

Alerting and CAP at The Weather Company, an IBM Business

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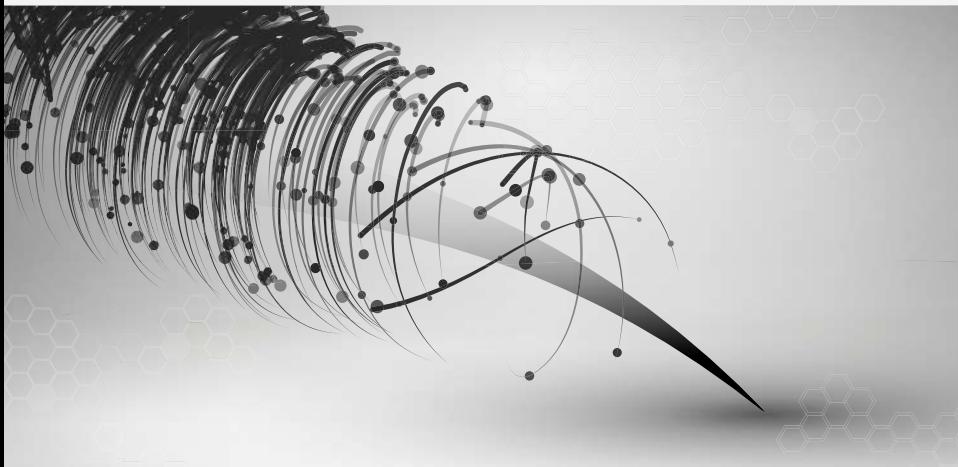
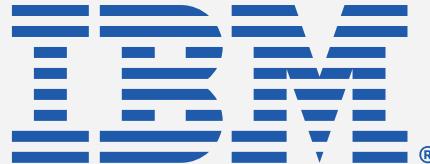
Presentation overview

- Review of several IBM weather brands
- Broad glance at IBM & The Weather Company products and capabilities in the weather alerting space
- Very high-level overview of alert data processing and distribution approaches
- Highlights of decisions and considerations choosing CAP vs non-CAP data
- Questions and discussion



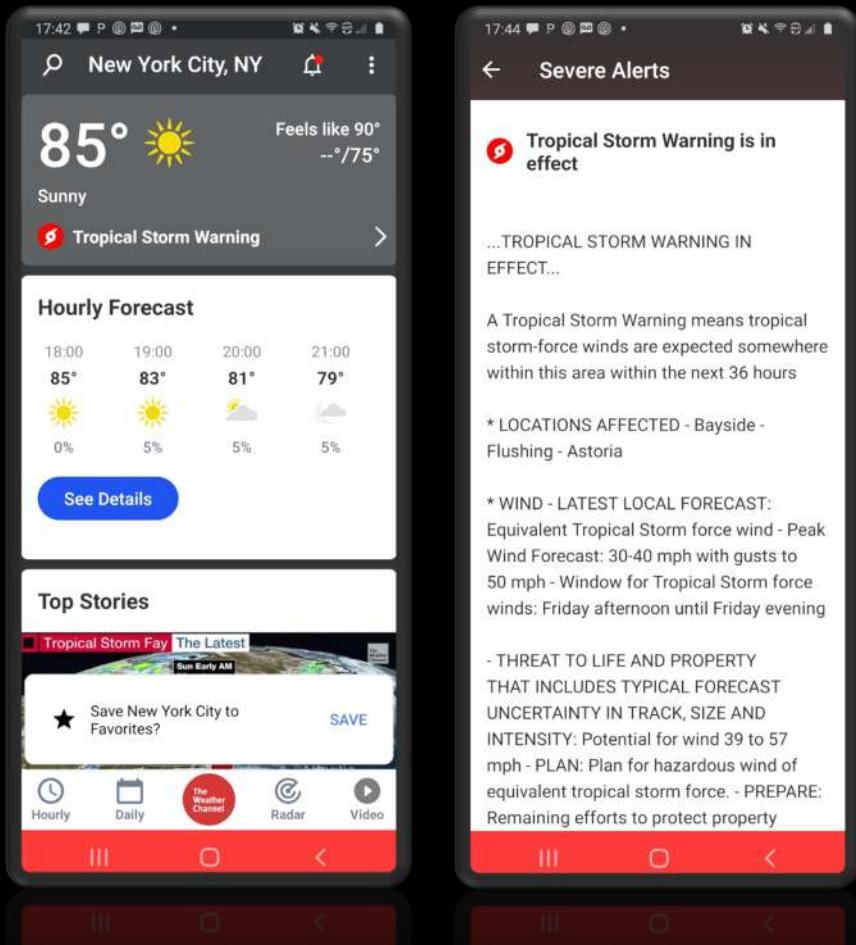
IBM & its weather brands

- IBM acquired The Weather Company on January 29, 2016
- Weather products for consumers (B2C) and businesses (B2B) offered under several IBM-owned brands
- IBM – The Weather Company (TWC) – The Weather Channel – Weather Underground
- The Weather Channel digital properties (mobile applications, weather.com, etc.) owned by IBM
- The Weather Channel U.S. television network, under licensed branding, is owned by Entertainment Studios



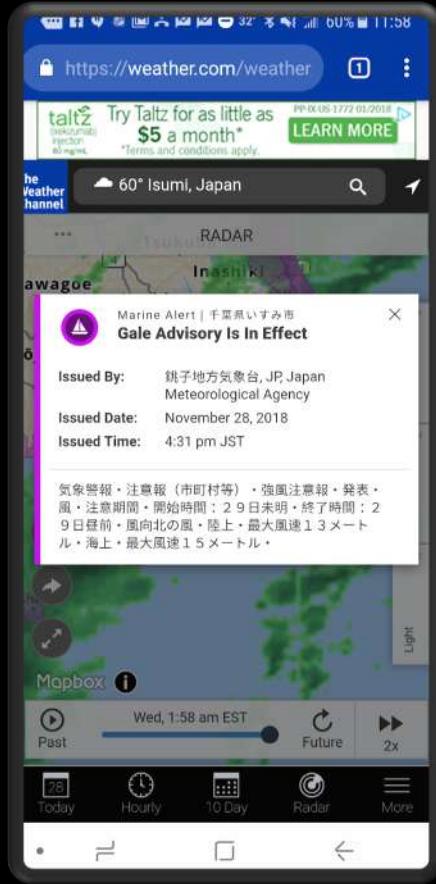
IBM/TWC weather alerting

- Broad international reach
- 330 million monthly consumer users
- TWC role is amplification of government alerting information
- Backed by team of software engineers and meteorological experts dedicated to government weather alerts
- The Weather Channel (right) and Weather Underground mobile apps give users quick, palm-accessible information on emerging weather threats
- “Subscribable” Push notifications for current or important locations

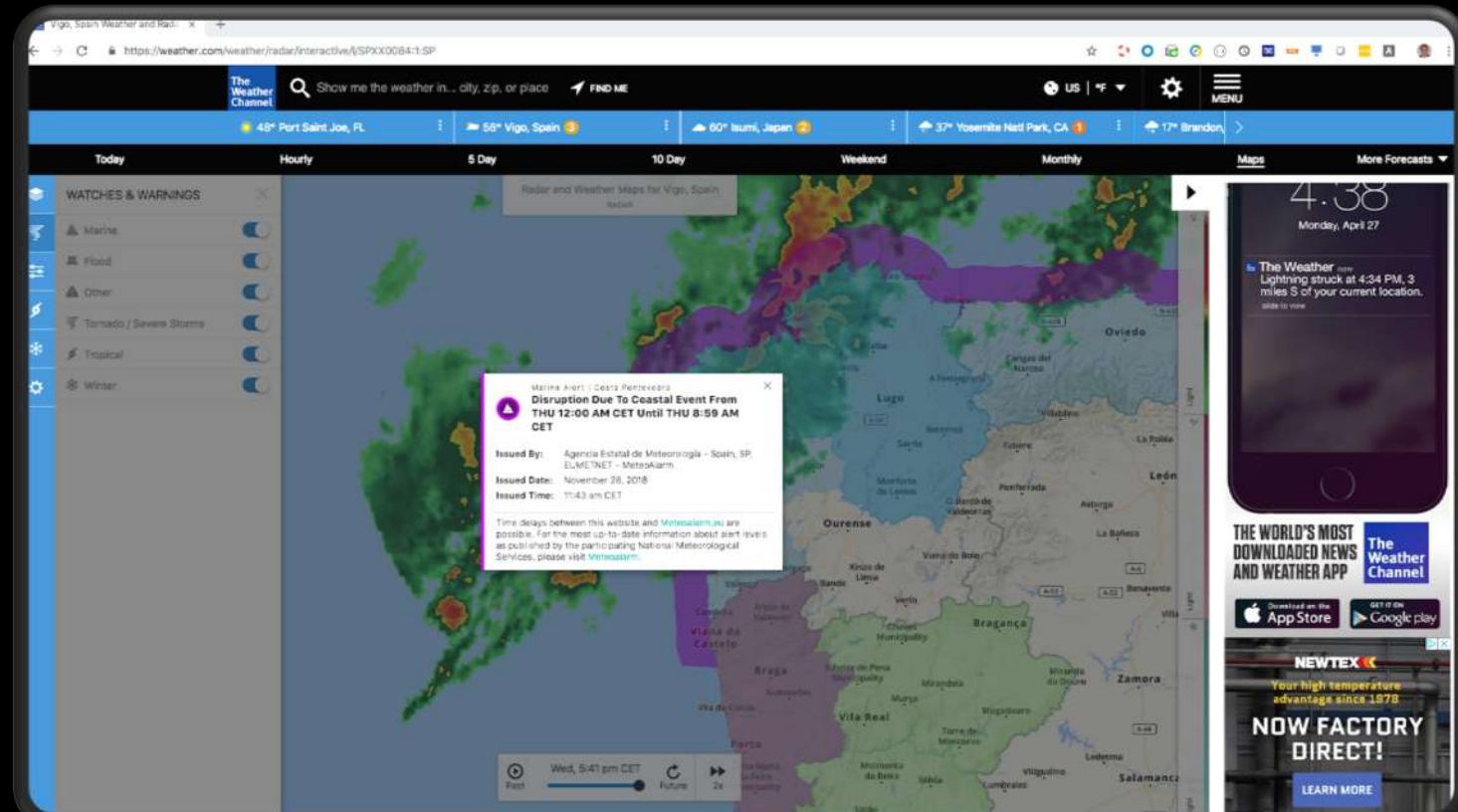


IBM/TWC weather alerting

- The Weather Channel website weather.com equally emphasizes government warnings
- Desktop and mobile browser users kept abreast of potential weather threats to safety and property
- Gale Advisory from Japanese Meteorological Agency shown on weather.com mobile website



IBM/TWC weather alerting



weather.com website

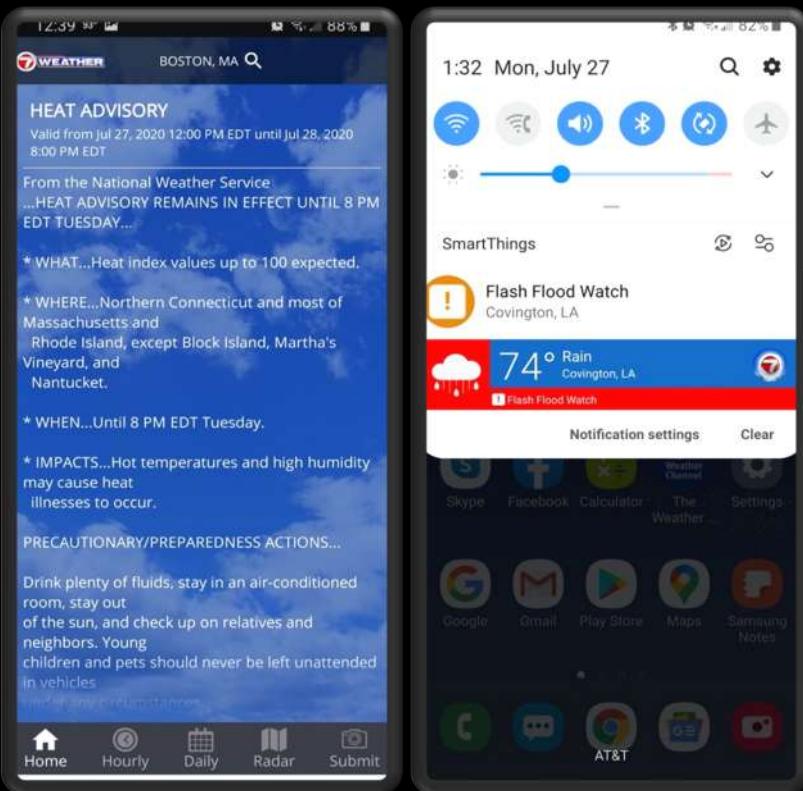
IBM/TWC weather alerting

- TWC has deep history and experience in broadcast meteorology
- Continues to develop innovative media solutions
- The Max weather software ecosystem provides broadcast visualization of government alerting information, including the ubiquitous broadcast weather “crawl” powered by TWC’s LiveWire software.



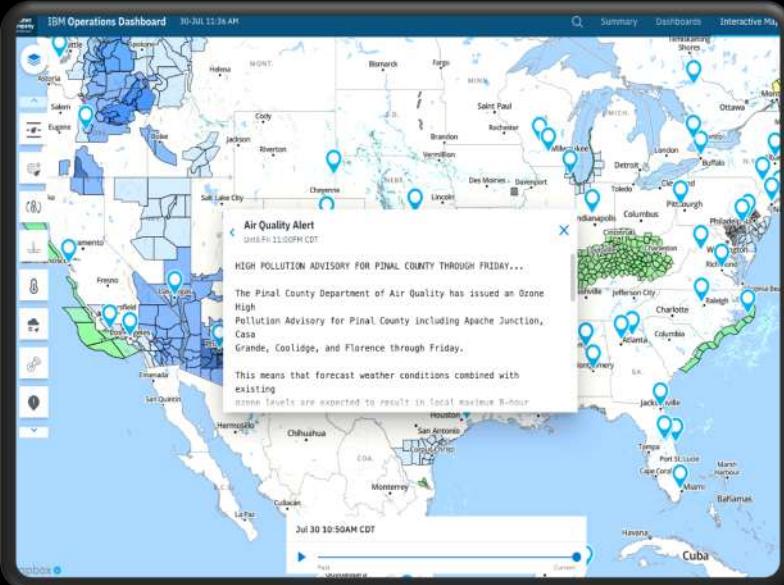
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- “Private-label” weather applications operated by TWC for broadcast weather entities include government weather alerts.



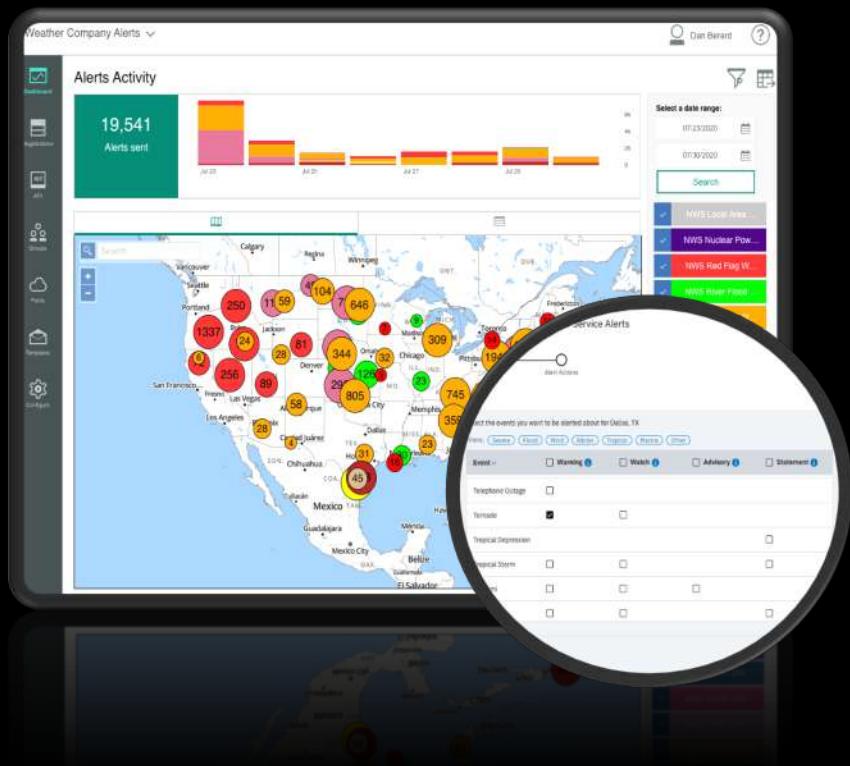
IBM/TWC weather alerting

- IBM Weather Operations Center – plan for and respond to critical weather events to ensure business continuity
- Operations Dashboard component powers high-level insights for businesses sensitive to weather (and other) activity



IBM/TWC weather alerting

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- Scalable alerting component pushes out action items to thousands of personnel



IBM/TWC weather alerting

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- Operations dashboard component powers high-level insights for businesses sensitive to weather (and other) activity
- Scalable alerting pushes out action items to thousands of personnel
- Massively scalable Weather API services provide access to variety of weather data including government alerts for use by enterprises in their own products, systems, software, and applications.

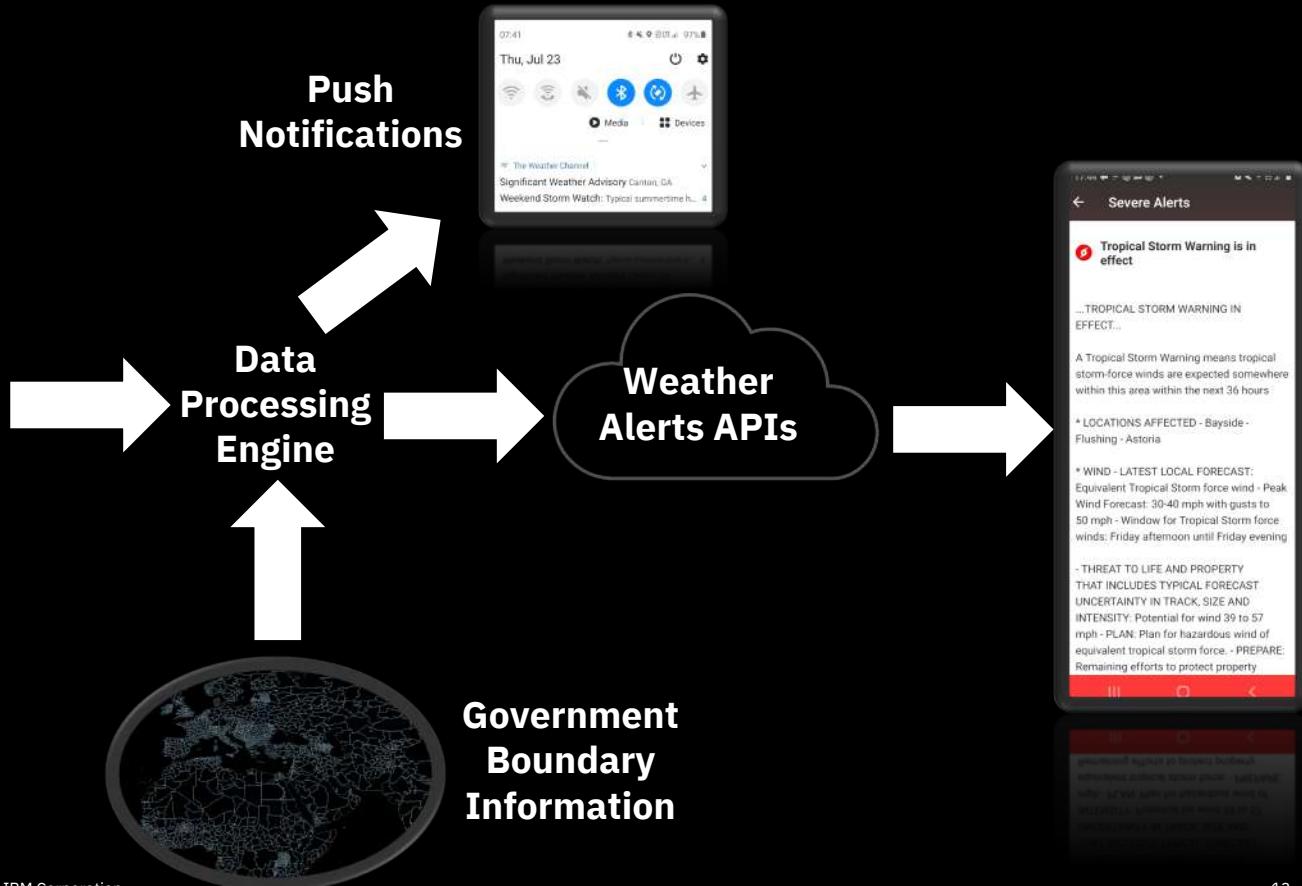
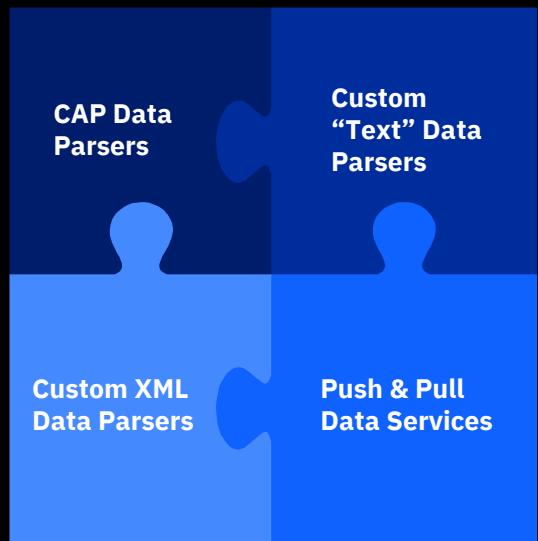
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IBM/TWC alerts processing

- Individually-sourced alerts data
 - U.S. National Weather Service
 - Environment and Climate Change Canada
 - Japan Meteorological Agency
 - Australia Bureau of Meteorology
- Aggregated alerts data
 - Europe via Meteoalarm



IBM/TWC alerts processing



CAP vs Non-CAP Choices

- The Weather Company has invested time and resources in developing CAP processing capabilities
- CAP data **is preferred & desired** by The Weather Company, but still not always the best fit for each circumstance
- Is CAP available for a country / entity?
- Does a custom or legacy format have more information or is it easier to parse?
- Which format satisfies TWC's own API required fields best?
- Is CAP data treated with the same priority as custom formats?



U.S. NWS CAP example

NONCAP	CAP
<p>471 WWUSS4 KMRX 130332 SVSMRX</p> <p>Severe Weather Statement National Weather Service Morristown TN 1132 PM EDT Sun Apr 12 2020</p> <p>TNC065-130345- /O.CON.KMRX.TO.W.0010.000000T0000Z-200413T0345Z/ Hamilton TN- 1132 PM EDT Sun Apr 12 2020</p> <p>...TORNADO EMERGENCY FOR OOLTEWAH AND COLLEGEDALE...</p> <p>...A TORNADO WARNING REMAINS IN EFFECT UNTIL 1145 PM EDT FOR SOUTHEASTERN HAMILTON COUNTY...</p> <p>At 1131 PM EDT, a confirmed large and destructive tornado was located near Cohutta, or 7 miles northeast of Ringgold, moving east at 45 mph.</p> <p>TORNADO EMERGENCY for OOLTEWAH AND COLLEGEDALE. This is a PARTICULARLY DANGEROUS SITUATION. TAKE COVER NOW!</p> <p>HAZARD...Deadly tornado.</p> <p>SOURCE...Radar confirmed tornado.</p> <p>IMPACT...You are in a life-threatening situation. Flying is may be deadly to those caught without shelter. Mobile will be destroyed. Considerable damage to homes,</p>	<pre><?xml version="1.0" encoding="UTF-8" standalone="yes". <alert xmlns:ns2="http://gov.fema.ipaws.services/capreq xmlns="urn:oasis:names:tc:emergency:cap:1.2" xmlns:ns="http://gov.fema.ipaws.services/IPAWS_CAPService/" xmlns:ns3="http://gov.fema.ipaws.services/capresponse"> <identifier>NWS-IDP-PROD-4154576-3518577</identifier> <sender>w-nws.webmaster@noaa.gov</sender> <sent>2020-04-12T23:32:00-04:00</sent> <status>Actual</status> <msgType>Update</msgType> <scope>Public</scope> <code>IPAWSv1.0</code> <note></note> <references>w-nws.webmaster@noaa.gov,NWS-IDP-PROD-4154559-351 8560,2020-04-12T23:27:00-04:00 w-nws.webmaster@noaa.gov,NWS-IDP-PROD-4154529-3518533,2020-04 -12T23:16:00-04:00 w-nws.webmaster@noaa.gov,NWS-IDP-PROD-4154537-3518540,2020-04 -12T23:18:00-04:00 w-nws.webmaster@noaa.gov,NWS-IDP-PROD-4154552-3518554,2020-04 -12T23:24:00-04:00 w-nws.webmaster@noaa.gov,NWS-IDP-PROD-4154555-3518556,2020-04 -12T23:25:00-04:00</references> <info> <language>en-US</language> <category>Met</category> <event>Tornado Warning</event> <responseType>Shelter</responseType> <urgency>Immediate</urgency> <severity>Extreme</severity> <certainty>Observed</certainty> <eventCode> <valueName>SAME</valueName> <value>SVS</value> </eventCode> <eventCode></pre>

U.S. NWS CAP example

- IBM / TWC receives both NWS custom text and U.S. NWS CAP weather alerts
- IBM / TWC primarily processes only the U.S. NWS custom text data
- Today, U.S. NWS CAP is created in a centralized, post-processed fashion
- U.S. is initiating deployment of software to NWS offices to allow for creation of CAP directly by its forecasters, including Urgency, Severity, Certainty fields
- IBM / TWC currently engaged as a partner with U.S. NWS; discussing CAP improvements and prioritized data handling.

Leveraging Common Alerting Protocol (CAP)

Articulating Urgency, Severity, Certainty (U-S-C) Element of the CAP Message

Current				Proposed																												
Pre-defined U-S-C; criteria-based products				Forecasters edit CAP; impact-based information																												
<table border="1"><thead><tr><th>Alert Name</th><th>CAP Urgency</th><th>CAP Severity</th><th>CAP Certainty</th></tr></thead><tbody><tr><td>Wind Chill Watch</td><td>Future</td><td>Severe</td><td>Likely</td></tr><tr><td>Wind Chill Warning</td><td>Expected</td><td>Severe</td><td>Likely</td></tr><tr><td>Wind Chill Advisory</td><td>Expected</td><td>Moderate</td><td>Likely</td></tr><tr><td>Winter Storm Watch</td><td>Future</td><td>Severe</td><td>Possible</td></tr><tr><td>Winter Storm Warning</td><td>Expected</td><td>Severe</td><td>Likely</td></tr><tr><td>Winter Weather Advisory</td><td>Expected</td><td>Moderate</td><td>Likely</td></tr></tbody></table>				Alert Name	CAP Urgency	CAP Severity	CAP Certainty	Wind Chill Watch	Future	Severe	Likely	Wind Chill Warning	Expected	Severe	Likely	Wind Chill Advisory	Expected	Moderate	Likely	Winter Storm Watch	Future	Severe	Possible	Winter Storm Warning	Expected	Severe	Likely	Winter Weather Advisory	Expected	Moderate	Likely	Situation #1: Quick inch of snow with cold front overnight → CAP Severity: Minor
Alert Name	CAP Urgency	CAP Severity	CAP Certainty																													
Wind Chill Watch	Future	Severe	Likely																													
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Winter Weather Advisory	Expected	Moderate	Likely																													
				Situation #2: 2-4 inches of snow overnight on a weekend → CAP Severity: Moderate																												
				Situation #3: 2-4 inches of snow during rush hour → CAP Severity: Severe																												

U.S. NWS proposal for direct forecaster editing of CAP U-S-C fields (Jacks and Nagele 2020)¹.

```
<info>
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  <category>Met</category>
  <event>Tornado Warning</event>
  <responseType>Shelter</responseType>
  <urgency>Immediate</urgency>
  <severity>Extreme</severity>
  <certainty>Observed</certainty>
  <eventCode>
    <valueName>SAME</valueName>
    <value>T0R</value>
  </eventCode>
```

CAP responseType field in CAP-formatted NWS Tornado Warning.

¹Jacks, Eli, and Danielle Nagele. 2020. *A Proposal to Revamp the NWS Watch, Warning, and Advisory System*. Webinar. Silver Spring, MD, Webinar., June 3.

Australia & Canada examples

- Australia ABOM's CAP vs AMOC
 - Issue time field availability ?
 - Synopsis information ?
 - Headline text information ?
 - Phenomena element ?
 - AMOC most widely available & preferred
 - CAP can be processed if available
- Canada CAP (ECCC)
 - Wide availability
 - National Alert Aggregation & Dissemination System (NAAD) / National Public Alerting System (NPAS)
 - CAP used extensively by TWC
 - Some legacy data still processed



Thank you

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