

# Secure MapReduce

⚠ WARNING: Work In Progress ⚠

The sequence diagram below is intended to be a very detailed description of the interactions that occur during the process of defining, submitting and executing a map reduce job on a secure Hadoop cluster. Ideally this will complement and clarify the [Hadoop security design white paper](#).

The descriptions of the interactions below take this form.

```
[Protocol] message( input ) : output
```

The [Protocol] portion describes the protocol, authentication mechanism and identities exchanged.

Abbreviation	Description
[KRB]	Kerberos Protocol
[RSK:{ticket}]	RPC protocol with SASL mutual authentication using Kerberos tickets.
[RSD:{delegation-token}]	RPC protocol with SASL mutual authentication using delegation tokens.
[DTP]	Data transfer protocol between the DataNode and a client. HTTP protocol with block tokens plus SHA1 hash exchange.

Suffixes are used in many cases to denote type.

Abbreviation	Description
tgt	Kerberos Ticket Granting Ticket
kp	Kerberos Principal: nn-kp = The Kerberos principal for the NameNode nn
kt	Kerberos Ticket: u-jt-kt = A Kerberos Ticket for User u to access the JobTracker jt

Kerberos principals use the principal abbreviation and the kp suffix.

Abbreviation	Description
nn-kp	NameNode's Kerberos Principal
dn-kp	DataNode's Kerberos Principal (Unique principal for each DataNode on every node)
jt-kp	JobTracker's Kerberos Principal
tt-kp	TaskTracker's Kerberos Principal (Unique principal for each TaskTracker on every node)

Kerberos tickets use the consumer principal abbreviation, provider principal abbreviation and kt suffix.

Abbreviation	Description
u-nn-kt	Kerberos service ticket for User u to access NameNode nn
u-jt-kt	Kerberos service ticket for User u to access JobTracker jt
dn-nn-kt	Kerberos service ticket for DataNode dn to access NameNode nn
jt-nn-kt	Kerberos service ticket for JobTracker dn to access NameNode nn
tt-jt-kt	Kerberos service ticket for TaskTracker tt to access JobTracker jt



