Fog&Cloud Opensource Microsoft cloud Google **AWS** The ecosystem Elasticity Infrastructure-as-a-Service Tenancy Platform-as-a-Service **CLOUD ECOSYSTEM Delivery models** ⁴ Virtualization Transference **Deployment** Dynamic Software-as-a-Service and migration Private models Binary cloud Translation Para-Virtualization Shadow page table Traps **Public** X86 cloud Hybrid Hardware cloud EPT/RVI assisted Community virtualization cloud Cpu Memory virtualization virtualization Dedicated HW Device emulation Linux containers Docker vs LXC LXC para-virtualized device I/O Union file virtualization Direct system Docker -**VIRTUALIZATION** assignment Type-1 Functioning **Hypervisor** Network architectures **OS-level** Type-2 virtualization Hybrid architecture Network process namespaces namespaces L2 connectivity overlay vs bridge vs linux direct routing linux L3 namespaces macvlan cgroups connectivity macvlan Lightweight virtualization **Datacenter** Linuxbridge wide services Tenant view Tenant-defined network Open services **Software** Multi-tenancy vSwitch bridges in Single server: linux complex Feature-rich **CLOUD NETWORKING** services network Host based connectivity switching Single server: basic Co-existence services Hairpin of virtual switching IP address services and assignment host applications NIC Data center switching networks Balancing workloads Open stack Master and Cinder tablets Interconnection **GBT** Datacenters Block servers networks implementation networks storage **Block** Compactions storage Google Topology Big Table Storage Internet models Fat Types of networks Distributed File locks trees **CLOUD STORAGE** databases storage Tablet serving Systematic Object Storage approach to locking Locks **Locks and** consensus Chubby Distributed Distributed Unix File object storage file systems Nodes System Organization General Resource OpenStack Parallel File Network allocation in Hierarchy Swift System File System the fog Designs and policies for distributed fs **Approximation** Consistency Swift Google File servers architecture **RESOURCE** System **ORCHESTRATION** Storage Rings **NP** problem Proxy servers server Resource allocation in cloud Dynamic allocation Static allocation Dynamic vs Static