## NCL and Python Tools 2018-2020 Roadmap and Software Diagram

The NCL and Python tools roadmap and diagram was copied from the "NCL and the Pivot to Python: Discussion and Roadmap" report and put into its own document for easier access. The full report is available as a PDF at:

## http://www.ncl.ucar.edu/Document/Pivot to Python/

For a short description of the software tools mentioned in the roadmap, refer to the software diagram at the end of this document.

Roadmap Legend					
CM	Completed Milestone				
SM	Scheduled Milestone				
IP	In Progress				
PW	Planned Work				

NCL and Python Tools Software Release Roadmap										
NCL	Jul- Sep 2018	Oct- Dec 2018	Jan- Mar 2019	Apr- Jun 2019	Jul- Sep 2019	Oct- Dec 2019	Jan- Mar 2020	Apr- Jun 2020	Jul- Sep 2020	
Version 6.5.0	<u>CM</u>									
<ul> <li>Subprocess module</li> </ul>										
<ul> <li>Several new</li> </ul>										
computational routines										
<ul> <li>Graphical enhancements</li> </ul>										
<u>Version 6.6.0 *</u>			<u>SM</u>							
• New WRF-NCL	IP	IP	IP							
functions										
WRF-NCL performance	IP	IP	IP							
enhancements										
<ul> <li>WRF-NCL bug fixes</li> </ul>	IP	IP	IP							
<ul> <li>Contributor's Guide</li> </ul>	IP	IP	IP							
<ul> <li>Apache 2.0 License</li> </ul>			IP							
* This will be the last feature	release of	NCL. Af	fter this j	point it w	ill go int	o mainte	enance m	ode and		
software development will be	focused o	on the Pyt	hon tool	s, "NCO	MP", an	d open d	levelopm	ent effor	ts.	
"NCOMP"	Jul- Sep 2018	Oct- Dec 2018	Jan- Mar 2019	Apr- Jun 2019	Jul- Sep 2019	Oct- Dec 2019	Jan- Mar 2020	Apr- Jun 2020	Jul- Sep 2020	
Version 1.0.0			<u>SM</u>							
<ul> <li>NCL computational</li> </ul>		IP	IP							
library factored into its										
own package										

	I	TD	TD		1	I		ı	
Add language agnostic		IP	IP						
C wrappers to subset of									
computational routines									
Contributor's Guide			$\mathbf{PW}$						
Version 1.1.0					<u>SM</u>				
Add more language									
agnostic C wrappers			$\mathbf{PW}$	$\mathbf{PW}$	$\mathbf{PW}$				
• Performance									
enhancements			PW	$\mathbf{PW}$	PW				
(OpenMP, OpenACC)			2 11	2 11	_ '''				
(OpenWir, OpenACC)	Jul-	Oct-	Jan-	Apr-	Jul-	Oct-	Jan-	Apr-	Jul-
"NVIZ"	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep
1112	2018	2018	2019	2019	2019	2019	2020	2020	2020
Version 1.0.0				SM					
NCL graphical library				<u>5171</u>					
and components		IP	IP	$\mathbf{PW}$					
factored into their own				1 11					
package			$\mathbf{PW}$	$\mathbf{PW}$					
Contributor's Guide			1 **	1 **		CD 4			
Version 1.1.0		TD	-	TOWAY	*****	<u>SM</u>			
• GPU performance		IP	IP	$\mathbf{PW}$	$\mathbf{PW}$	$\mathbf{PW}$			
enhancements applied to									
contouring									
	Jul-	Oct-	Jan-	Apr-	Jul-	Oct-	Jan-	Apr-	Jul-
"PyNComp"	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep
		2010	2010	2010	2010	2010	2020	2020	2020
	2018	2018	2019	2019	2019	2019	2020	2020	2020
Version 0.1 – internal	2018	2018	2019 <u>SM</u>	2019	2019	2019	2020	2020	2020
<u>release</u>	2018		<u>SM</u>	2019	2019	2019	2020	2020	2020
release • Subset of NCL	2018	2018 IP		2019	2019	2019	2020	2020	2020
<u>release</u>	2018		<u>SM</u>	2019	2019	2019	2020	2020	2020
release • Subset of NCL	2018		<u>SM</u>	2019	2019	2019	2020	2020	2020
<ul><li>release</li><li>Subset of NCL computational routines</li></ul>	2018		<u>SM</u>	2019	2019	2019	2020	2020	2020
<ul> <li>release</li> <li>Subset of NCL         computational routines         ported to Python based         on CVDP pilot project</li> </ul>	2018		<u>SM</u>	2019	2019	2019	2020	2020	2020
<ul> <li>release</li> <li>Subset of NCL computational routines ported to Python based</li> </ul>	2018		<u>SM</u>	2019	2019	2019	2020	2020	2020
release  • Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some	2018		<u>SM</u>	2019	2019	2019	2020	2020	2020
release  • Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)	2018		<u>SM</u>	2019	2019	2019	2020	2020	2020
release  • Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  • Contributor's Guide	2018		SM IP		2019	2019	2020	2020	2020
release  Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  Contributor's Guide  Version 0.2 – internal	2018		SM IP	2019 <u>SM</u>	2019	2019	2020	2020	2020
release  Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies) Contributor's Guide Version 0.2 – internal release	2018		SM IP		2019	2019	2020	2020	2020
release  Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  Contributor's Guide  Version 0.2 – internal release  More NCL	2018		SM IP PW	<u>SM</u>	2019	2019	2020	2020	2020
elease  ■ Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  ■ Contributor's Guide  Version 0.2 – internal release  ■ More NCL computational routines	2018		SM IP		2019	2019	2020	2020	2020
release  ■ Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  ■ Contributor's Guide  Version 0.2 – internal release  ■ More NCL computational routines ported (EOFs,	2018		SM IP PW	<u>SM</u>	2019	2019	2020	2020	2020
elease  ■ Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  ■ Contributor's Guide  Version 0.2 – internal release  ■ More NCL computational routines ported (EOFs, interpolation)	2018		SM IP PW	<u>SM</u>		2019	2020	2020	2020
elease  ■ Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  ■ Contributor's Guide  Version 0.2 – internal release  ■ More NCL computational routines ported (EOFs, interpolation)  Version 1.0 – public release	2018		SM IP PW	<u>SM</u>	2019 SM	2019	2020	2020	2020
release  ■ Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  ■ Contributor's Guide  Version 0.2 – internal release  ■ More NCL computational routines ported (EOFs, interpolation)  Version 1.0 – public release ■ Performances	2018		SM IP PW	SM PW	<u>SM</u>	2019	2020	2020	2020
release  Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  Contributor's Guide  Version 0.2 – internal release  More NCL computational routines ported (EOFs, interpolation)  Version 1.0 – public release Performances enhancements	2018		SM IP PW	<u>SM</u>		2019	2020	2020	2020
release  ■ Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  ■ Contributor's Guide  Version 0.2 – internal release  ■ More NCL computational routines ported (EOFs, interpolation)  Version 1.0 – public release ■ Performances		IP	SM IP PW	SM PW	SM PW				
release  Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies) Contributor's Guide Version 0.2 – internal release More NCL computational routines ported (EOFs, interpolation) Version 1.0 – public release Performances enhancements (xarray/dask)	Jul-	IP Oct-	SM IP PW	SM PW PW	SM PW	Oct-	Jan-	Apr-	Jul-
release  Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies)  Contributor's Guide  Version 0.2 – internal release  More NCL computational routines ported (EOFs, interpolation)  Version 1.0 – public release Performances enhancements	Jul- Sep	IP Oct-Dec	SM IP PW	SM PW Apr- Jun	SM PW Jul- Sep	Oct- Dec	Jan- Mar	Apr- Jun	Jul- Sep
release  Subset of NCL computational routines ported to Python based on CVDP pilot project (running average, dtrend, some climatologies) Contributor's Guide Version 0.2 – internal release More NCL computational routines ported (EOFs, interpolation) Version 1.0 – public release Performances enhancements (xarray/dask)	Jul-	IP Oct-	SM IP PW	SM PW PW	SM PW	Oct-	Jan-	Apr-	Jul-

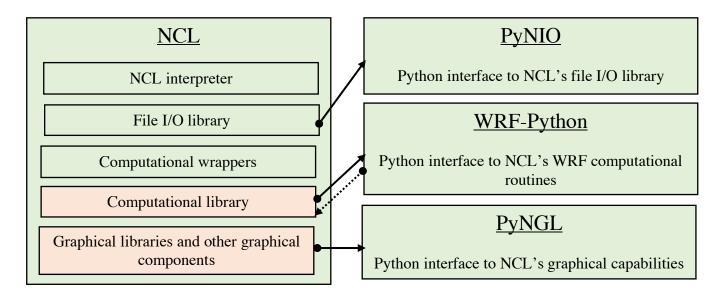
• Cross-section									
enhancements									
Bug fixes									
Version 1.3.1			<u>SM</u>						
Contributor's Guide		IP	IP						
Version 2.0.0					<u>SM</u>				
<ul> <li>Xarray input support</li> </ul>									
Performance			$\mathbf{PW}$	$\mathbf{PW}$	PW				
enhancements (dask)									
			PW	PW	PW				
	Jul-	Oct-	Jan-	Apr-	Jul-	Oct-	Jan-	Apr-	Jul-
PyNIO	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep
V : 152	2018	2018	2019	2019	2019	2019	2020	2020	2020
Version 1.5.2	<u>CM</u>								
• Improved support for									
Python 3.x		G3.5							
Version 1.5.3		<u>CM</u>							
<ul> <li>Critical bug-fix release</li> </ul>									
(if needed)									
Version 1.6.0		<u>CM</u>							
<ul> <li>Improved support for</li> </ul>									
Python 3.x									
• Apache 2.0 License									
Versions 1.6.x *			<u>SM</u>						
<ul> <li>Bug fix releases</li> </ul>									
(as needed)									
* D MO :	1 1'1	1 .	1 . 1	•	1 D 1	1	1'1	•	1

\* PyNIO is in maintenance mode while being evaluated against other Python packages like xarray and cfgrib. Critical bug fix releases will be deployed as possible.

PyNGL	Jul- Sep 2018	Oct- Dec 2018	Jan- Mar 2019	Apr- Jun 2019	Jul- Sep 2019	Oct- Dec 2019	Jan- Mar 2020	Apr- Jun 2020	Jul- Sep 2020
Version 1.6.0	<u>CM</u>								
• Support for Python 3.x									
<u>Version 1.6.1</u>		<u>CM</u>							
• Minor Python 3.x bug									
fixes									
Apache 2.0 License									
Version 2.0.0				DAX	DXX/	<u>SM</u>			
Xarray input support				$\mathbf{PW}$	PW	PW			
<ul> <li>Extended suite of examples to include xarray</li> </ul>				PW	PW	PW			
Contributor's Guide				PW	PW	PW			
Version 3.0.0							<u>SM</u>		
Performance enhancements (GPU) applied to contouring		IP	IP	PW	PW	PW	PW		

Pivot to Python and Training Roadmap										
Pivot to Python	Jul- Sep 2018	Oct- Dec 2018	Jan- Mar 2019	Apr- Jun 2019	Jul- Sep 2019	Oct- Dec 2019	Jan- Mar 2020	Apr- Jun 2020	Jul- Sep 2020	
Host NCL Advisory Panel	<u>CM</u>				SM					
Meeting	CIVI				<u>SW1</u>					
Officially announce NCL-to-			SM							
Python pivot			SIVI							
CVDP Pilot Project										
(Convert NCL CVDP scripts	IP	IP	IP	$\mathbf{PW}$						
to Python)										
Convert NCL application										
examples to Python and		IP	IP	$\mathbf{PW}$	$\mathbf{PW}$	$\mathbf{PW}$	$\mathbf{PW}$	PW	$\mathbf{PW}$	
create new Python examples										
Write first draft of "NCL-to-	IP	IP	<u>CM</u>							
Python" transition guide			<u>CIVI</u>							
Evaluate PyNGL with other										
Python graphics packages	IP	IP	IP	$\mathbf{PW}$	PW					
(Iris, matplotlib, cartopy,				1 11	1 11					
xESMF, MetPy, others)										
Evaluate PyNIO with other										
Python file I/O packages		IP	IP	$\mathbf{PW}$	PW					
(xarray, cfgrib,				± 11	- ''					
netcdf4python, others)										
Evaluate Python										
computational packages			PW	$\mathbf{PW}$	$\mathbf{PW}$					
(ESMPy, xESMF, Iris,										
others)										
Establish online forum for					<u>SM</u>					
Python tools user support										
Host informational webinars			$\mathbf{PW}$	$\mathbf{PW}$	$\mathbf{PW}$					
on pivot to Python plans	T1	0.4	T	<b>A</b>	T1	0.4	T	A	T1	
Training	Jul- Sep	Oct- Dec	Jan- Mar	Apr- Jun	Jul- Sep	Oct- Dec	Jan- Mar	Apr- Jun	Jul- Sep	
Training	2018	2018	2019	2019	2019	2019	2020	2020	2020	
Official end of NCL										
Workshops	<u>CM</u>									
WRF-Python / VAPOR	GD 4									
Tutorial at Boise State	<u>CM</u>									
Develop Data Carpentry						TDXX7	DAY?	DES.	TOXX?	
training modules						PW	PW	PW	PW	
Develop and host NCL-to-				DXX7	DYY	DXX/	DVV7	DXX7	DXX7	
Python transition tutorials				$\mathbf{PW}$	PW	PW	PW	PW	PW	
Conduct training on how to				DXX	DIII	DXX	DVI	DVI	DXX7	
contribute software				$\mathbf{PW}$	PW	PW	PW	PW	PW	
Host Python training similar						PW	DXX7	PW	PW	
to NCL Workshops						IF VV	PW	IT VV	I VV	

## Diagram of current suite of NCL and Python



## Diagram of restructured NCL and Python software

