

## Analytical and other software on the Secure Research Environment

*The Research Environment runs with the operating system: Microsoft Windows Server 2016 DataCenter edition. The environment is based on the Microsoft Data Science virtual machine template and includes the following software:*

- R Version 3.5.2 (2018-12-20), as part of the Microsoft R Client
- R Studio Desktop 1.2.5033 working with R 3.5.2
  - Also available: R Version 3.6.2 (2019-12-12) installed separately.
- Anaconda, including an environment for Python 3.5
- Python, 3.5 as part of Anaconda environment: py35, and Python 2.7 as part of Anaconda environment: root
  - Also available: Python 3.8.1, installed separately
- STATA 16.1
- Jupyter Notebook, as part of the Anaconda Python 3.5 environment
- Microsoft Office 2016 Standard edition, including Word, Excel and PowerPoint
- JuliaPro 0.5.1.1 and the Juno IDE for Julia
- PyCharm Community Edition - 2017.2.3
- Apache Spark 2.2.0
- SparkML and pySpark
- Apache Drill 1.11.0
- MAPR Drill driver
- VIM 8.0.606
- TensorFlow
- MXNet, MXNet Model Server
- Microsoft Cognitive Toolkit (CNTK)
- Weka
- Vowpal Wabbit
- xgboost
- Team Data Science Process (TDSP) Utilities
- VOTT (Visual Object Tagging Tool) 1.6.11
- Microsoft Machine Learning Server
- PowerBI
- Docker version 10.03.5, build 2ee0c57608
- SQL Server Developer Edition (2017), including Management Studio and SQL Server Integration Services (SSIS)
- Visual Studio Code 1.17.1
- Nodejs
- 7-zip
- Evince PDF Viewer
- PowerShell

And in the Premium research environments:

- SAS 9.4, m4 (academic license)

Users also have the ability to bring in additional software if the software was specified in the data request, the software runs in the operating system described above, and the user can provide Vivli with any necessary licensing keys. Software licenses must be validated by the software only at installation or setup: software that validates the license on each invocation will not work. Users must attest that the license agreements they need for any of the software they want to bring in can be used in the Vivli research environment.

### R Packages included in R version 3.5.2 in the Research Environment:

abind	coin	e1071	gplots
acepack	colorspace	earth	graphics
askpass	combinat	editrules	grDevices
assertthat	commonmark	ellipse	grid
AzureML	CompatibilityAPI	ellipsis	gridExtra
backports	compiler	evaluate	gtable
base	corpcor	exactRankTests	gtools
base64enc	covr	fansi	haven
BH	cowplot	farver	highr
bindr	crayon	fastICA	Hmisc
bindrcpp	crosstalk	forcats	hms
bitops	crpp	foreach	htmlTable
boot	crrstep	foreign	htmltools
brew	crskdiag	formatR	htmlwidgets
brglm	Cubist	Formula	httpuv
broom	curl	fs	httr
cairoDevice	data.table	gam	igraph
callr	datasets	gbm	influenceR
car	DBI	gdata	ini
carData	dbplyr	geepack	ipred
caret	deployRserve	generics	ipw
caTools	desc	geosphere	IRdisplay
cellranger	devtools	ggmap	IRkernel
checkmate	df2json	ggplot2	irlba
checkpoint	DiagrammeR	ggpubr	ISwR
class	dichromat	ggrepel	iterators
classInt	digest	ggsci	jomo
cli	doParallel	ggsignif	jpeg
clipr	doRSR	gh	jsonlite
clisymbols	downloader	git2r	kernlab
cluster	dplyr	glmnet	KernSmooth
cmprsk	drat	glue	klaR
codetools	DT	gower	km.ci

KMsurv	mvtnorm	R6	rpart
knitr	nlme	randomForest	rpart.plot
labeling	nloptr	ranger	rprojroot
labelled	nnet	RANN	rstudioapi
later	numDeriv	rattle	RUnit
lattice	olapR	rcmdcheck	rversions
latticeExtra	openssl	RColorBrewer	rvest
lava	openxlsx	Rcpp	sandwich
lazyeval	ordinal	RcppArmadillo	sas7bdat
libcoin	pamr	RcppEigen	SASxport
lme4	pan	RcppRoll	scales
logistf	parallel	RCurl	selectr
lpSolveAPI	party	readr	sessioninfo
lubridate	pbdZMQ	readxl	shape
magrittr	pbrktest	recipes	shiny
mapproj	pdp	rematch	sourcetools
maps	pec	remotes	sp
maptools	pillar	repr	SparseM
markdown	pkgbuild	reprex	spatial
MASS	pkgconfig	reshape2	splines
Matrix	pkgload	RevolOQ	spls
MatrixModels	plogr	RevoMods	sqlrutils
matrixStats	plotmo	RevoPemaR	SQUAREM
maxstat	plotrix	RevoScaleR	stats
mda	pls	RevoTreeView	stats4
memoise	plyr	RevoUtils	stringi
methods	png	RevoUtilsMath	stringr
mgcv	polyspline	rex	strucchange
mice	polynom	rgexf	subselect
MicrosoftML	praise	RgoogleMaps	superpc
MicrosoftR	prettyunits	RGtk2	survAUC
mime	pROC	rio	survival
miniCRAN	processx	riskRegression	survivalROC
miniUI	prodlim	rJava	survminer
minqa	profileModel	rjson	survMisc
mitml	progress	RJSONIO	sys
mlbench	promises	rlang	tcltk
ModelMetrics	proto	rmarkdown	TeachingDemos
modelr	proxy	rms	testthat
modeltools	ps	ROCR	TH.data
mrsdeploy	purrr	RODBC	tibble
multcomp	quantreg	Rook	tidyr
munsell	questionr	roxygen2	tidyselect

tidyverse  
timeDate  
timereg  
tinytex  
tools  
translations  
ucminf  
usethis  
utf8  
utils  
uuid  
vctr  
viridis  
viridisLite  
visNetwork  
whisker  
withr  
xfun  
xgboost  
XML  
xml2  
xopen  
xtable  
yaml  
zeallot  
zip  
zoo

## Python Packages included in Python 3.5 in the Research Environment:

adal (0.4.7)	azure-mgmt-scheduler (1.1.3)	colorama (0.3.9)
alabaster (0.7.10)	azure-mgmt-sql (0.5.3)	comtypes (1.1.2)
anaconda-client (1.6.5)	azure-mgmt-storage (1.0.0)	configparser (4.0.2)
anaconda-navigator (1.6.8)	azure-mgmt-trafficmanager (0.30.0)	contextlib2 (0.5.5)
anaconda-project (0.8.0)	azure-mgmt-web (0.32.0)	cPython (0.0.5)
applicationinsights (0.11.9)	azure-nspkg (2.0.0)	cryptography (2.1.1)
asn1crypto (0.23.0)	azure-servicebus (0.21.1)	cupy (3.0.0a1)
astroid (1.5.3)	azure-servicefabric (5.6.130)	cycler (0.10.0)
astropy (2.0.2)	azure-servicemanagement-legacy (0.20.6)	Cython (0.26.1)
azure (2.0.0)	azure-storage (0.34.3)	cytoolz (0.8.2)
azure-batch (3.0.0)	azureml (0.2.7)	dask (0.15.2)
azure-cli-nspkg (3.0.1)	babel (2.5.0)	datashape (0.5.4)
azure-common (1.1.8)	backports-abc (0.5)	decorator (4.1.2)
azure-datalake-store (0.0.17)	backports.functools-lru-cache (1.6.1)	distlib (0.2.5)
azure-graphrbac (0.30.0)	backports.shutil-get-terminal-size (1.0.0)	distributed (1.18.3)
azure-keyvault (0.3.7)	backports.ssl-match-hostname (3.7.0.1)	docutils (0.14)
azure-mgmt (1.0.0)	beautifulsoup4 (4.6.0)	entrypoints (0.2.3)
azure-mgmt-authorization (0.30.0)	bitarray (0.8.1)	enum34 (1.1.9)
azure-mgmt-batch (4.0.0)	bkcharts (0.2)	et-xmlfile (1.0.1)
azure-mgmt-cdn (0.30.3)	blaze (0.11.3)	fastcache (1.0.2)
azure-mgmt-cognitiveservices (1.0.0)	bleach (1.5.0)	fastrlock (0.3)
azure-mgmt-compute (1.0.0)	bokeh (0.12.7)	filelock (2.0.12)
azure-mgmt-containerregistry (0.2.1)	boto (2.48.0)	Flask (0.12.2)
azure-mgmt-datalake-analytics (0.1.6)	Bottleneck (1.2.1)	Flask-Cors (3.0.3)
azure-mgmt-datalake-nspkg (2.0.0)	bz2file (0.98)	funcsig (1.0.2)
azure-mgmt-datalake-store (0.1.6)	CacheControl (0.12.3)	future (0.16.0)
azure-mgmt-devtestlabs (2.0.0)	cached-property (1.3.1)	futures (3.1.1)
azure-mgmt-dns (1.0.1)	certifi (2017.7.27.1)	gensim (3.0.1)
azure-mgmt-documentdb (0.1.3)	cffi (1.11.2)	gevent (1.2.2)
azure-mgmt-iothub (0.2.2)	chainer (3.0.0rc1)	glob2 (0.5)
azure-mgmt-keyvault (0.31.0)	chainercv (0.7.0)	graphviz (0.8.4)
azure-mgmt-logic (2.1.0)	chainerrl (0.2.0)	greenlet (0.4.12)
azure-mgmt-monitor (0.2.1)	chardet (3.0.4)	grin (1.2.1)
azure-mgmt-network (1.0.0)	click (6.7)	gym (0.9.4)
azure-mgmt-nspkg (2.0.0)	cloudpickle (0.4.0)	h5py (2.7.0)
azure-mgmt-rdbms (0.1.0)	clyent (1.2.2)	heapdict (1.0.0)
azure-mgmt-redis (4.1.0)	cntk (2.2)	html5lib (0.999999999)
azure-mgmt-resource (1.1.0)		idna (2.6)
		imageio (2.2.0)
		imagesize (0.7.1)
		ipaddress (1.0.23)

ipykernel (4.6.1)	nbformat (4.4.0)	Pygments (2.2.0)
ipython (6.1.0)	nbpresent (3.0.2)	pygpu (0.6.9)
ipython-genutils (0.2.0)	networkx (1.11)	PyJWT (1.5.3)
ipywidgets (7.0.0)	nlTK (3.2.4)	pylint (1.7.2)
isodate (0.6.0)	nose (1.3.7)	pymongo (3.10.1)
isort (4.2.15)	notebook (5.0.0)	pyodbc (4.0.17)
itsdangerous (0.24)	numba (0.35.0+10.g143f70e)	pyOpenSSL (17.2.0)
jdcal (1.3)	numexpr (2.6.2)	pyParsing (2.2.0)
jedi (0.10.2)	numpy (1.13.3)	PyQt5 (5.9)
Jinja2 (2.9.6)	numpydoc (0.7.0)	PySocks (1.6.7)
jsonschema (2.6.0)	oauthlib (2.0.4)	pyspark (2.2.0)
jupyter-client (5.1.0)	odo (0.5.1)	pytest (3.2.1)
jupyter-console (5.2.0)	olefile (0.44)	python-dateutil (2.6.1)
jupyter-core (4.3.0)	openpyxl (2.4.8)	pytz (2017.2)
jupyterlab (0.27.0)	packaging (16.8)	PyWavelets (0.5.2)
jupyterlab-launcher (0.4.0)	pandas (0.20.3)	pywin32 (221)
Keras (2.0.8)	pandocfilters (1.4.2)	pywin32-ctypes (0.1.2)
keyring (10.4.0)	partd (0.3.8)	PyYAML (3.12)
lazy-object-proxy (1.3.1)	path.py (10.3.1)	pyzmq (16.0.2)
lightgbm (2.0.7)	pathlib2 (2.3.0)	QtAwesome (0.4.4)
llvmlite (0.20.0)	patsy (0.4.1)	qtconsole (4.3.1)
locket (0.2.0)	pbr (3.1.1)	QtPy (1.3.1)
lockfile (0.12.2)	pep8 (1.7.0)	requests (2.18.4)
lxml (3.8.0)	pickleshare (0.7.4)	requests-file (1.4.3)
mako (1.0.7)	Pillow (4.3.0)	requests-ftp (0.3.1)
Markdown (2.6.9)	pip (9.0.1)	requests-oauthlib (0.8.0)
MarkupSafe (1.0)	pkginfo (1.4.1)	rope (0.10.5)
matplotlib (2.1.0)	ply (3.10)	ruamel-yaml (0.11.14)
mccabe (0.6.1)	progress (1.3)	scandir (1.10.0)
menuinst (1.4.8)	prompt-toolkit (1.0.15)	scikit-image (0.13.0)
mistune (0.7.4)	protobuf (3.4.0)	scikit-learn (0.19.0)
mock (2.0.0)	psutil (5.2.2)	scipy (0.19.1)
mpmath (0.19)	psycpg2 (2.7.3.1)	seaborn (0.8)
msgpack-python (0.4.8)	py (1.4.34)	setuptools (36.6.0)
msrest (0.4.17)	pycodestyle (2.3.1)	simplegeneric (0.8.1)
msrestazure (0.4.15)	pycosat (0.6.2)	singledispatch (3.4.0.3)
multipledispatch (0.4.9)	pycparser (2.18)	sip (4.19.3)
mxnet (1.6.0)	pycrypto (2.6.1)	six (1.11.0)
navigator-updater (0.1.0)	pycurl (7.43.0)	smart-open (1.5.3)
nb-anacondacloud (1.4.0)	pydocumentdb (2.2.1)	snowballstemmer (1.2.1)
nb-conda (2.2.0)	pydot (1.2.3)	sortedcollections (0.5.3)
nb-conda-kernels (2.1.0)	pyflakes (1.5.0)	sortedcontainers (1.5.7)
nbconvert (5.3.1)	pyglet (1.2.4)	Sphinx (1.6.3)



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sphinxcontrib-websupport (1.0.1)	Theano (0.9.0)	win-inet-pton (1.0.1)
spyder (3.2.3)	toolz (0.8.2)	win-unicode-console (0.5)
SQLAlchemy (1.1.13)	tornado (4.5.2)	wincertstore (0.2)
statistics (1.0.3.5)	traitlets (4.3.2)	wrapt (1.10.11)
statsmodels (0.8.0)	typing (3.6.2)	xgboost (0.6)
subprocess32 (3.5.4)	unicodcsv (0.14.1)	xlrd (1.1.0)
sympy (1.1.1)	urllib3 (1.22)	XlsxWriter (0.9.8)
tables (3.4.2)	wcwidth (0.1.7)	xlwings (0.11.4)
tblib (1.3.2)	webencodings (0.5.1)	xlwt (1.3.0)
tensorflow-gpu (1.3.0)	Werkzeug (0.12.2)	zict (0.1.2)
tensorflow-tensorboard (0.1.8)	wheel (0.29.0)	
testpath (0.3.1)	widgetsnbextension (3.0.2)	

This document describes the software contained on Research Environments provisioned after March 13, 2020.