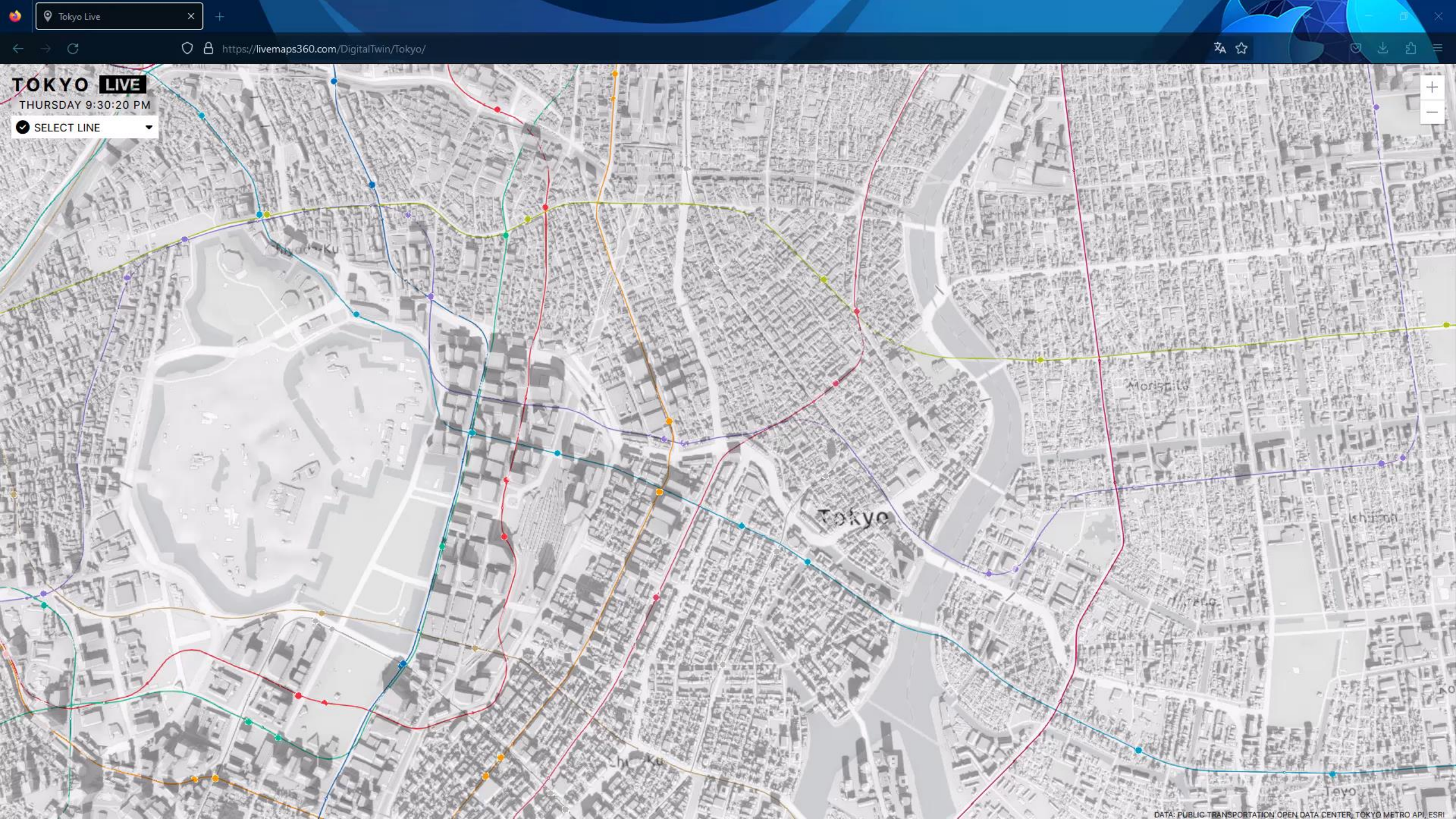
Le socle d’autres applications bien connues du système ArcGIS



Quelques exemples


Hurricanes
Download Hurricanes.csv
Explore hurricanes
Pacific
Atlantic
Powered by Esri


Jeu de boules
Noyer du Caucase
Oranger des Osages
Utrillo
Grenadier commun
Noyer du Caucase
Sophora du Japon
Funiculaire Montmartre
- Station Supérieure
Square Louise Michel
Gymnase Ronsard
Espace Montmartre
Marronnier d'Inde
Funiculaire Montmartre
- Station Inférieure


Tokyo Live
https://livemaps360.com/DigitalTwin/Tokyo/
TOKYO LIVE
THURSDAY 9:30:20 PM
SELECT LINE
Tokyo
DATA: PUBLIC TRANSPORTATION OPEN DATA CENTER, TOKYO METRO API, ESRI

Fonctionnement

Appel à l'API, directive require et ouverture de la fonction

```
<html>
<head>
    <title>Visiter Strasbourg</title>


    <link rel="stylesheet" href="style/style.css"/>

    <!--Référencer l'API-->
    <link rel="stylesheet" href="https://js.arcgis.com/4.18/esri/themes/light/main.css">
    <script src="https://js.arcgis.com/4.24/"></script>

    <script>

        require(["esri/config","esri/Map", "esri/views/MapView", "esri/layers/FeatureLayer",
        "esri/popup/content/AttachmentsContent", "esri/popup/content/TextContent",
        "esri/renderers/UniqueValueRenderer","esri/widgets/Legend","esri/widgets/BasemapGallery","esri/widgets/Expand"],

         function (esriConfig, Map, MapView, FeatureLayer, AttachmentsContent, TextContent,
         UniqueValueRenderer,Legend,BasemapGallery,Expand) {
```

```
         });
     </script>
 </head>
 <body>
        <div id="viewDiv"></div>
 </body>
 </html>
```

L’architecture du code en poupées russes

```
const view = new MapView({
  map: map,
  center: [7.7588522, 48.588221],
  zoom: 14,
  container: "viewDiv"
});
```

MapView / SceneView

```
const map = new Map({
  basemap: "topo-vector",
  layers : [POI]
});
```

Map

Widgets

```
let legend = new Legend({
    view: view
});
view.ui.add(legend, "bottom-right");
```

```
const POI = new FeatureLayer({
    url: "https://services.arcgis.com/d3voDfTFbHOCRwVR/ArcGIS/
    outFields: ["Adresse","Description","Type","Site","Nom"],
    popupTemplate: popupPOI,
    renderer: symbo
});
```

Layers

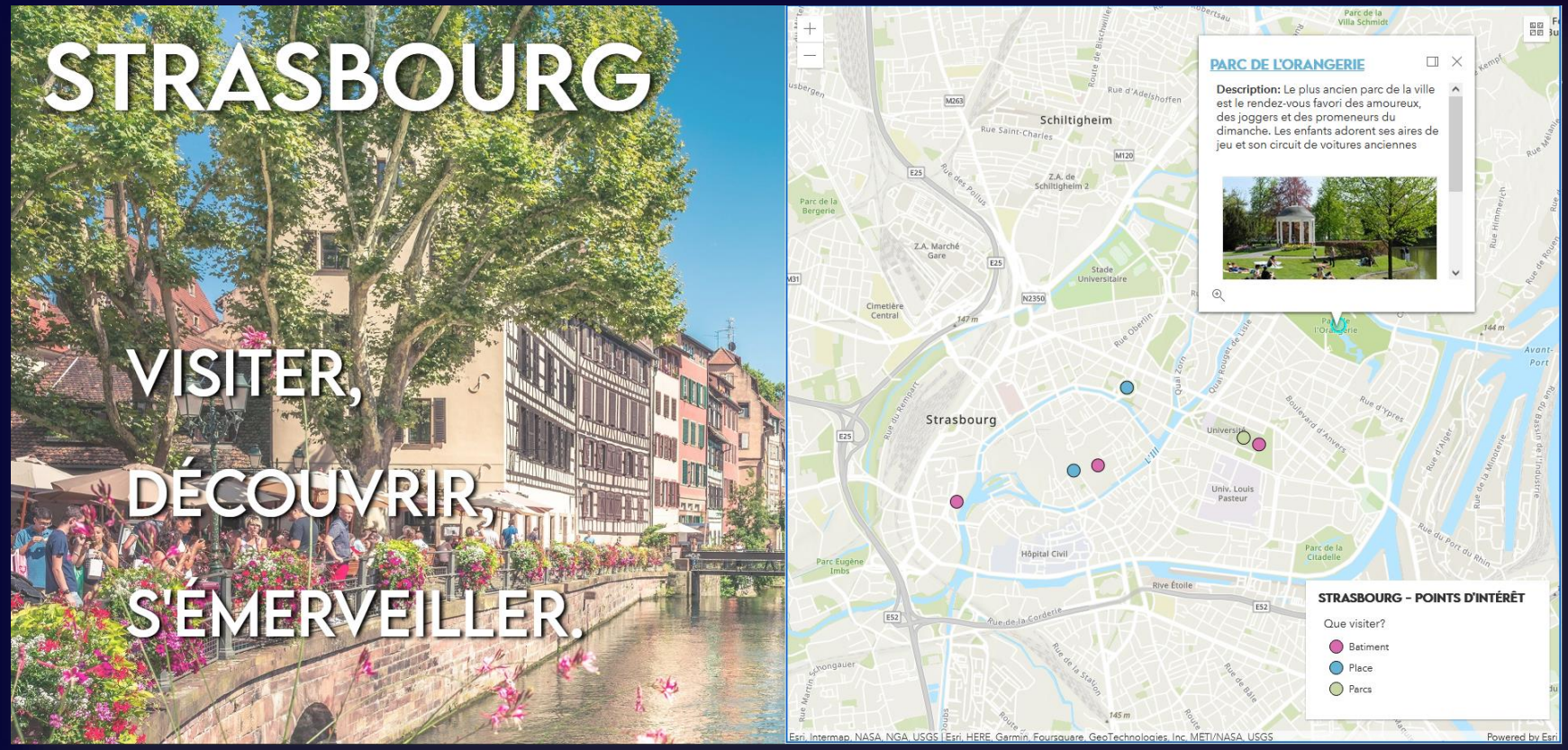
```
let symbo = {
    type: "unique-value",
    field: "Type",
    defaultSymbol: null,
    uniqueValueInfos: [{
```

Renderers

Popups

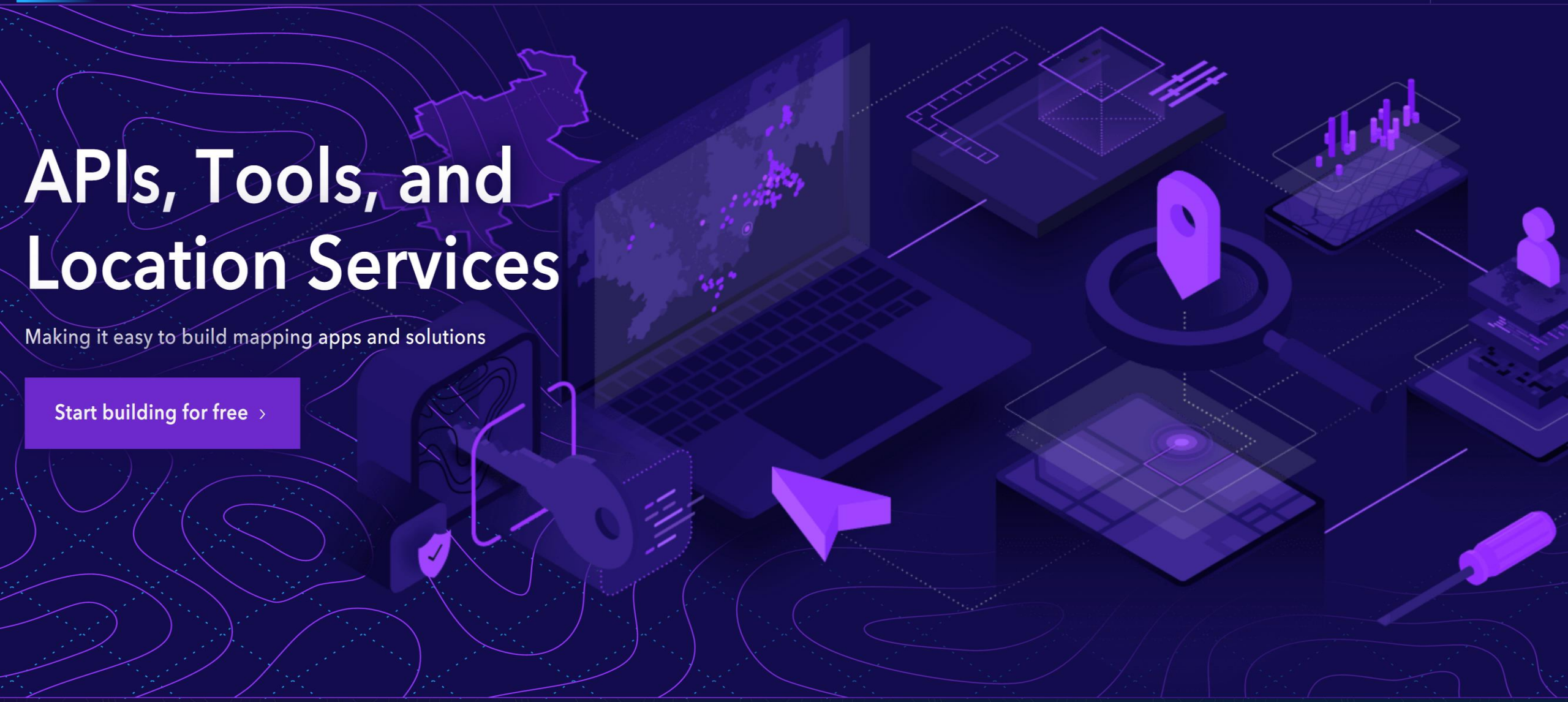
```
const popupPOI = {
    "title": "<a href='{Site}' target='blank'>{Nom}</a>",
    "content": [textElement1,attachmentsElement,textElement2]
}
```

Démo commentée : création d'une application cartographique basique pour un site web



Utiliser la documentation

Site développeurs : Overview/Tutorials, Sample Code, API Reference, Showcase



APIs, Tools, and Location Services

Making it easy to build mapping apps and solutions

Start building for free ›

Overview

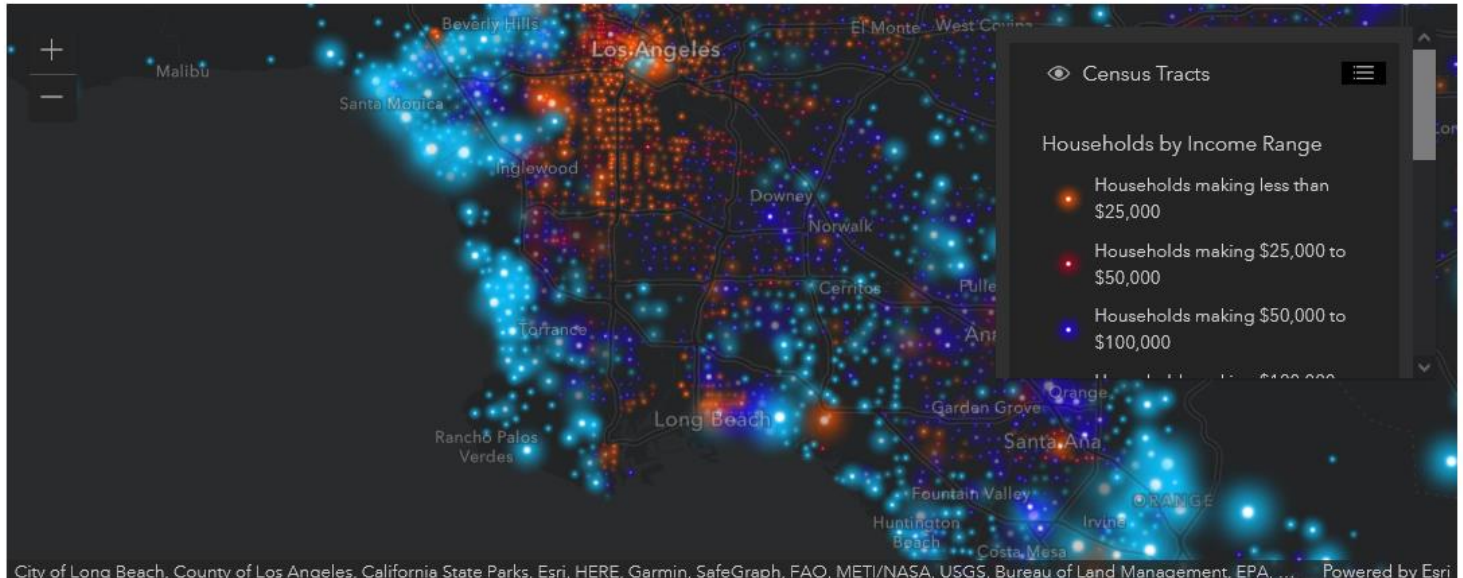
Find page...

- Overview
- Key features
- Get started
- Install and set up
- Release notes
- FAQ
- Community
- Tutorials
- Core concepts
- Visualization
- Building your UI
- Working with ArcGIS Online and Enterprise
- Developer tooling
- Migrating from 3.x
- Reference

Overview

Current version: 4.25 (November 2022)

This guide describes how to use ArcGIS API for JavaScript to build compelling web apps that unlock your data's potential with interactive user experiences and stunning 2D and 3D visualizations.



On this page

- Where to start
- Sample code
- Showcase
- Tutorials
- Blog

Looking for 3.x ?

Was this page helpful?

Yes No

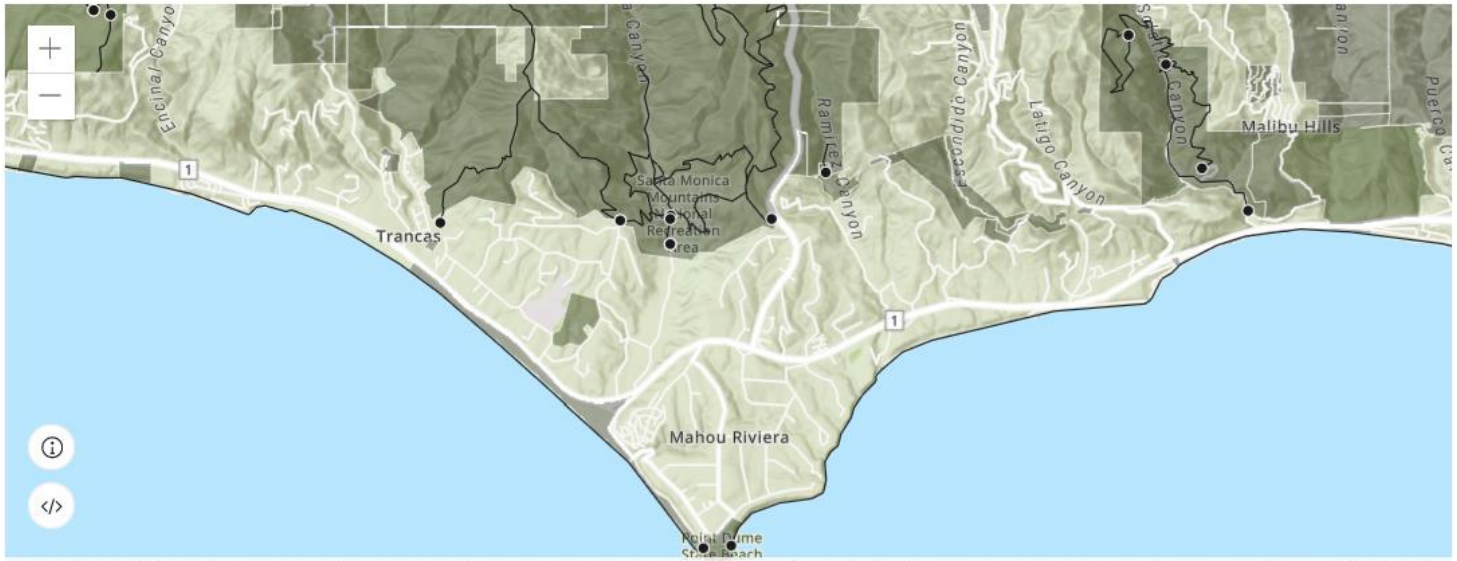
Overview – Tutoriels de prise en main

Find page...

Overview
Key features
Get started
Install and set up
Release notes
FAQ
Community
Tutorials
Maps and scenes
Display a map
Display a scene (3D)
Change the basemap layer
Display a custom basemap style
Add a point, line, and polygon
Add a feature layer
Style a feature layer

Add a feature layer

Learn how to access and display point, line, and polygon features in feature layers.



A feature layer is a dataset in a hosted feature service. Each feature layer contains features with a single geometry type (point, line, or

On this page

Prerequisites
Steps
Create a new pen
Set the API key
Add modules
Add a point feature layer
Add a line feature layer
Add a polygon feature layer
Run the app
What's next?

Solution

View in CodePen

Estimated time

10 minutes

API Reference

Find page...

esri
arcade
Basemap
Camera
Color
config
geometry
Graphic
Ground
intl
kernel
Map
pointCloudRenderers
PopupTemplate
rasterRenderers
renderers

Map

AMD:
```
require(["esri/Map"], (Map) => { /* code goes here */ });
```

ESM:
```
import Map from "@arcgis/core/Map";
```

Class: `esri/Map`

Inheritance: Map > Accessor

Subclasses: WebMap , WebScene

Since: ArcGIS API for JavaScript 4.0

The Map class contains properties and methods for storing, managing, and overlaying layers common to both 2D and 3D viewing. Layers can be added and removed from the map, but are rendered via a MapView (for viewing data in 2D) or a SceneView (for viewing data in 3D). Thus a map instance is a simple container that holds the layers, while the View is the means of displaying and interacting with a map's layers and basemap.

A single map may be referenced by multiple views. This sample for example, contains a single Map that is visible in two separate views - one in 2D and the other in 3D. Because one map may be accessed by multiple views in the same application, all user interaction with a map's layers is handled on the View, not the Map.

An instance of Map is an essential component of the MapView and SceneView. A Map object should be created prior to a view so it

On this page
Constructors
Properties
Methods

Sample Code

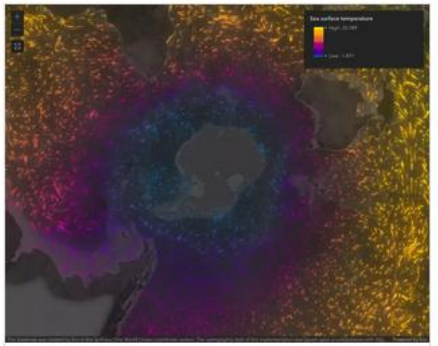
Find page...

- Get started
  - Featured samples
  - Intro to MapView (2D)
  - Intro to SceneView (3D)
  - Intro to layers
  - Intro to popups
  - Intro to widgets
- Latest samples
- Mapping and views
- Layers
- Query
- Editing
- Labels
- Draw
- Visualization
- Popups

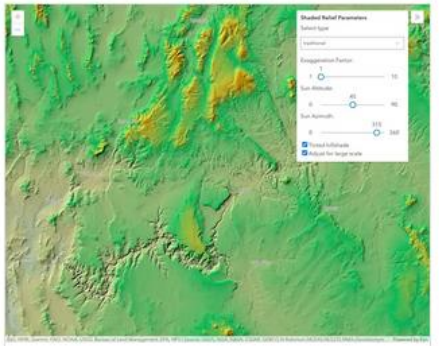
Featured samples

Basemaps with different projections

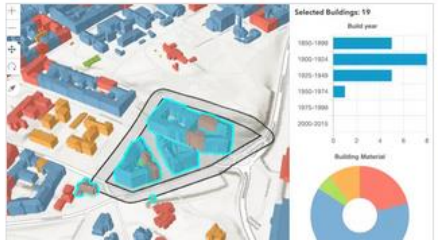
Point clustering - advanced configuration



FlowRenderer with effects and blending



ImageryTileLayer - shaded relief renderer



Showcase

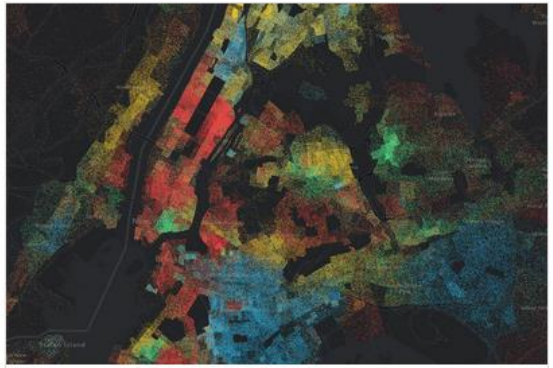
Showcase

Visualize Arctic and Antarctic Sea Ice

Visualize and explore monthly and historical sea ice extents.

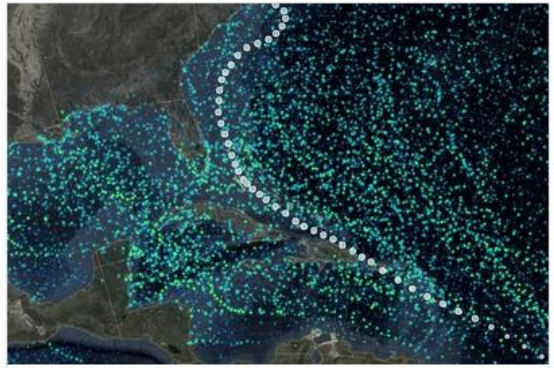
Building Viewer

Create a website that showcases your BIM data



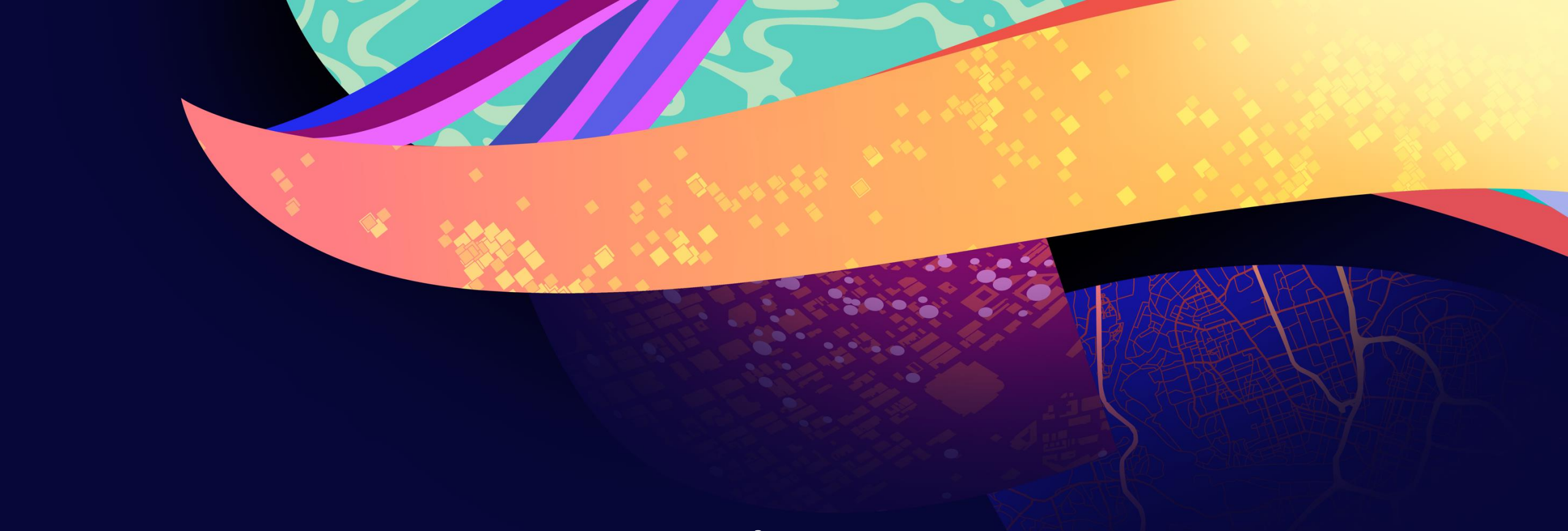
Population Density by Race in the United States

This app visualizes population density by race in the U.S. based on current population estimates as determined by the American Community Survey (ACS).



Hurricane Explorer

Visualize and query hurricanes using powerful client-side processing



La consommation de services

Services à disposition, Pay as you Go, Crédits, Authentification

esri France
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Pourquoi Esri fait ça?

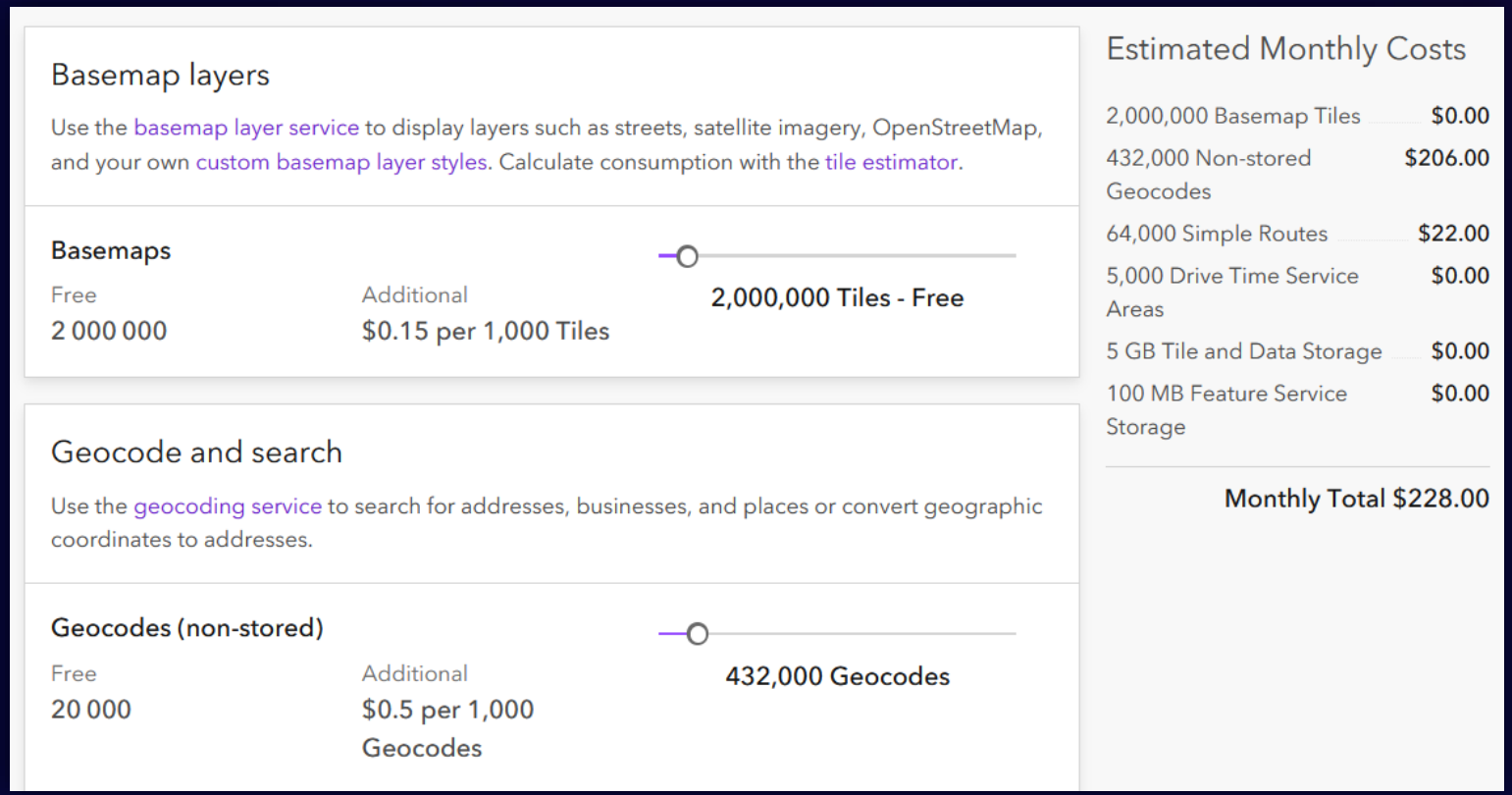
Les services disponibles

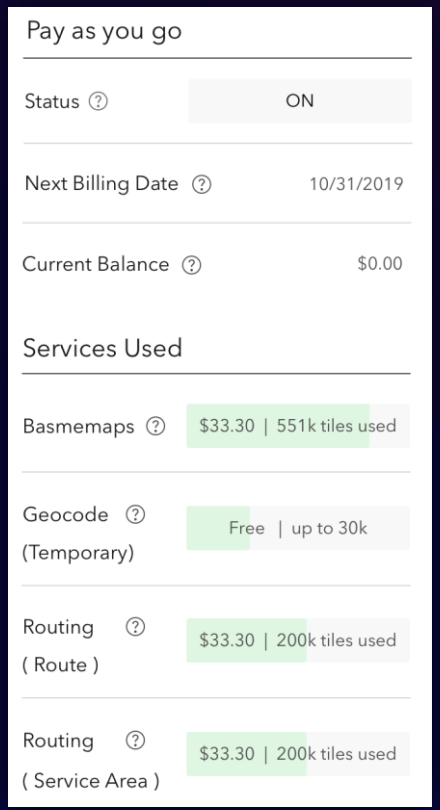
Une offre de services basés sur l'intelligence géographique d'ArcGIS

- Fonds de cartes et couches
- Géocodage
- Places (POI) - *beta*
- Itinéraires & directions
- Géo-enrichissement
- Analyse spatiale
- Hébergement de données

Comment consommer ces services ?

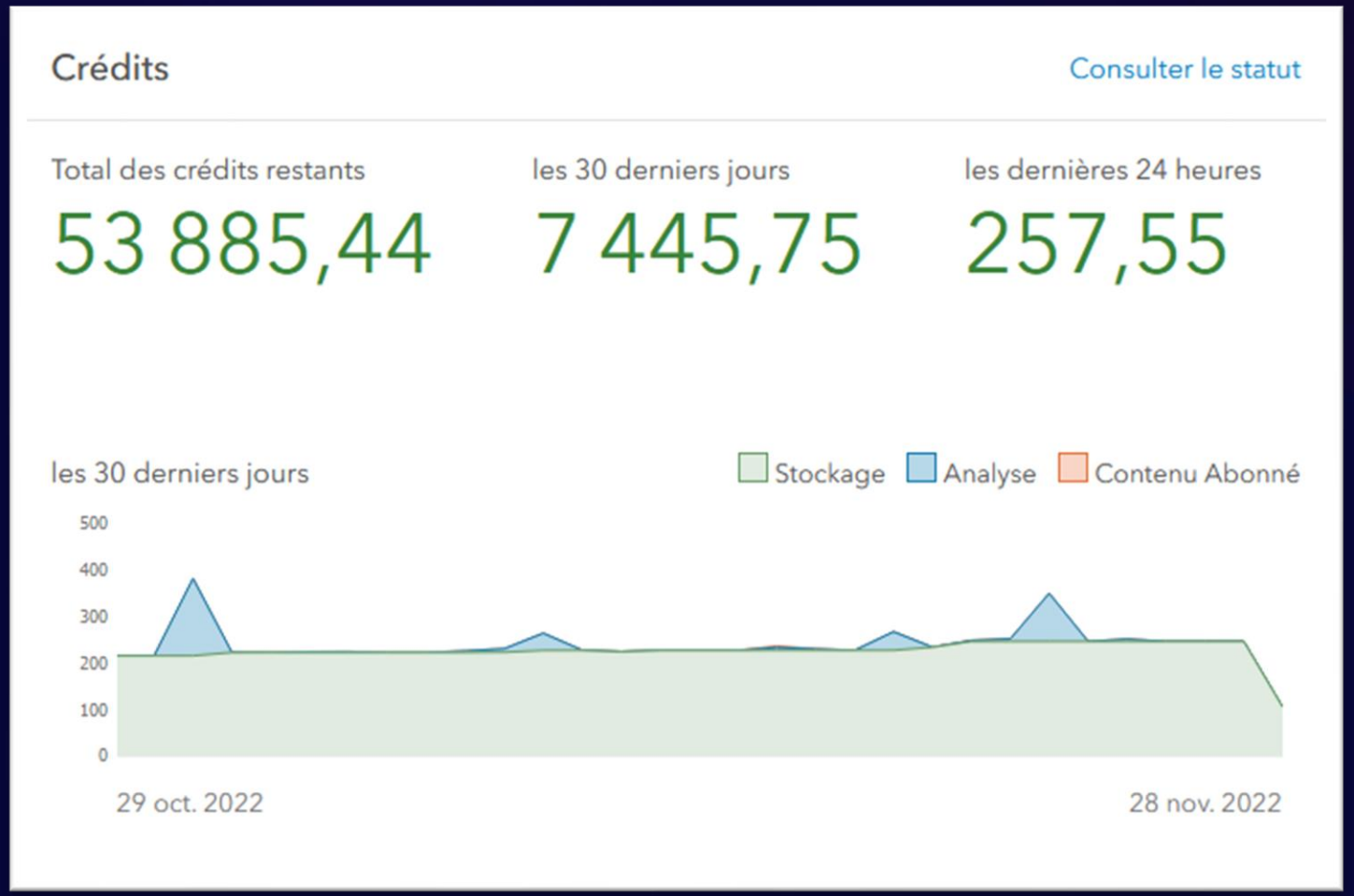
Pay as you go





Comment consommer ces services ?

Abonnement ArcGIS Online et consommation de crédits



Comment consommer ces services ?
Authentification

API Key

- **Méthode d'authentification standard de l'industrie** permettant de s'authentifier avec une **clé d'accès préconfigurée**
- Donne accès aux services de localisation ArcGIS et au contenu développeurs
- Token permanent

Application credentials

- **Méthode d'authentification basée sur OAuth 2.0** permettant de s'authentifier avec les information d'authentification **délivrées à *l'application***
- Donne accès aux services de localisation ArcGIS et au contenu premium
- Token temporaire

ArcGIS Identity

- **Méthode d'authentification basée sur OAuth 2.0** permettant de s'authentifier avec les information d'authentification **délivrées à *l'utilisateur***
- Donne accès aux ressources et aux capacités attribuées à l'utilisateur
- Token permanent

Comment consommer ces services ?
Authentification

	API keys	ArcGIS identity	Application credentials
Permanent tokens	✓	✗	✗
Short-lived tokens	✗	✓	✓
Serverless authentication	✓	✓	✗
Server-based authentication	✓	✗	✓
Restrict to specific services	✓	✗	✗
Restrict to specific referrers	✓	✗	✗
Ready-to-use services	✓	✓	✓
Data hosting services	◔ [1]	✓	✗
Content management	◔ [2]	✓	✗

1. ArcGIS Developer subscriptions only

2. ArcGIS Developer subscriptions only, limited

✓ *Full support* ◔ *Partial support* ✗ *No support*

Comment consommer ces services ?
Authentification

	API keys	Application credentials	ArcGIS identity
ArcGIS API for JavaScript	✓	◔ [1]	✓
ArcGIS Runtime API for Android	✓	✓	✓
ArcGIS Runtime API for iOS	✓	✓	✓
ArcGIS Runtime API for Java	✓	✓	✓
ArcGIS Runtime API for .NET	✓	✓	✓
ArcGIS Runtime API for Qt	✓	✓	✓
ArcGIS API for Python	✓	✓	✓
Esri Leaflet	✓	◔ [1]	◔ [2]
MapLibre GL JS	✓	◔ [1]	◔ [2]
OpenLayers	✓	◔ [1]	◔ [2]
ArcGIS REST JS	✓	✓	✓

✓ *Full support* ◔ *Partial support* ✗ *No support*

1. Requires use of a server component to access and manage token and/or user session.

2. Supports using a token obtained from OAuth 2.0 but lacks advanced identity management features.

Conseils et ressources

developers.arcgis.com, codethemap.fr, GitHub

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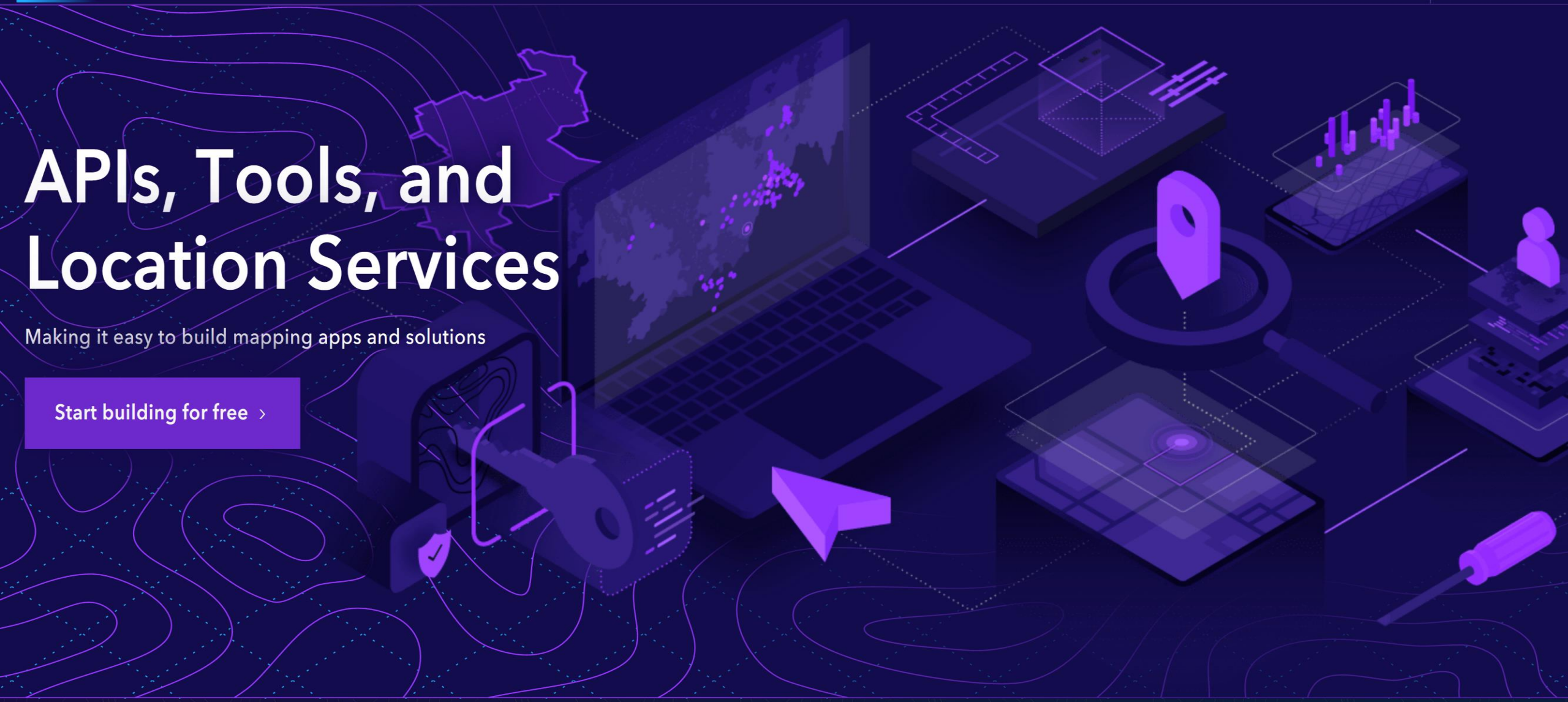

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Étape 2 : Afficher sa carte

2.0 Créer une vue

Nous allons commencer par créer la vue dans laquelle sera affichée la carte par la suite. Nous travaillons en 2D, nous allons donc utiliser une **MapView**.

Rendez-vous sur la page de documentation de MapView.

Le haut de la page vous indique toujours ce qu'il faut ajouter à require et à la fonction ; nous utiliserons le format AMD.

AMD:
```
require(["esri/views/MapView"], (MapView) => { /* code goes here */ });
```

Mettez à jour votre require avec ces informations. Voici ce à quoi il devrait ressembler :

JavaScript
```
    <script>
        require(["esri/config","esri/views/MapView"],
        function (esriConfig,MapView) {

            //Tout le reste du code ira ici
```


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