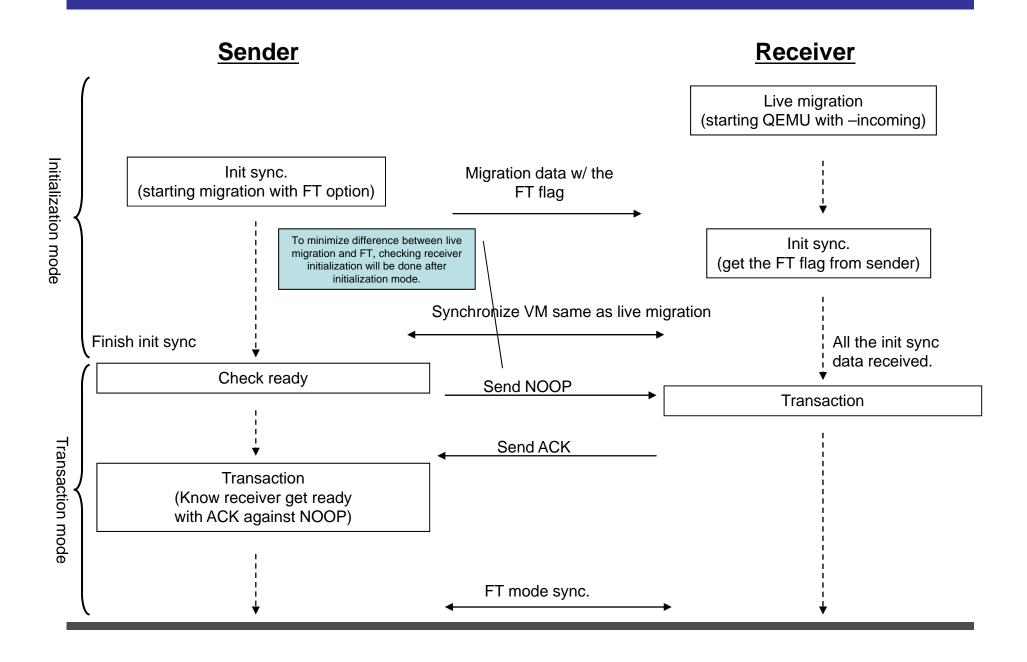
Kemari Sender/Receiver protocol Version 0.2a (Feb. 2nd, 2010)

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Definition of words.

- Sender
 - QEMU that send the snapshot of VM for fault tolerance.
- Receiver
 - QEMU that receive the snapshot of VM for fault tolerance.
- Initialization mode
 - Mode to synchronize all the VM information before starting fault tolerant synchronization. The fault tolerant synchronization is done with transaction mode.
- Transaction mode
 - Mode to send only the difference between events. If this mode started, QEMU will send the difference of VM snapshot only when some events occurs.
- FT mode.
 - Special transfer mode of migration to realize fault tolerance.
 - When sender start migration with this mode option, its state will become initialization mode and transaction mode, accordingly.

Message sequence chart and state transitions of sender and receiver



Data format from sender to receiver. (Initialization mode)

| Whole Transferred data | | (1) | (2) | | (3) | (4) | |
|------------------------|------------|-----------|----------|---------------|------------|------------------------------------------------------|--|
| | | | | | [| To append migration mode, use version 4 instead of 3 | |
| | | 4 byte | S | ,- | | 4 bytes | |
| (1) QEMU header | QEMU_VA | N_FILE_VA | N_FILE_N | AGIC | QEMU_ | _VM_FILE_VERSION | |
| | | 4 byte. | s | | Also can b | be used with QEMU_VM_LIVE_MIGRATION_MODE. | |
| (2) Migration mode | QE. | MU_VM_F | T_MODE | | | | |
| (3) Payload | | | | ly same as li | | on , | |
| (4) OF HILL () | 1 byte | , | | | | | |
| (4) QEMU footer | QEMU_VM_EO | F | | | | | |

Completely same as live migration except its QEMU_FILE_VERSION and mode.

Data format from sender to receiver. (transaction mode)

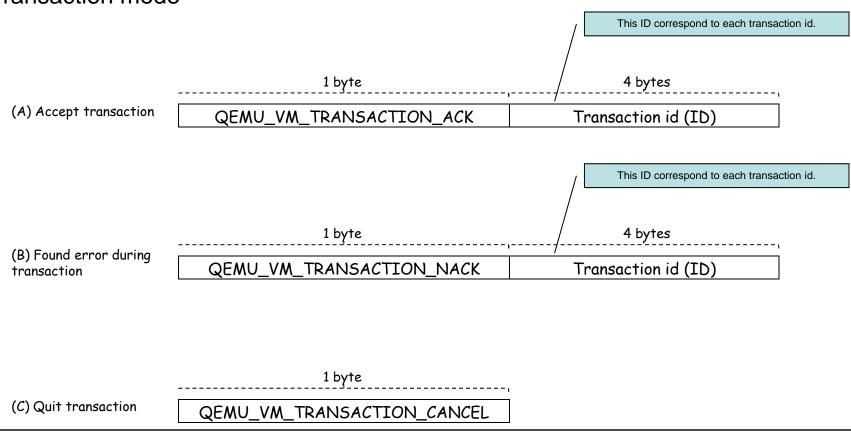
| Whole Transfe | (1) | (2) | | | | (2) | (3) | |
|----------------------------------------------------------------|------------------------------------------|--------|------------------------------------|-----------------|---------------------|----------|-------------------------------------|---------------|
| | | . , , | .,, | (2) can exist m | nore than once. | <u> </u> | | 1 , , |
| | | | | | / U | | sh each transact umber between t | |
| | 1 byte | | | | 4 bytes | | | |
| (1) Transaction header | QEMU_VM_TRANSACTION_BEGIN | | | | Transaction id (ID) | | | |
| | | | Payload contain of all payloads of | | | | | |
| | | 1 by | te | 4 bytes | 4 bytes | S | Payload le | ength (bytes) |
| (2) Transaction payload | QEMU_VM_T | RANSAC | TION_CONTI | NUE ID | Payload le | ength | Pa | yload |
| | | 1 byte | : | , , | 4 ! | oytes | , | |
| (3) Transaction footer | action footer QEMU_VM_TRANSACTION_COMMIT | | | IT | ID | | | |
| pecial purpose formats nose can be sent any time instead of | | 1 byte | : | | 4 1 | oytes | | |
| (A) Check receiver ready | QEMU_VM_ | TRANSA | ACTION_NOO | P | | :D | | |
| | | 1 byte | | | | | | |
| (B) Quit transaction | QEMU_VM_T | RANSAC | CTION_CANCE | L | | | | |

Data format from receiver to sender.

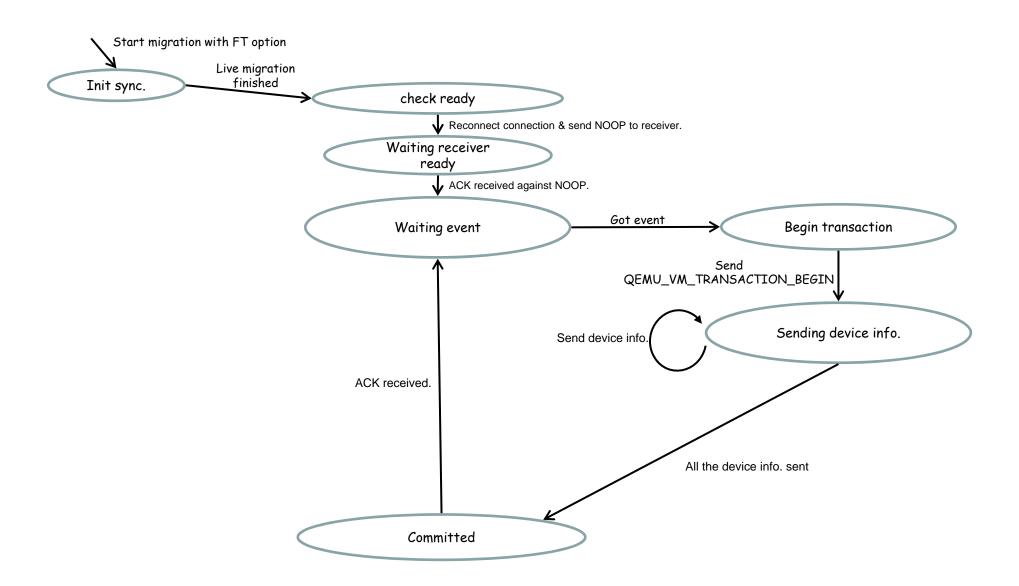
Initialization mode

•Nothing will be sent in this mode. Its behavior is the same as live migration.

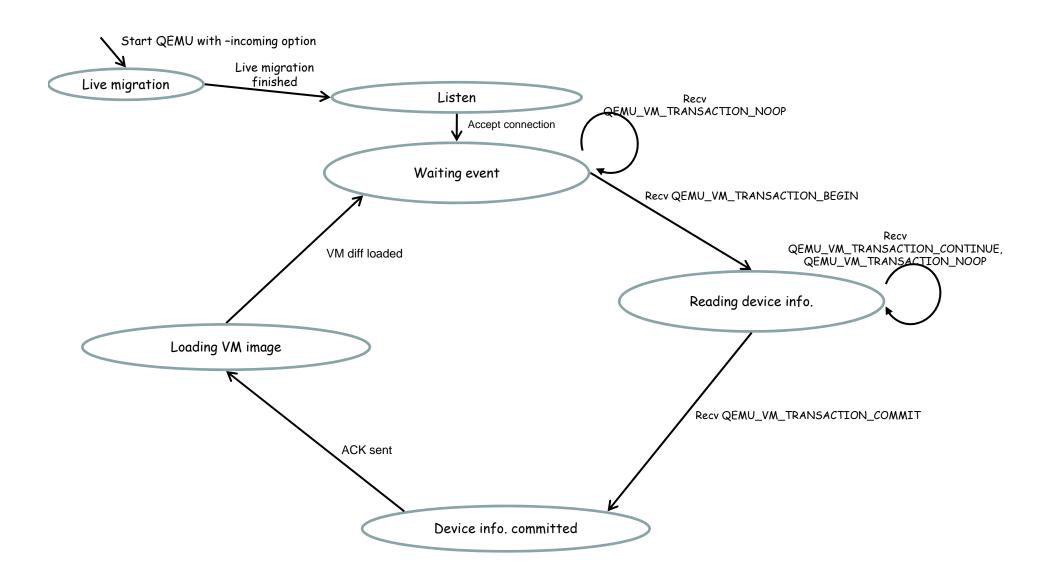
Transaction mode



State transition diagram of sender



State transition diagram of Receiver (normally)



State transition diagram of Receiver (to cancel FT mode)

