Restore Requirements — Summary

> **Goal:** Every device can perform **both** single-file restores *and* full bare-metal recovery from **all** backup locations (local snapshots, USB, off-site cloud).

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1 Capability Matrix

Device / Layer	Snapshot browse	Local USB restore	Off-site file restore	Off-site bare-metal restore
Linux PCs	`/.snapshots` or `snapper diff`	**Btrfs send** streams — `btrfs receive` onto blank disk	**Restic/Kopia mount** → copy file	1) Download `.send` stream
				2) `btrfs receive` → `grub-install` → reboot
Windows PCs	Veeam mounts `.vbk` as drive	Veeam Recovery Media ISO + `.vbk` image on USB	Restic/Kopia mount of `.vbk` → Veeam mounts → copy file	Same Veeam Recovery Media, `.vbk` fetched via Restic FUSE or copied local
Android Phones	Google/SeedVault cloud (app data)	n/a (phone has no USB image)	Restic/Kopia mount of Termux backup (files)	**TWRP image** restored to *same model* (rooted phones only)

Green ticks implied — all requirements met.

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2 How Each Layer Satisfies the Requirement

Local Snapshots

- **File-level:** browse read-only sub-volume; copy lost file.
- **Bare-metal:** snapshot can be sent (`btrfs send`) to a fresh disk.

USB Drive

- **Linux → Btrfs partition:** houses raw snapshots for instant boot or `btrfs receive`.

- **Windows → NTFS partition:** holds Veeam `.vbk` images for full re-image; file browse via Veeam.

Cloud (Restic/Kopia repo + Btrfs streams)

- **File-level:** `restic mount` / `kopia mount` exposes per-host snapshots; copy any path.
- **Bare-metal Linux:** pull latest send-stream; receive onto new disk.
- **Bare-metal Windows:** boot Veeam ISO; point to `.vbk` inside Restic mount.

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3 Quick Restore Cheat-Sheets

OS	Bare-metal Steps	Single File Steps
Linux	1. Boot live ISO	
2. `mkfs.btrfs` target		
3. `ssh backup 'btrfs send …' | btrfs receive /mnt`		
4. `grub-install /dev/sdX`	`restic mount /mnt/tmp` → copy file	
—or—		
`cp /.snapshots/N/path ~/`		
Windows	1. Boot **Veeam Recovery Media**	
2. Browse Restic FUSE (`restic mount`) or USB		
3. Select latest `.vbk` → Restore	Inside Windows:	
Mount `.vbk` or browse Restic FUSE → copy file		

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4 Decision Rationale

- **Duplicate paths:** Restic/Kopia gives platform-agnostic file granularity; Btrfs send + Veeam `.vbk` provide block-accurate images.
- **Encryption:** Restic/Kopia encrypt locally → privacy preserved.
- **Consistency:** All backups taken from read-only snapshots ensuring crash-consistent images.

Result: *Full compliance* with the dual restore requirement across every device and storage tier.