GIS Catalog

Geographic Information Systems - a complete offering available via ESRI Map Services and served from an ArcGIS Server
What is GIS Services?

When considering a weather data provider, ability to scale as your needs require is vital. DTN data is served from a completely scaleable environment. Our GIS solutions provide the largest selection of precision weather layers on the market today. Map Services are exposed through ArcGIS Server REST endpoints for quickly adding past, present, and future weather to any ESRI maps or apps.
Radar (Map Service)

Radar & Radar Mosaics

DTN processes all the raw, single-site radar data in CONUS, North America, Australia, Europe, and Japan. Once the data are quality controlled, they are mosaicked into a single radar mosaic. Precipitation type is also depicted to distinguish between rain, freezing rain, sleet, and snow. This radar mosaic is available via 2 REST endpoints per region from DTN ArcGIS Server.

<table>
<thead>
<tr>
<th>Region</th>
<th>Current Radar Update Frequency</th>
<th>Past Loop Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONUS</td>
<td>5 minutes</td>
<td>3 hr loop</td>
</tr>
<tr>
<td>NORTH AMERICA</td>
<td>5 minutes</td>
<td>3 hr loop</td>
</tr>
<tr>
<td>AUSTRALIA</td>
<td>6 minutes</td>
<td>60 minutes</td>
</tr>
<tr>
<td>EUROPE</td>
<td>6 minutes</td>
<td>60 minutes</td>
</tr>
<tr>
<td>JAPAN</td>
<td>6 minutes</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>
Radar (Map Service)

Storm Attributes (+Feature Server)

The Storm Attributes service provides useful metrics about the threats associated with a specific storm cell. Storm speed and direction, maximum hail size, rotation, and storm height (echo tops) are included. This attributes are derived from radar algorithms and update every 5 minutes as the radar mosaic updates.

Tornado Vortex Signature - The Tornado Vortex Signature is an attribute assigned to a storm cell that has strong rotation as detected by radar. This rotation is correlated vertically which intimates that the rotation is well organized and a tornado could be possible. This does not mean that a tornado is ongoing, only that the storm is capable of producing a tornado at any time.

Hail Size - This is an estimate of the maximum hail size diameter in inches that would be expected within the storm cell that the hail size value is associated with. The majority of hail in the given storm will normally be smaller than this value as this estimate is a worst-case scenario.

Storm - The Storm layer identifies a unique storm cell. This layer will have all the storm attribute information associated with each specific storm cell.

Projected Path - The Projected Path layer provides the speed in miles per hour and direction in degrees of a unique storm cell to help provide insight as to when a storm may arrive at a particular location.
**Radar (Map Service)**

**TornadoTrax (+Feature Server)**

This important product analyzes real-time radar data across the U.S. looking for areas of rotation. When an area of rotation is identified, the algorithm is able to classify the strength of the rotation and plot the intensity, in real-time.

This product is often used by first responders and emergency managers with many assets to manage. Utilities and pipeline operators have relied on this product to help identify assets that may have been affected in real-time. This can reduce the manpower needed to scout for damage, reduce time needed to restore services, and expedite clean-up and containment efforts for any hazardous materials that may have been impacted.
Satellite & Tropical (Map Service)

Global Infrared (Current & 6 hr Loop)

This map service updates every 30 minutes and provides global infrared satellite data which also indicates cloud top temperatures. Because cloud top temperatures correlate with cloud height, the height of the cloud can be estimated. Colder temperatures indicate higher clouds which indicate stronger convection (stronger storm).
Global Tropical Forecasts Issued by the National Hurricane Center & Joint Typhoon Warning Center

DTN aggregates forecasts from the National Hurricane Center (NHC) and the Joint Typhoon Warning Center (JTWC) to provide global tropical storm/hurricane forecasts. This REST endpoint from DTN ArcGIS Server includes the observed locations (starting when the storm achieves tropical storm criteria), observed track, current location, forecast locations, forecast track (line), forecast error cone, and forecast wind radii (34kt, 50kt, & 64kt). This data service updates as new forecasts are issued from the NHC and JTWC. Note: Wind radii will soon be replaced by a continuous wind swath forecast before June 2018.
Global Tropical Forecasts Issued by DTN Forecasters

DTN Forecasters produce forecasts for tropical storms around the globe. They use the same parameters (prediction/forecast, forecast cone, forecast track) as the forecasts issued by the National Hurricane Center (forecast points, error fan, and wind swath out to 5 days). However, our forecasters create their own which will often deviate from the NHC/JTWC forecasts. In 2017, DTN Significant Tropical Storm Advisories issued on average 50 hours before products from the NHC, and DTN forecast tracks verified better than the NHC 5-year average at all forecast times in 2017. The DTN Tropical Forecasts update every 6 hours and are also available in the WeatherOps Display.
Models (Feature + Map Service)

HPA: Heavy Precipitation Algorithm

The HPA combines radar data and short-term weather forecast models to identify areas of heavy precipitation and forecast where it will be moving in the next 60 minutes. The model takes radar mosaics over various time steps to determine the speed and direction of areas of heavy precipitation. DTN then uses the model to determine where that heavy precipitation will move identified by polygons indicating a moderate or high categorical risk. The algorithm updates every 5 minutes with a revised heavy rain forecast.
Models (Feature + Map Service)

LAPS: Current Condition Analysis

DTN LAPS algorithm combines weather observation point data as well as model data to output a grid of current weather conditions. This algorithm uses quality control routines and physics-based objective analysis schemes to create a grid of current weather conditions regardless of proximity to a weather observation station. The final product is a contoured polygon data set that is made available as an ESRI Map Service. In the case of our “Wind Speed and Direction” product, the data is actually made available as a point data set where wind vectors (arrows) are used to symbolize the wind speed and direction. The point represents the center of each grid point. All of the LAPS current condition data services update every 30 minutes.

- Temperature (polygon) – in degrees Fahrenheit
- Dew Point (polygon) – in degrees Fahrenheit
- Relative Humidity (polygon) – in percentage
- Wind Speed (polygon) – in miles per hour
- Wind Speed and Direction (point) – speed in miles per hour and direction in degrees from north
- Visibility (polygon) – in miles
Models (Feature + Map Service)

Lightning Prediction: CONUS

The Lightning Prediction Algorithm (LPA) is an algorithm that predicts the threat of lightning in the next 60 minutes categorically using moderate and high threats. The polygons are derived and output every 5 minutes from an algorithm that combines radar data and detected lightning. Multiple time steps of radar mosaics are used to determine the direction and velocity of all storm cells in the gridded domain. Detected lightning is then used to identify the area currently affected by lightning and advect that area along the forecast path of the storm cell.
Quantitative Precipitation Estimate (QPE): CONUS

Quantitative Precipitation Estimate (QPE) is a product that utilizes MetStorm quality controlled radar data as input. Based on radar data, our algorithm estimates the amount of rainfall that has occurred across an area over a 1 hour, 6 hour, or 24 hour time period rather, than just at a point where a rain gauge is located.
Models (Feature + Map Service)

Sperry-Piltz Ice Accumulation (SPIA) Index: CONUS

The Sperry-Piltz Ice Accumulation (SPIA) Index is designed to help electric utilities, cooperatives, and transmission organizations forecast damage to their elevated infrastructure due to the impacts of ice storms. The SPIA index is built on nearly a decade of ice storm data consisting of both weather and resulting damage. SPIA’s unique combination of forecast ice accumulation and winds creates an easy to understand index with values ranging from 1-5 (1 – isolated impacts, 5 being catastrophic damage and outages lasting for more than a week). The SPIA Index is the best tool for supporting operational decisions regarding where/when to stage crews, whether to put contractors on retainer before other organizations, and determine if it’s necessary to contact mutual aide partners before an ice storm.

The SPIA index is currently available as a time-enabled map server and a feature server showing forecasts for the index out to 3 days in 6 hour time steps. Whether for display in an operations room, executive briefings, or for alerting using the GeoEvent Server, SPIA is a critical tool for GIS professionals supporting electric utilities through the winter months.
Global (Image Server)

Global Forecast Service

DTN provides global forecast data services through our ArcGIS Server infrastructure. These services are time-enabled and provide forecast weather data out to 10 days and are available via REST endpoints. These forecasts are DTN proprietary forecasts created using a combination of multiple government models (ECMWF and GFS) in a statistically proven manner and our WeatherOps forecasters curation of the forecasts. Below is a list of forecast data services:

• Temperature
  • Hourly
  • Daily High (6 and 24 hr)
  • Daily Low (6 and 24 hr)

• Precipitation
  • Hourly
  • Daily

• Probability of Precipitation – 3 hourly

• Thunderstorm Probability – 3 hourly

• Snow – hourly

• Relative Humidity – hourly

• Cloud Cover – hourly

• Wind – 1 hr Direction, Speed & Gust

• Marine
  • 1 hr Swell Direction, Period & Height
  • 1 hr Wave Height
  • 1 hr Wind/Wave Direction & Height
Global (Image Server)

Global & CONUS Analysis

Surface observations update every 5 minutes and show the current observations for the following weather variables: temperature, relative humidity, and wind speed and direction indicated by wind barbs.

- Temperature
  - 24 hr High & Low (Global)
- Dewpoint Temperature (Global)
- Evapotranspiration Short & Tall (Global)
- 1 and 24 hr Precipitation
- Relative Humidity
- 1 and 24 hr Solar Radiation (1hr only for CONUS)
- Wind Direction & Speed
Global (Image Server)

Real-time Global Lightning (+Feature Server)

DTN is a provider of lightning data from the Earth Networks Total Lightning Network (ENTLN). ENTLN is a high precision, extremely reliable lightning detection network with global coverage. DTN receives lightning data as a real-time feed and makes it available as an ArcGIS map and feature service. The lightning data service updates every minute and contains the last 5 minutes of global cloud-to-ground lightning which includes latitude, longitude, amplitude, polarity, and strike time to the millisecond. See the attached Earth Networks “Total Lightning Network“ for more information.
Alerting (Map + Feature Server)

DTN Forecaster Issued Weather Alerts

As mentioned in the WeatherOps portion of the proposal, DTN Forecasters issue Alerts for a variety of weather threats. These alerts come from polygons drawn by DTN forecasters and come with attributes that describe the weather threat and timing. DTN Forecasters issue alerts for customer assets all over the globe. The map and feature service available via DTN ArcGIS Server provides a REST endpoint so that the polygons drawn by the DTN Forecasters are available for display in mapping applications. These polygons are active in the WeatherOps Display and alerts are sent by email, SMS, and push notification to mobile devices. This service allows for parity across the enterprise whether using WeatherOps Display or a custom GIS application.
Alerting (Map Server)

National Weather Service Watch/Warnings & Advisories (WWA)

This REST endpoint from DTN ArcGIS Server is updated as products are issued by the NWS. NWS WWA includes Severe Thunderstorm Watches, Tornado Watches, Severe Thunderstorm Warnings, Tornado Warnings, Blizzard Warnings, and many others. For a complete listing of all NWS issued watches, warnings, and advisories check their website at: http://www.weather.gov/help-map.
DTN - Actionable Insight to the Nth Degree.

We are the independent, trusted source of insights to our customers, who are dedicated to feeding, fueling and protecting our world. We are proud to empower you with intelligent and actionable insights that exceed your expectations and enable your success daily. You rely on us to make sense of the data, look at it differently and deliver it through innovative, real-time solutions. Whether it is weather, commodity market information, or process improvements, you can trust that we always deliver with precision and accuracy to the Nth Degree. When you prosper, we all win.

Our Values

- **Customer Centric:** We consider our customers in all that we do. We strive to provide an experience greater than their expectations. Our aspiration is to delight our customers every day to help make them successful.

- **Colleague Focus:** We empower, inspire and energize our colleagues treating one another as partners. We endeavor to develop and recruit best-in-class talent to balance our strong historical experience with a view toward the future. We recognize and reward colleagues for their achievements.

- **Innovation:** We encourage a continuous flow of ideas and creativity to offer valuable solutions to our customers driven by innovation. We listen to our customers and embrace an entrepreneurial spirit to help them succeed. We embody an atmosphere that encourages risk taking, speed and agility.

- **Teamwork:** We work together as one team to achieve our goals and serve our customers. Each of us is given the opportunity to have a positive impact on our collective success. We promote and support a diverse, yet unified team.

- **Education:** We are committed to ongoing educational development to accelerate career growth. We promote an environment conducive to learning that drives personal and company excellence to benefit our customers.

- **Integrity:** We act with integrity each and every day employing the highest ethical standards. We treat everyone with the utmost level of respect and we are accountable for our actions. We make clear commitments and we keep them.

DTN invests in research and development to provide new and better ways to help business clients manage weather related risks. We serve clients in the surface transportation, aviation, energy, marine, public safety, turf, construction, recreation, and government communities.
Our vision for the future is to continue to develop the highest quality weather products using leading, proven technology and industry expertise to meet the goals of our mission statement while making our weather information more convenient, more immediate and more valuable to our customers.

**Accuracy**
Accuracy of forecasts can be measured and used as a KPI. DTN performs many varied types of accuracy measurements. DTN also verifies its overall forecast accuracy by submitting its forecasts to an independent third party.

**Reliability**
Reliability is often assumed and not measured, but it is among the most important measures of a weather provider. Weather information must be available at all times without fail. The information that is provided must be free of errors or omissions. These parameters are easily measured with statistics such as uptime, and are an essential performance indicator.

**Timeliness**
Timeliness of weather information is almost as important as reliability. Weather information, especially forecasts, have a very short shelf life, so information that is late or old is of little value. Timeliness can be measured in terms of latency, and can also be judged by comparison to independent sources.

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**our mission**
Empower our customers with intelligent and actionable insights that exceed their expectations and enable their success on a daily basis.

**our vision**
To be the independent, trusted source of insights to our customers who feed, protect and fuel the world.