What's next for Monitoring Data Storage and Retrieval?

A sense of future directions…

My rose-colored glasses...

- I have a BS in Computer Engineering
  - The answer is usually "reboot"
- I have spent 15 years using technology to solve air quality problems
- I have spent 15 years using technology to create new problems
- This is a talk about future directions in technology and how *I* think they *might* affect air quality monitoring

Disclaimer

- Past performance does not guarantee future results. Individual results may vary. Not every person responds the same way to this presentation; please consult your doctor before making lifestyle changes as a result of this presentation. Your mileage may vary. Tax benefits of this presentation depend upon your individual financial situation; please consult a tax professional.

Technology number one:

- XML (eXtensible Markup Language)
  - Similar to HTML, but a markup language for data that allows for transfer of machine-interpretable data files
- Why it's cool:
  - Should ensure interoperability
  - Should allow for easier data sharing
  - Will create larger data transactions (not so cool)
- Real World Application
  - The National Environmental Information Exchange Network
  - More on that later

Technology number two:

- ## Web Services
  - Services that accept or publish data over the web, usually using XML format
- ## Why they're cool:
  - A radical change to the "plumbing" of data systems
  - Removes the need to understand the underlying database or its technology
  - Makes everything available to everyone, over a common, universal network

Technology number three:

- ## Satellite Telemetry
  - Using satellites to up- and download data to and from remote sites
- ## Why it's cool:
  - It uses satellites
  - It can solve mobile monitoring data transmission issues
  - It allows a monitor to be placed practically anywhere on the planet

Technology number four:

- ## GIS (Geographic Information Systems)
  - Plotting and analyzing data by its spatial location on the Earth

- ## Why it's cool:
  - Geography is data's Rosetta Stone – almost all data lies somewhere in space
  - Integration is often possible only by geography (e.g., water and air data)
  - Spatially enabled data can be "geo-queried", e.g. how many schools are within five miles of an ozone monitor?

Examples that use one or more of these technologies

- AQS Datamart
  - Has web services and uses XML
  - Could be the foundation for new and exciting applications
  - Makes a rich set of AQS data available automatically
  - Proof of concept for datamarts; more will come.

Examples that use one or more of these technologies

- The National Environmental Information Exchange Network
  - With apologies to Al Gore, promises to be the "information superhighway" for environmental data
  - Rests upon a consistent set of XML schemas and hardware and software standards.
  - Built on the Internet for maximum accessibility
  - CDX (Central Data eXchange) provides a point of entry and departure for EPA data

One of the most exciting new technologies in MY world...

- The Air Quality Data Exchange (AQDE) – DE, NJ, NY
  - 1. Demonstrate State to EPA XML AQS data exchange to CDX, as well as State to State XML AQS data exchange.
  - 2. Develop a common ambient air data repository for storing historical data which can be used to display trends.
  - 3. View the shared results through web services using a GIS interface.
- Early on, my group was approached to integrate an AIRNow flow into this project

One of the most exciting new technologies in MY world...

- AIRNow and AQDE
  - Prototype up and running: AIRNow accepts data from AQDE over the NEIEN, using a subset of the AQS schema
  - AIRNow Tech is used as a central data sharing point, as well as a GIS interface to the AQDE real-time data
  - Plan to open this service in production, to all AIRNow agencies, next calendar year.

Lots of promise...

- AIRNow and AQDE
  - Lays the foundation for single submission of air quality data to AIRNow and AQS (many issues remain, though!)
  - Brings AIRNow onto the NEIEN
  - Use of a common XML schema may spur development of new data transfer software and systems for both AIRNow and AQS

Wrapping it all up

10 years ago – 1996

- – AIRNow was a small, regional program with three ozone monitor polls per day, covering only a few states in the Northeast
- – AQS was just beginning to transition from the mainframe to a UNIX/Oracle platform
- – There was no XML, no web services, not much of a world wide web at all

- Who knows what we'll have in 10 more years?

Wrapping it all up: a note of caution

– My favorite quote from the movie Jurassic Park:

Ian Malcolm (played by Jeff Goldblum) says, as the surviving characters flee the island, which is completely overtaken by prehistoric creatures:

"Yeah, but your scientists were so preoccupied with whether or not they could, they didn't stop to think if they should."