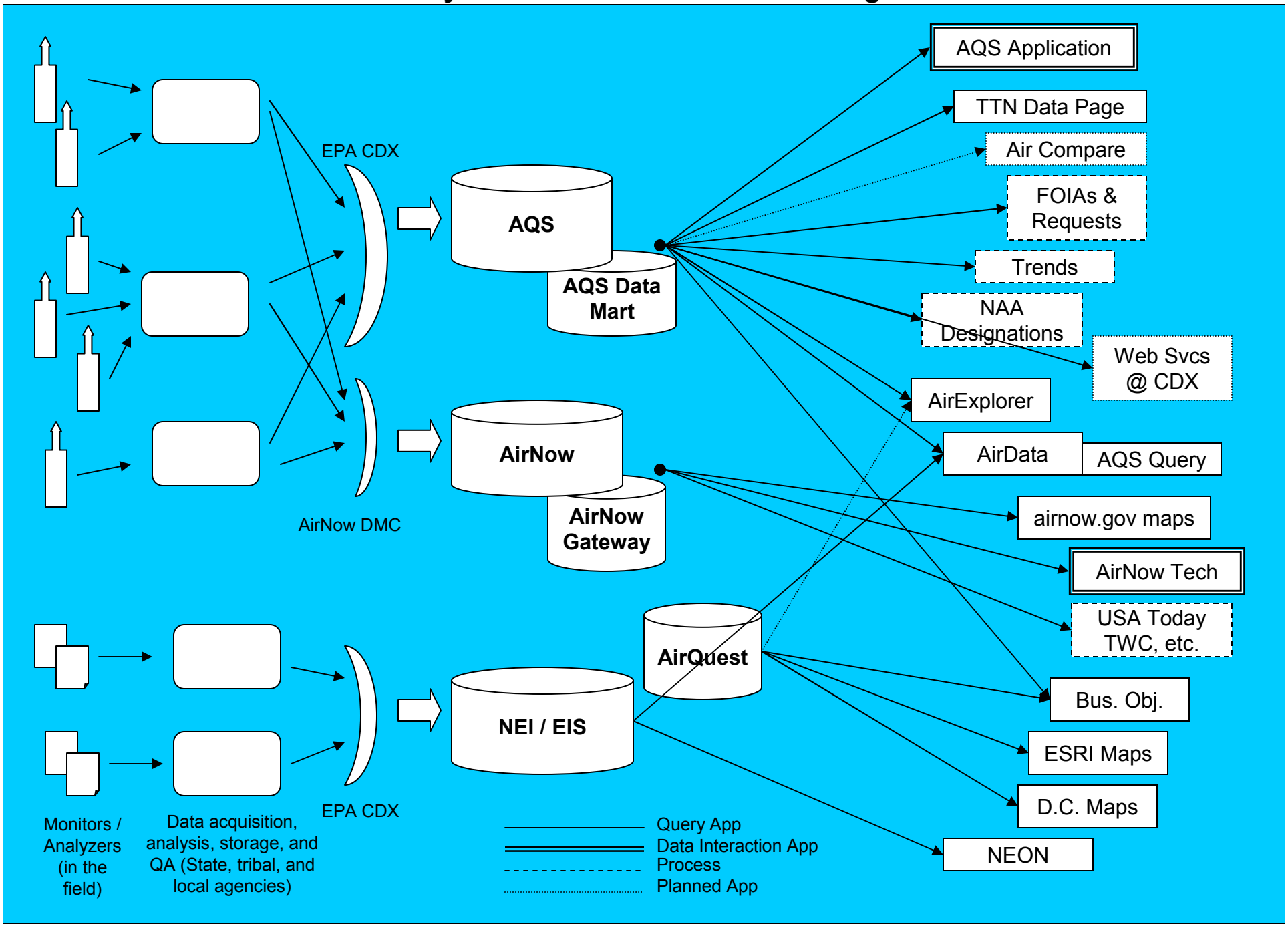
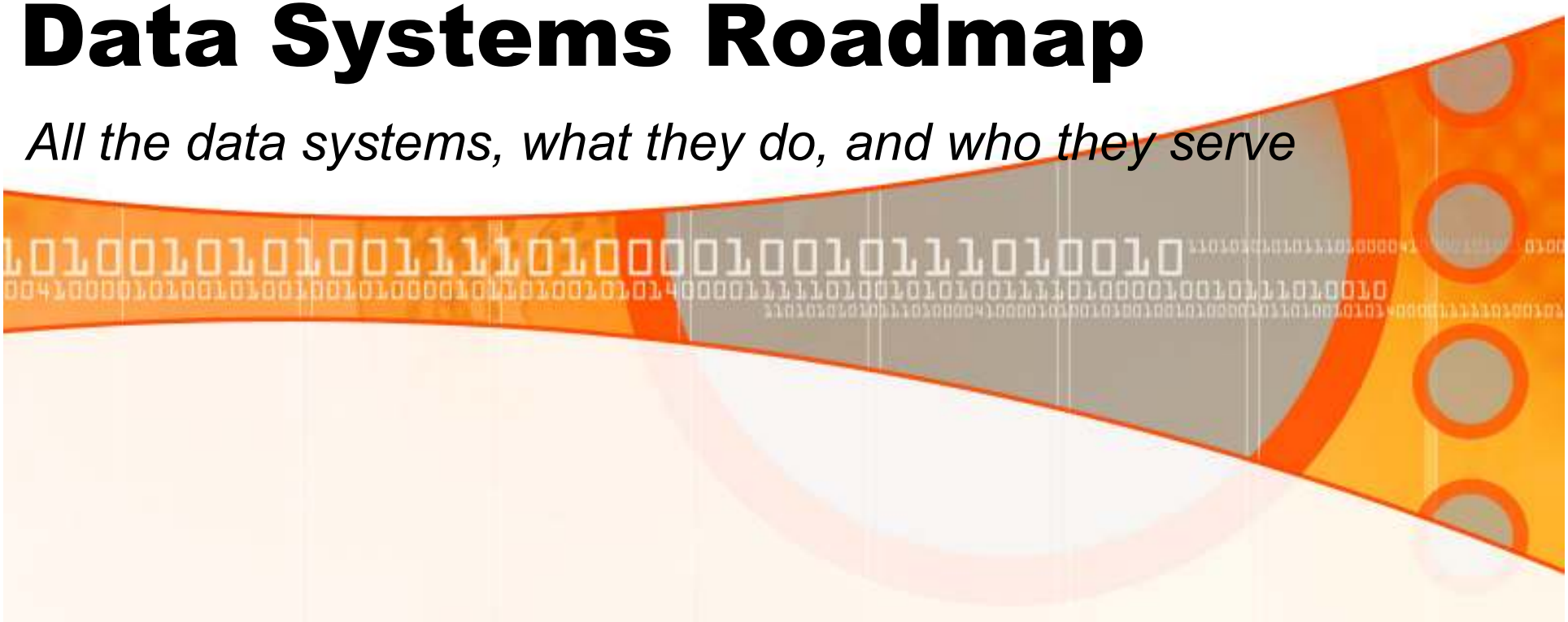
Air Quality and Emissions Data Flow Diagram



Data Systems Roadmap

All the data systems, what they do, and who they serve



Why so many?

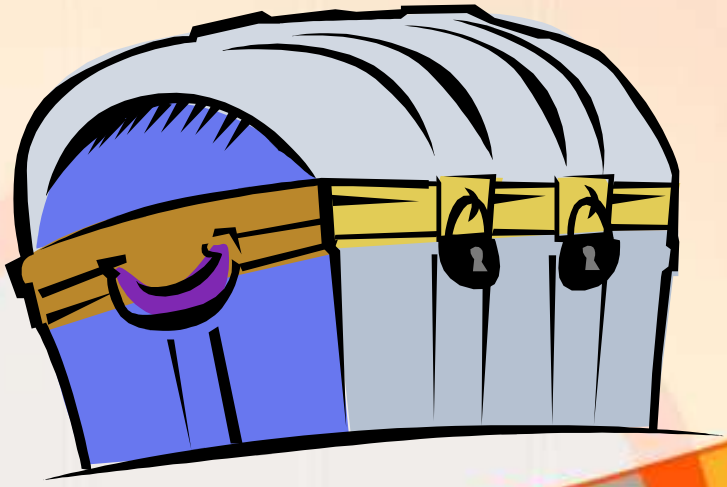
- *Different functions*
  - *Collection, storage, integration, analysis*
- *Different histories*
  - *Some regulatory, others voluntary*
- *Different audiences*
  - *State/Local/Tribal, general public, researchers*
- *Different technologies*
  - *Real-time*
  - *Warehouse*
  - *Transactional database*
  - *Web-based application*

The many data systems…

- ***Data Collection & Storage***
  - *AQS*
  - *NEI/EIS*
  - *AIRNow*

  Data Availability, Processing, & Integration
  - *AQS Data Mart*
  - *AIRNow Gateway*
  - *AIRQuest Data Warehouse*
- ***Analytical Applications***
  - *Many, including AIRExplorer, AIRData, etc.*

Data Collection and Storage Systems



AQS

- *History*
  - *First national ambient air quality database*
  - *Submittal required by monitoring regulations*
  - *High quality data used for regulatory purposes*
- *Audience*
  - *Data: SIP developers, toxic risk assessors, RIA's, trends and other air quality analyses, health studies*
  - *System: Registered AQS users*
- *Unique Attributes*
  - *Not real-time*
  - *Contains detailed measurements (hourly) for criteria and toxic pollutants from 1994 thru current.*
  - *source of air quality data for AirData, Air Quest and AQS Data Mart*
- *Subsystems*
  - *Pre-1996 data archived off-line and available by request*
  - *AQS Data Mart*

Emission Inventory System (EIS)

- *History/Purpose*
  - *Recently approved data base to store National Emission Inventory*
  - *For use in regulatory applications by EPA, State, local and tribal agencies*
  - *All users will have direct access to load/edit/retrieve data*
- *Unique Attributes*
  - *Will contain both detailed and summary level data for criteria and toxics pollutants*
  - *Can store greenhouse gases inventories*
- *Subsystems*
  - *To be determined*

AIRNow

- *History*
  - *Arose to fill the reporting gap between real-time and quarterly AQS reporting*
  - *Became a tool for the general public to determine their current air quality*
- *Audience*
  - *Raw Data: forecasters, researchers, NOAA*
  - *Processed data: media outlets*
  - *AIRNow web site: general public*
- *Unique attributes*
  - *Outside the NCC*
  - *Real-time, driven by hourly processing schedules*
- *Subsystems*
  - *AIRNow Tech*
  - *AIRNow Gateway*

Data Availability, Processing, & Integration

AQS Data Mart

- *History*
  - *Recently developed by OEI/OAQPS*
  - *Responds to National Academy of Sciences (NAS) report, making AQS data more accessible to scientists and others*
- *Audience*
  - *Scientists and analysts who want self-service access to detailed data*
  - *People who build display and sharing applications*
- *Unique Attributes*
  - *Contains both detailed and summary air quality data since 1980*
  - *Contains scope of criteria and toxics pollutants in AQS*
  - *Data are current, refreshed nightly*
  - *Integrates AQS and AirNow data (and other OEI data)*
- *Subsystems*
  - *None*

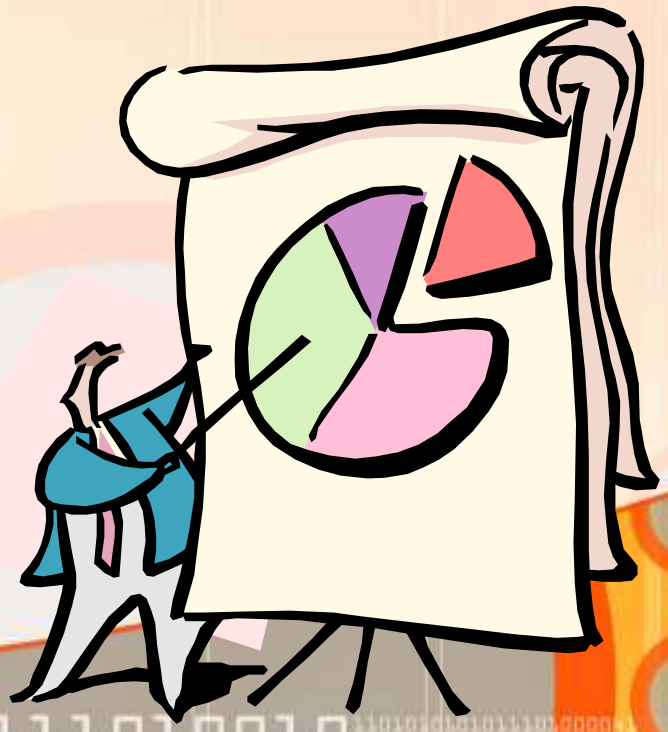
AIRNow Gateway

- *History*
  - *Increasing demand for real-time data by media partners, researchers, etc. ORD's GEOSS Advanced Monitoring Initiative (AMI) program provided funding*
- *Audience – AIRNow public partners – TWC, USAToday, academia*
- *Unique attributes*
  - *Independently hosted outside of EPA and DMC for maximum accessibility*
  - *Will remove access load from AIRNow's primary real-time database*

AIRQuest Data Warehouse

- *History*
  - *Priority from OAQPS Long Range Planning Exercise*
  - *Prototype released in FY03, accepted by OAQPS management, development continued*
- *Audience*
  - *OAQPS analysts and managers*
  - *Application builders and their users who need access to high-quality, integrated air quality data*
- *Unique Attributes*
  - *Codifies analytical processes to produce a single, high quality, refined dataset that meets analysts needs*
  - *Integrates AQS, AirNow, NEI, and supporting data*
- *Subsystems*
  - *AIRQuest Mapper (GIS)*
  - *Business Objects interface (tabular queries)*

Analytical Applications



AIRNow Tech

- *History*
  - *Demanded by AIRNow data submitters in order to query their, and other partners, data*
- *Audience – AIRNow data submitters*
- *Unique attributes*
  - *Only query tool for real-time data*
  - *Hosted off-site at Data Management Center*
- *www.airnowtech.org*

AirExplorer

- *History*
  - *Data analysis tool allowing users to map, plot, or download tables of data*
  - *Started small and evolved into public application*
- *Audience*
  - *Analysts who want quick visual access to summary data*
- *Unique Attributes*
  - *Presents data in format familiar to and desired by most analysts*
  - *Only source of corrected PM speciation data*
  - *Built entirely in-house by EPA staff*
- *Subsystems*
  - *Can be connected to a backend database (like AQS Data Mart or AirQuest) but currently copies data and stores separately*
- *www.epa.gov/airexplorer*

AirData

- *History*
  - *Data analysis tool allowing users to map, plot, or download tables of data*
  - *One of the first public web apps to offer emissions or AQ data*
- *Audience*
  - *The general public, although must know a bit about AQ data*
- *Unique Attributes*
  - *The only public app to offer both emissions data and air quality data*
- *Subsystems*
  - *None. But, can be connected to a backend database (like AQS Data Mart and/or AirQuest) but currently copies data and stores separately in another database.*
- *www.epa.gov/air/data*

Comparison of Systems

KP = known public
AP = anonymous public
I = Internal only

System	Back End / Front End	Raw Data	Summary Data	Parameters	Audience	Notes
AQS	Database Web App	1995 – Present	1950's – Present	AQ: CAPS, HAPS, Species, Met	KP	feeds AirData, AirQuest and AQS Data Mart
AirNow	Database Web Page	2002 – Present	2002 - Present	AQ: CAPS	AP	Lots of media users
EIS/NEI	Database Web App	Current Year + 3 Previous	1990 - Present	Emissions: CAPS & HAPS	I	Still in planning phase
AQS Data Mart	Database Various	1980 – Present	1980 – Present	AQ: CAPS, HAPS, Species, Met	KP	currently operating in a pilot phase.
AirNow Gateway	Database Various	2002 – Present	2002 – Present	AQ: CAPS, HAPS, Met	KP	Planned for FY 07
AirQuest	Database Various	EM: 2001	AQ: 1990 – 2005 EM: 1990-2001	AQ & Emissions: CAPS, HAPS; met, census, utility, etc.	I	
AirNow Tech	Database Web App	2002 – Present	2002 - Present	AQ: CAPS	KP	Data feeds into AQS mart and AIRQuest
AirExplorer	Database Web Page	---	1996-2005	AQ: CAPS, Benzene, Species	AP	Could use Data Mart or AirQuest as back end
AirData	Database Web App	---	AQ: 1995 – 2005 EM: 1990-2001	AQ & Emissions: CAPS, HAPS	AP	Could use Data Mart or AirQuest as back end