



The Multi-Radar Multi-Sensor (MRMS) System Configuration to Support Research-to-Operations

Carrie Langston and Karen Cooper

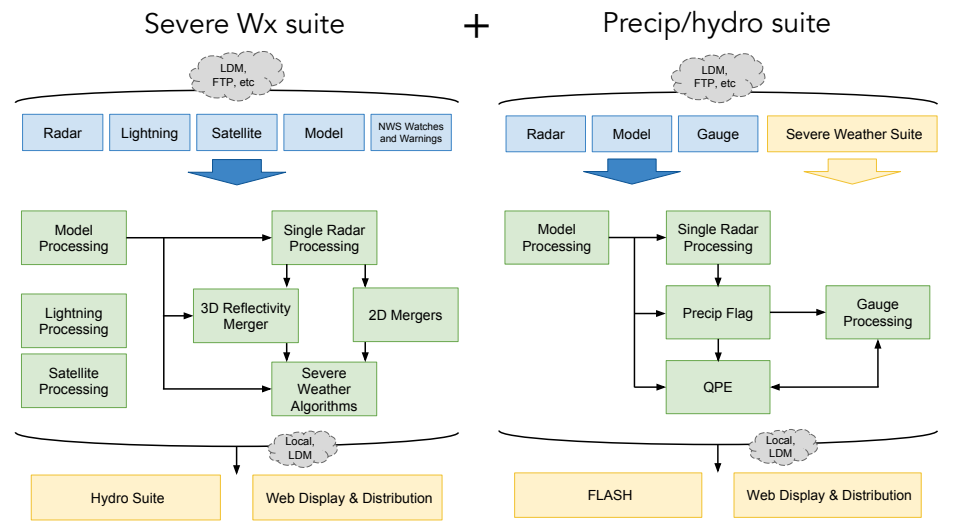
Cooperative Institute for Mesoscale Meteorological Studies, The University of Oklahoma, and NOAA/National Severe Storms Laboratory, Norman, OK



MRMS Highlights

- MRMS around the world
 - NWS operational system (virtualized blade infrastructure)
 - NSSL research (HP farm changing to virtualized blade infrastructure)
 - FAA William J. Hughes Technical Center (blade infrastructure)
 - Central Weather Bureau of Taiwan
 - Chinese Ministry of Water Resources
 - Salt River Project (Arizona)
- Brief history
 - 1990's – development of MRMS began
 - 2000-2003 – the first regional MRMS systems established
 - 2004 – the first national MRMS system implemented at NSSL
 - 2013 – dual pol upgrade to MRMS
 - 2014 – MRMS operational at NCO
- Features
 - event driven processing
 - code infrastructure allows for rapid algorithm development
 - modular design allowing for a robust flexible system
 - long history of real-time processing (NSSL system uptime at 99+%)

MRMS Design



MRMS at NCEP Central Operations

- MRMS is running operationally as part of the Integrated Dissemination Program (IDP) at NCO
- Timeline to operations
 - Hardware testing: Oct/Nov 2013
 - Phase I VM testing: March 2014
 - Onboarding prep: Feb – May 2014
 - MRMS v10.0: Sept 2014
- Virtual Machine (VM) distribution →
- Current system architecture
 - Network storage
 - VM specs (46 VMs)
 - Standard: 6-cores; 16GB RAM
 - Specialty VMs: 6-cores; 24-32GB RAM

Planned updates
 June 2015: MRMS v11
 Sept 2015: RIDGE2
 March 2016: MRMS v12

VM Count	Processing type
24	Single radar
1	Non-radar ingest (model, gauge)
1	Lightning
1	Satellite
4	3D reflectivity mosaics
3	Severe weather
3	Precip/hydro
6	GRIB2 encoding
2	Internal data flow management
1	Data distribution

- NCO onboarding process
 - Takes 3-4 months
 - Documentation: system design, testing and troubleshooting guide and build, implementation and execution instructions.
 - Configuration of development system
 - Orientation of NCO staff: On-site visits and weekly conference calls
- Lessons learned
 - Documentation requirements are significant. Feedback from NCO's onboarding team (SIB) is a must. Recommend using a collaborative tool like Google Drive to draft all documents.
 - NCO has their own tools for monitoring/managing real-time systems. New systems should expect that some changes will be required to their native real-time management methods.
 - Providing guidelines to NCO for determining system health is an essential part of the onboarding documentation.
 - Onboarding is an iterative process that takes longer than you think!