

NW-AIRQUEST ANNUAL STATE OF THE MODEL REPORT

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NW-AIRQUEST Annual Meeting, June 15-17, 2016
PACCAR Clean technology Building, WSU - Pullman

TOPICS

- Contract review, status and balance
- Ongoing Tasks
- One-Time Tasks
- Deliverables
- Aeolus Cluster Evolution and Status
- AIRPACT-5

CONTRACT REVIEW, STATUS AND BALANCE

- State of the Model Report ~ June 30, 2016 (this report)
- Project Duration: July 1, 2015 – June 30, 2016
- Contract for this period, between LRAPA & WSU, was in place September 14, 2015
- Contract #: LRAPA 14-10-01
- Balance as of 12/31/2015 was \$70,585.39 of budget of \$110K
- Balance as of 5/31/2016 was – \$19,271.84

CONTRACT REVIEW, STATUS AND BALANCE

- Budget Shown for 2-year period, resulting in – \$19K.

14E	3815-5427	NW AIRQUEST REG AIR QUAL MODELING SYSTEM	7/1/2014	BTD Through: 5/31/2016	6/30/2016	95.9 %
Category	Object	Allocation	Expense	Encumbrance	Balance	Alloc Spent
Salaries	00	123,208.00	122,199.53	7,835.00	-6,826.53	105.54 %
Wages	01	2,040.00	1,772.00	0.00	268.00	86.86 %
Consumable Goods And Services	03	12,000.00	34,477.23	0.00	-22,477.23	287.31 %
Travel	04	2,567.00	7,673.38	0.00	-5,106.38	298.92 %
Equipment - Capitalized	06	20,000.00	0.00	0.00	20,000.00	0.00 %
Employer Contributions	07	51,774.00	52,403.09	879.75	-1,508.84	102.91 %
Facilities & Administrative Cost	13	20,911.00	24,531.86	0.00	-3,620.86	117.32 %
Award Restrictions	14	7,500.00	0.00	7,500.00	0.00	100.00 %
Account Totals:		240,000.00	243,057.09	16,214.75	-19,271.84	108.03 %

- Spent ~\$20K that was planned for cluster upgrades for web-programming instead, spending \$20.5K at UI.

ONGOING TASKS

1. Provide daily forecasts of air quality	Current and Ongoing
2. Provide real-time verification statistics of by pollutant, by month, and provide access.	Current and Ongoing
3. Continue to run ClearSky.	Current and Ongoing
4. Track model performance.	Current and Ongoing
5. Maintain data streams from AIRNow & satellites.	Current and Ongoing
6. Continue improvements and requested additions to web graphical display.	Current and Ongoing
7. Maintain the "Change Log", posted on the AIRPACT website.	Current and Ongoing
8. Archive daily model output and provide access. Web-based graphics for the most recent 5 years & model output for at least one month.	Current and Ongoing A recent crash of new webserver resulted in loss of online airpact4 imagery (conc, aconc, emis & met) for 2012 and 2013 and imagery (conc & aconc) for April-Dec 2014.
9. Modify AIRPACT as needed for fire emissions produced by other organizations.	Current and Ongoing
10. As requested by members, make Google Map API map images for PM _{2.5} and ozone available...	No specific requests received.

ONE-TIME TASKS (1 OF 2)

General task description

1. Update emission inventories with data supplied by Washington, Oregon, Idaho, and Canada including:

- Incorporate Emission Inventory.
- Potential additional wood smoke refinements.

Details

July 17, 2015

- BlueSky Canada is now used to get Can. fires.
- All fire processing is done with SMOKE 3.5.1; so the memory allocation error is gone.
- The daily fire locations kml layer includes updated formatting.
- The minimum fire size of 40 acres was changed to 0.001 acres.
- ~~SMARTFIRE2 is now queried for USA fires at 10:15 pm PDT (instead of 7 pm) to allow more fires to be ingested.~~
- Scripting is in place to get yesterday's fires from AirFire when WSU BlueSky fails.

October 2015

- Used 2011 NEI (same as AP5 inventory) to update RWC emissions for WA and OR
- Used 2014 NEI (same as AP5 inventory) to update RWC emissions for WA. This reduces emissions modestly.

ONE-TIME TASKS (2 OF 2)

General task description	Details
<p data-bbox="208 382 459 418">2. ClearSky2:</p> <ul data-bbox="208 475 923 1260" style="list-style-type: none"><li data-bbox="208 475 923 654">• Work with EPA on incorporating results from the planned 2013 agricultural burn field project into the AIRPACT-4 Ag Burn tracer tool.<li data-bbox="208 761 923 889">• Work with NW-AIRQUEST members to develop and establish a public webpage for the ClearSky2 runs.<li data-bbox="208 946 923 1025">• New default scenarios requested by Idaho & needed by CRB season.<li data-bbox="208 1089 923 1260">• New default scenarios requested by Ecology for Orchard Burning, etc. Should complete by end of contract year, 6/30/2016.	<p data-bbox="962 382 1377 418">Re-scripted May 2016.</p> <ul data-bbox="1029 475 1773 1125" style="list-style-type: none"><li data-bbox="1029 475 1773 696">• RARE 2013 fires modeled in June-July 2015, with experimentation at 1.33-km runs. Problems with the 1.33-km run emissions generation for the Nezperce, ID burns.<li data-bbox="1029 761 1773 932">• Still to be done. Plan to use new LAR web programmer and to display RARE 2013 results as 'safe' example.<li data-bbox="1029 946 1193 982">• Done<li data-bbox="1029 1089 1242 1125">• Pending

DELIVERABLES

<p>1. Provide a suite of air quality predictions in graphical by 6am Pacific/7am Mountain local time.</p>	<p>Variable Success</p>
<p>2. The 1st day forecast products will be produced and updated to the website by 6am PT with target of 95% The 2nd day forecast products within 2 hours after the 1st day products.</p>	<p>Continuous accumulation of completeness statistics. Present completeness statistics at a mid-year meeting and Annual Meeting.</p>
<p>3. Mid-Year report must be provided to Project Sponsor for the period ending December 31, 2015.</p>	<p>Delivered in January 2016</p>
<p>4. Provide an annual “state of the model” report The “state of the model” report must be provided to Project Sponsor for the contract period ending June of the contract year, however it may be provided in the form of a presentation at the Annual Meeting, if held in June.</p>	<p style="text-align: center;">This Report</p> <p>No later than June 30, 2016 Annual Meeting is planned for June 15-17, 2016</p>
<p>5. SMKREPT product(s) with input from members on product platform and format.</p> <ul style="list-style-type: none"> • Produce initial 1-month summary to support a comprehensive review of the Emission Inventory and to initiate a discussion of the type of information, platform and format desired by members. • Annual Summary of SMKREPT-based products covering the first complete annual cycle. 	<ul style="list-style-type: none"> • Input from EI workgroup needed here!

DELIVERY OF DAY-1 RESULTS BY 6 PT

Month of 2015	UW delays	WSU delays	Total days delayed
July	1	3	4
Aug	0	3	3
Sept	0	2	2
Oct	1	4	5
Nov	3	4	7
Dec	0	2	2
Totals	5	18	23
Completions on time, %	97%	90%	87%

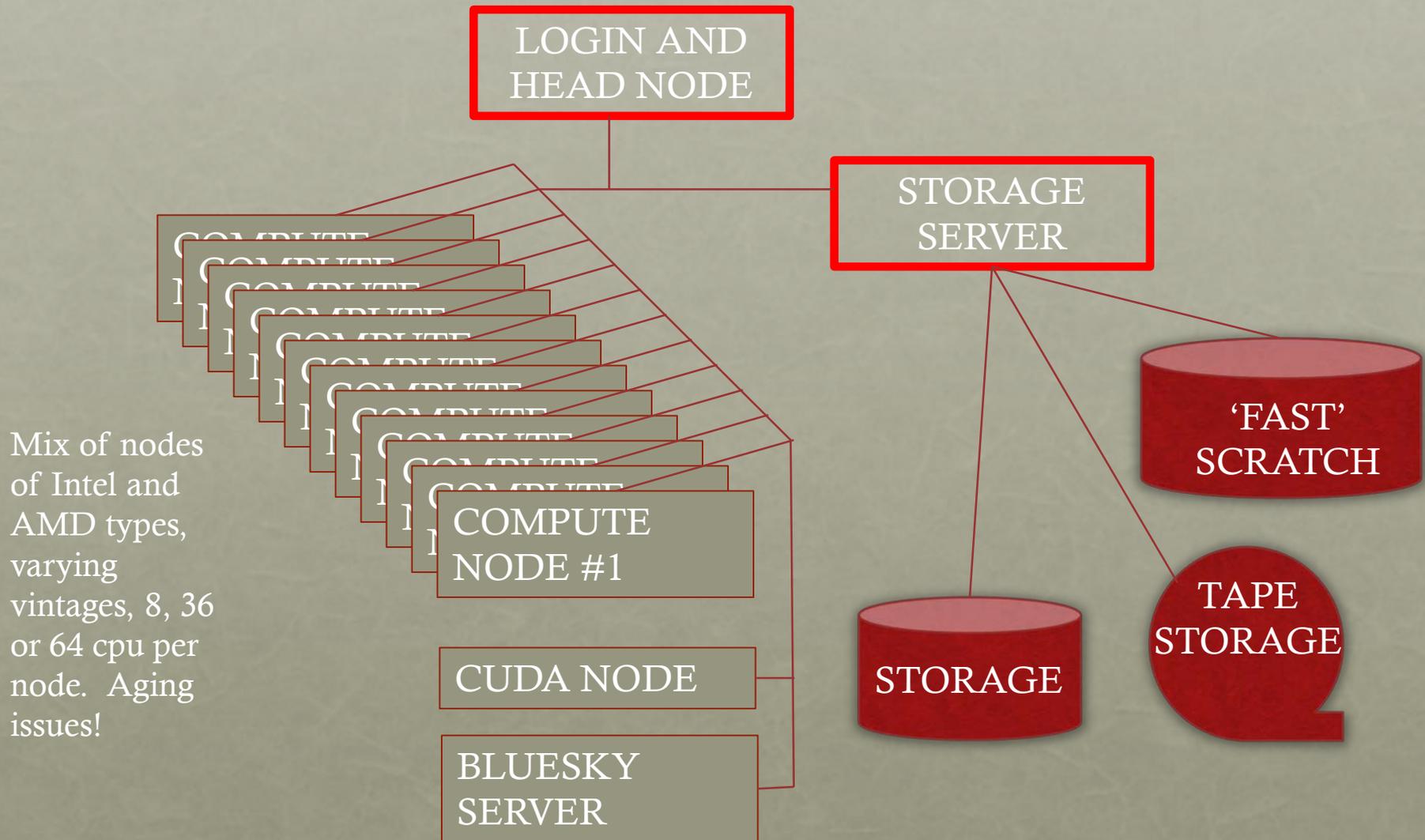
DELIVERY OF DAY-2 RESULTS BY 2H AFTER

Scripting approach for Day-2 call	Days	Failed to run	Late by 2-hrs as per specs	Absolutely late (completed after 8 PT)
Standard call in AIRPACT scripting	159	78	13	8
Cron Table call (Dec. 7, 2015 onward)	25	4	21	0
Totals		82	34	8
% Failed or 'late'		44%	18%	4%

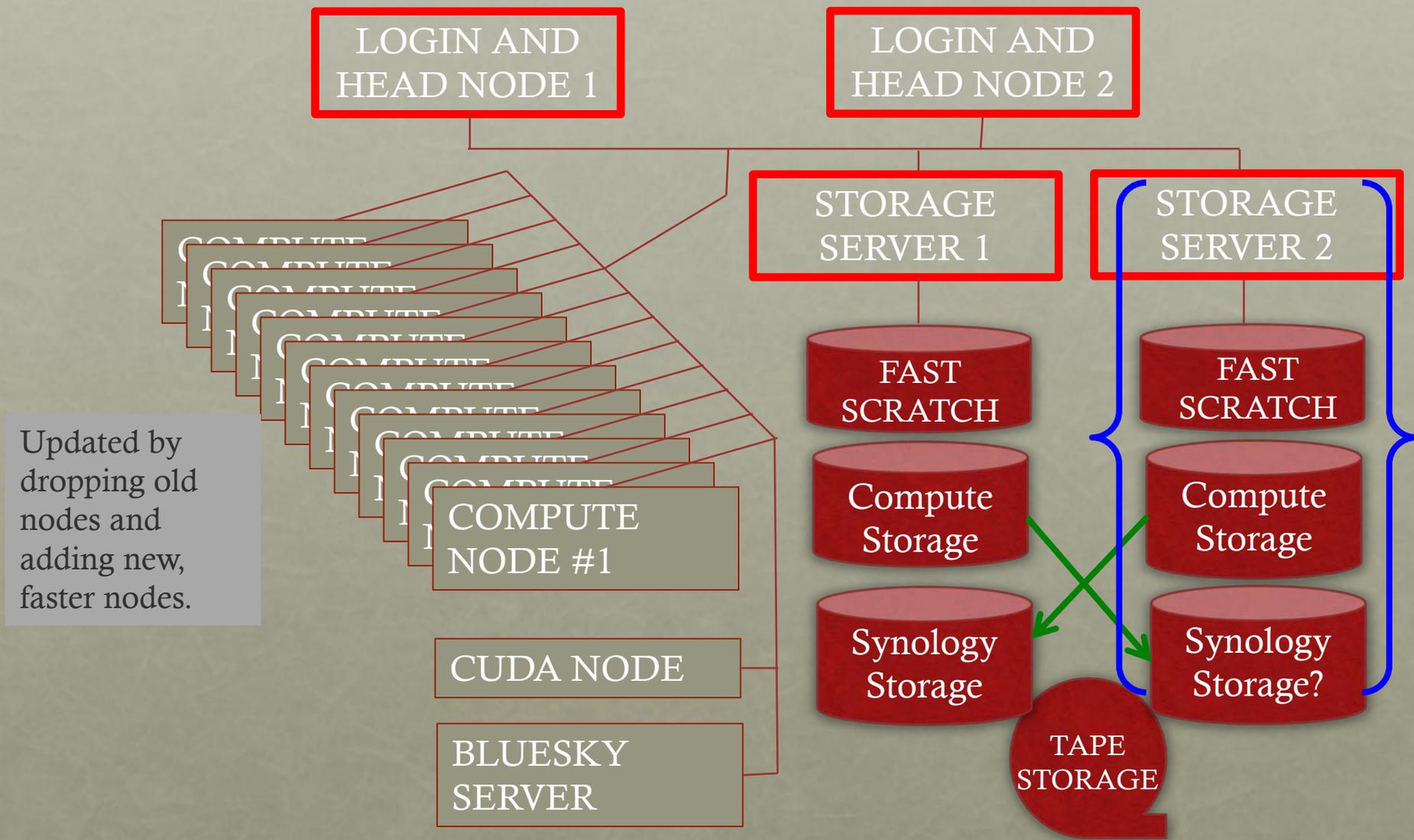
AEOLUS CLUSTER EVOLUTION

- Had project-supported w/ 0.25 FTE Sys Admin and now VCEA supports 1.0 FTE Sys Admin.
- Randall replaced as Sys Admin by Andrew Bates.
- VCEA created new Applications Development & Support Specialist position w/ 2 years funding, Shengting Cui.
- Changing scheduler/resource mgr. to SLURM .
- Bought storage solution (still to be installed), Synology.
- Now 'funding' the first leg of new storage design.

OLD AEOLUS CLUSTER



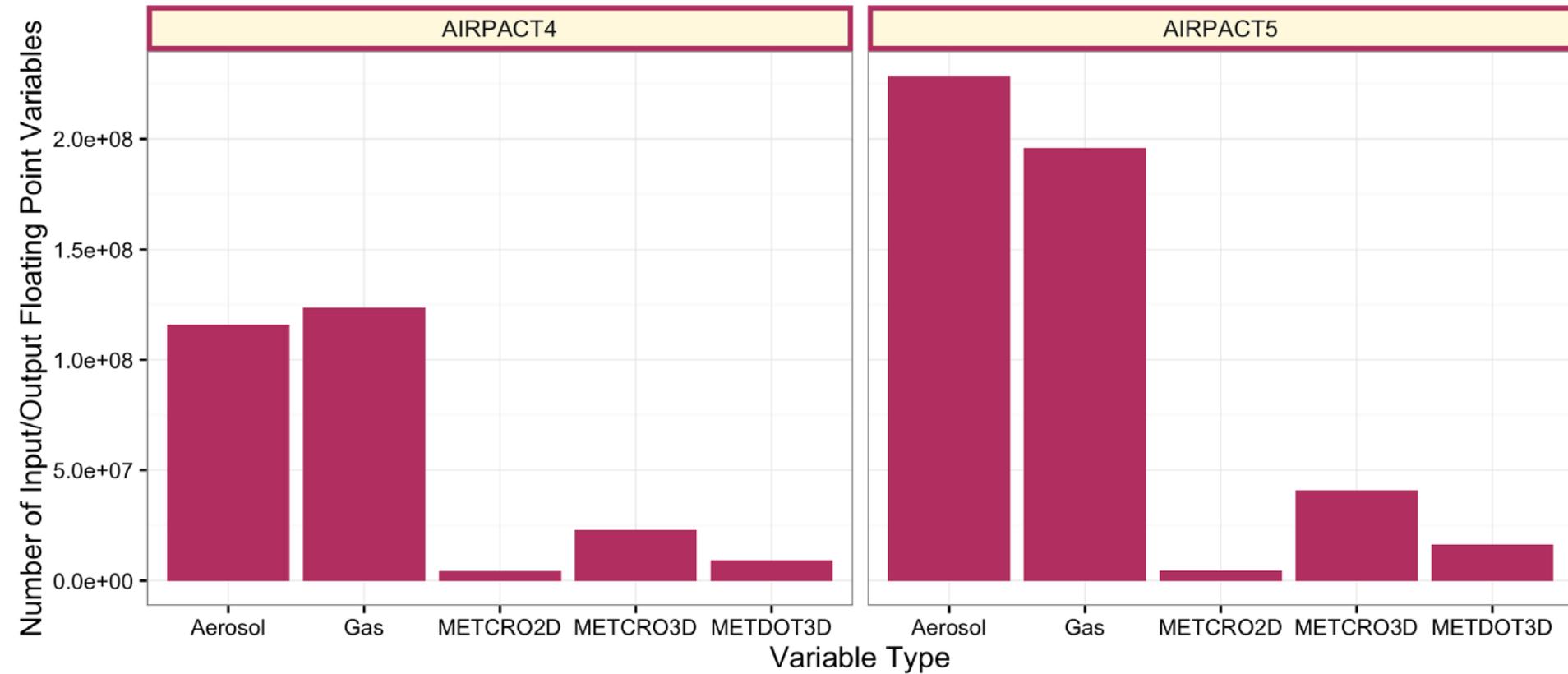
NEW AEOLUS CLUSTER



AIRPACT-4 VS AIRPACT-5

	AIRPACT-4	AIRPACT-5
Grid cells	285x258 4-km	285x258 4-km (same)
Vertical Layers	21 layers	37 layers
MCIP	v3.6	v3.6 (same)
SMOKE	v2.7, v3.5	v3.5.1
CMAQ	v4.7.1	v5.0.1
Gas-Phase Mechanism	SAPRC99	CB05
Aerosol Module	AERO5	AERO6
Anthropogenic Emissions	~2008	~2014
Fire Emissions	SMARTFire v2, BlueSky 3.5.1 (2014 and later)	SMARTFire v2, BlueSky 3.5.1
Biogenic Emissions	MEGAN v2.0.4	MEGAN v2.1

AIRPACT-4 VS AIRPACT-5



INVENTORY ELEMENTS:

Element	Old AIRPACT-4	AIRPACT-5
Domain	ID, OR, WA, southern BC and AB	No change
Grid	4-km	4-km
Pollutants	See earlier slide	No change
Speciation	SAPRC99	CB05
Temporal Allocation	EPA CAIR (2001), some local data 1996-2005	EPA 2011v2 platform, some local data 1996 – 2014
Spatial Allocation	Census 2000, LC 1992, VMT 2000-2010, other	Census 2010, LC 2006, FEMA Hazus v2.1 2006, EPA 2003&2010 surrogates, VMT 2002–2014, other
SMOKE Version	Several: 2.7 – 3.5.1	3.5.1

EMISSIONS ESTIMATES

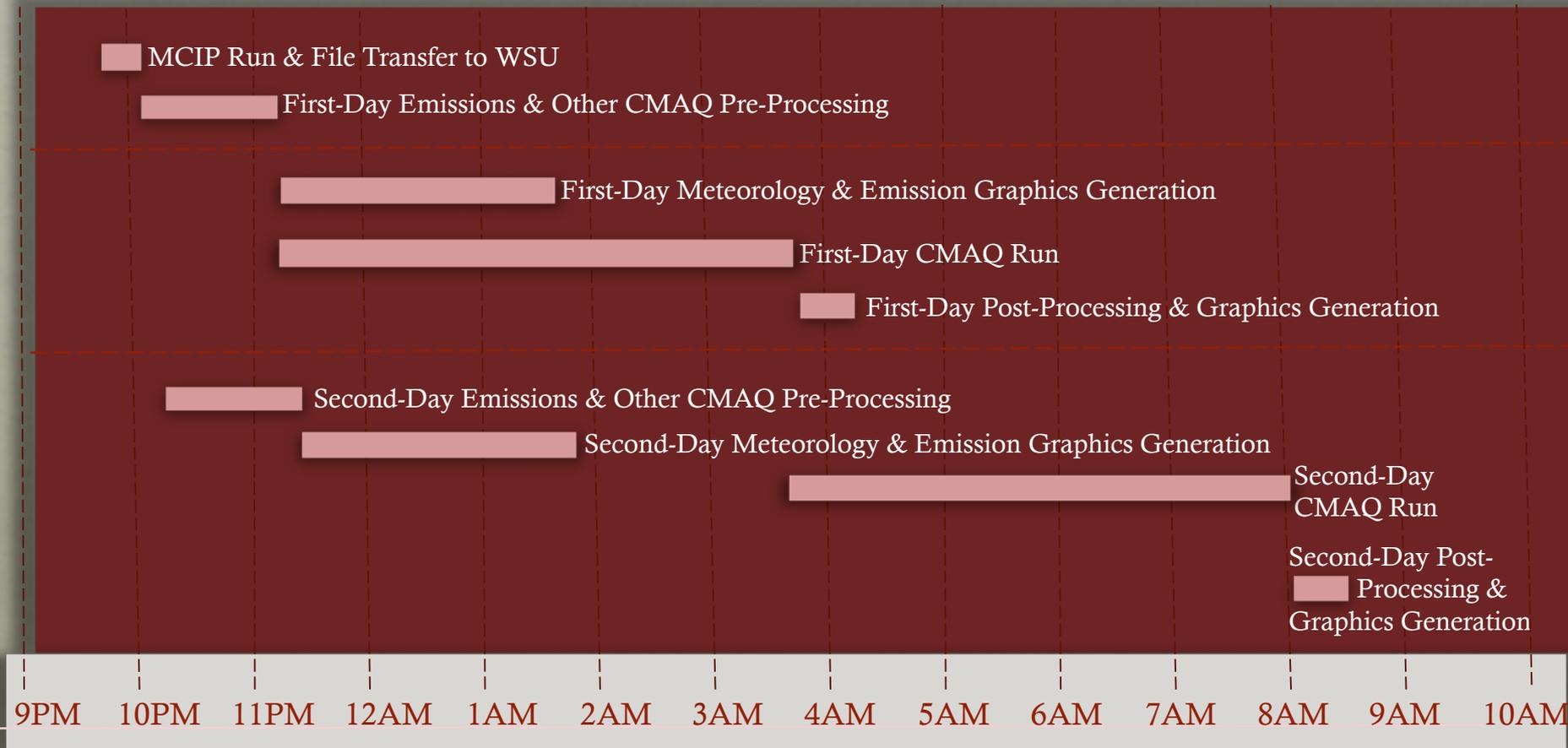
Category	Current	New
Point	2007 – WA 2005 – other areas	2011 – USA 2010 – Canada Major updates since 2011 included for ID, OR, WA
Onroad	2009 – MOBILE6.2	2014 – MOVES2010
Nonroad	2009 – NONROAD2005	2014 – NONROAD2008
Nonpoint	2009 – OR 2005 – other areas	2011 – USA 2010 – Canada More categories incl.
Biogenic	WSU-MEGAN2.04 w/ MODIS LCLU	WSU-MEGAN2.10 w/ MODIS LCLU
Large Fires	WSU -SF2/BlueSky for USA	WSU -SF2/BlueSky for USA and Canada

EMISSIONS UPDATES

- Aerosol plume propagation: AIRPACT-4 had 3-D gaseous emissions but only (effectively) 2-D for aerosols, limiting plume modeling. This 'bug' has been corrected.
- AIRPACT-4 was carrying fires forward from previous 48 hours, using *persistence*. Now we are only carrying fire forward from previous 24 hours, resulting in fewer short lived fires being projected forward.
- Running BlueSky at 7 pm now (instead of 10 pm) so that it is always ready for the forecast immediately (no pausing airpact to wait for fire emissions)
- MEGAN is now run in parallel, cutting MEGAN's (serial time) delay in forecast run emissions processing from ~ 50 min to ~8 min.
- AFdust: modification of road dust emissions to reflect moisture effects, pending.

AIRPACT-5 OPERATION

- 1st-day forecast: operational on 12/01/2015
- 2nd-day forecast: operational on 04/24/2016
- Ideally:



CLEARSKY: RARE 2013 PLUME RISE AT WALLA WALLA BURN OF 08/24, 4- & 1.33-KM

