Microsoft

Build and Lease Key Milestone Definitions

Microsoft Cloud Infrastructure and Operations

REVISION HISTORY

Version	Date	Author	Rationale
1.0	7/23/2020	Pranjali Sadh Troy Staten	First Draft
2.0	3/10/2021	Troy Staten	Periodic Review
3.0	6/22/2021	Pranjali Sadh Andy Croasdell	RNI definition update

1 Lease milestone definitions

Key Milestones

1.1 Signals (DSSP – Supply Planning)

Data Center Supply, Strategy and Planning (DSSP) issues a signal to Execute Leases/RNGs/AZNGs and any other required signals for E2E execution.

Investigate Signals are sent to investigate Lease options. These are normally sent to begin site selection and lease due diligence before a final location is chosen. An investigation signal leads later to an Execute signal.

1.2 Charter Approved

For lease projects, Charter approval is within the Lease Stage Gate process. Charter is approved with the closure of Stage Gate 2.

1.3 Capex Approved

The Capex approval is sought by the Site Selection (SAP) and DSSP teams from Finance. All the details are presented in the deal summary and once approved; this task is considered closed.

1.4 Lease Contract Executed

Lease Contract execution is when a formal contract is signed between a lease provider and Microsoft. The lease contract specifies all the technical specifications Microsoft requires to support our Azure platform along with a contractual schedule the lessor is expected to meet. The contractual RFS (Ready for Service) date is agreed upon in this contract. Once the Lease Contract is executed, E2E schedules can be transitioned from a V0 to V1 state, which signals to the business we now have a high confidence schedule.

1.5 Design Complete

Design is completed by Datacenter Engineering (DCE) and is incorporated in the Lease contract. The Design should be completed prior to signing the Lease contract.

1.6 CTB Complete (Clear to Build)

This is the official handoff from the GNDS team for an official Regional Network Plan to the NID team for execution. In general, this takes a few months to complete a full network plan and is triggered by a DSSP signal to support the GNDS workflow.

1.6.1 Stages of HLD

High Level Design (regional) is a graphical representation of the regional build; Table in right corner is list of all required spans (UseIndex # in schedule and tracker); Wealth of information (Gear, Connections, Cables, Decoms, etc)

The HLDs have the following "Stages" of maturity:

1. Stage 0.x – Draft - Indicates that the region is merely in the early analysis and feasibility stage, sites have not been locked, relative locations of facilities unknown, fiber viability unknown, etc.
2. Stage 1.x – Budgetary - This stage is intended to allow for progression to a Cap Council request for the region. Completion of "Stage 1" indicates that preliminary regional planning has been largely completed, including:
    - All known sites identified
    - DC sizes (XS, S, M, L) of each DC are locked
    - RNGs are located and RNG sizes are locked (Regional "heat map")
    - Locations of facilities are known (leases are being worked) and facilities are being validated to make sure the layout and construction requirements can be met
    - Metro fiber feasibility has been established
    - Pricing of colo space and fiber can be estimated.
    - Budgetary estimates for all equipment and space fit-out
3. Stage 2.x – Early Design – This stage is intended to allow for commencing the buildout of facilities. Completion of "Stage 2" indicates:
    - Region has had "legacy" equipment and migration equipment identified (if applicable)
    - Rack layouts of RNGs and IDFs have been done. Possible to begin fit-out of facilities
    - SitePro has been populated from the default templates, and ordering of long lead-time stable equipment in possible at this stage
4. Stage 3.x – Final Design – This stage is intended to finalize the design and complete ordering
    - Fiber contracts are locked allowing optical equipment selection

---

    - All legacy and migration equipment has been identified and designed into the HLD
    - BOM are finalized for the regions and the ordering of all remaining equipment is possible.

1.7 Ready for Network Install (RNI)

Ready for Network Install (RNI) is a milestone that signals that a facility is complete with required infrastructure for all network distribution frames, including mechanical and electrical systems and Fiber Infrastructure to support Dark Fiber Splicing. The milestone is intended to provide all the necessary infrastructure to begin Rack/Stack/Patch of Network devices.

The RNI Definition consists of the following main scope items (IDF | RNG | AZNG):

A. Power Requirements: For builds, RNI is achieved 5 days after Level 4 Cx starts, however IST is needed to ensure permanent power to start configuration. For Leases, permanent power is achieved at RFS.
B. Overhead Cabling Pathways: Wire Mesh Cable Trays & Fiber Runners installed
C. Network Racks: NW Racks should be in place and bolted with Fiber Splice Housings, Splice Trays & Trunk Cables installed.
D. Grounding and Bonding: Earth Grounding and bonding of all metallic components per DCE by project.
E. Aisle Containment: Cold and Hot Aisle containment and all components included.
F. Security Requirements: Security measures include an Access List and a segregation fence if in Colo space.
G. Cleanliness: Spaces are to be clean of any debris and dust in order to deploy network devices.
H. Temporary Storage: Required to ensure storage is available for high value assets.
I. Campus/Bulk Fiber Connections: All Service connections that are on campus or within the building are required by RNI. Outside plant fiber (or metro fiber) is not an RNI requirement and is completed by CIA/NFOS teams.

RNI Milestone Checklist - taken from the DCI Document SharePoint

While Fiber Infrastructure Ready (FIR)* is not tracked separately, all the scope of FIR is included in the RNI completion. Below are supporting documentation:

1. Fiber Infrastructure Readiness Checklist
2. Fiber Infrastructure Ready Design Elements

Build Schedule Timeline

RNI should be achieved 5 calendar days after Level 4 Commissioning begins. At this time, Rack/Stack/Patch of Network devices can begin. Network configurations cannot begin until IST is achieved.

1.8 DC Ready

1.8.1 Ready for Service (RFS)

RFS condition is always defined in the contract and a sample looks as below:

1. The Premises for the applicable Phase and Building meet or exceed the "Premises and Building Specifications"
2. <Provider> completed the Storage and Office Improvements and the work described in the Phase Design Plan (unless the deadline for the work has been extended beyond the Ready for Service
3. <Provider> satisfied its commissioning obligations set forth in Exhibit E;
4. <Provider> delivered actual and sole possession of the Premises for the applicable Phase and the Office Area and Dedicated Storage Area to Microsoft, and the Premises and all Common Areas are available for Microsoft's use in conformity with this Agreement;
5. <Provider> has received all permits, licenses and other government approvals required for the work in the Phase Design Plan and the Storage and Office Improvements and the operation of the Building;
6. <Provider> has made the Capacity and all utilities for the applicable Phase available to Microsoft; and
7. <Provider> has conducted a thorough cleaning of the Premises for the applicable Phase so that Microsoft may begin its business from the aforesaid Premises immediately after STT Defu 2 completes such clean-up.

1.9 Fiber Delivery Complete

Milestone representing all Fiber delivery is completed including Fusion Splicing and Fiber Characterization (this is usually done by a third-party contractor such as CommScope (formally Arris). This unblocks the potential to start Optical configurations of the ADVA or MOLEX gear by the NID team.

1.10 OOB Circuit Delivery Complete

Once the ITIM team completes RNI, and the OOB (Out of Band) Circuit is delivered and cross connect installed, this milestone dictates that we have full OOB connectivity in to the IDF / RNG to start NW configurations. This can only be fully tested once the OOB Router is delivered and configured on this OOB Circuit.

1.11 Clear to Dock

Clear to Dock is a milestone stating that network HW can be delivered to the site. This requires
1. NDTs
2. Fiber and Litwaves delivered to the respective racks
3. Secure storage to put the gear.
4. Network gear PO are approved
5. Consumables docked
6. OOB Circuit delivered
7. RNI Achieved

1.12 Colo Fitout Complete

All the data halls are fitted out with required infrastructure like cable trays, baskets, fiber, copper, electrical whips, MoR racks, etc.

1.13 CorpNet Live

Corpnet switches have been racked, stacked, and configured. MSIT has approved Corpnet configuration to the site. In order to begin Security Commissioning, Base configuration on at least a single leg of CorpNet must be available. Fully redundant CorpNet is required prior to Colo Ready.

1.14 Security Lockdown

The Security Lockdown event involves:

The DCD PM on the project (Owns responsibility for all construction)
The Regional Security Manager (Owns responsibility for Security)
The Data Center Operations Manager (Owns responsibility for Data Center Operations)

Security Lockdown is required to turn over the space from the Landlord's Operations to Microsoft Operations.

There will be a number of Go / No Go meetings that occur in the runup to Security Lockdown so there are typically no surprises when the Security Lockdown event occurs.
Thought there are three roles involved in the Security Lockdown event, and all parties must agree that Security Lockdown is a GO, The DCPS Team and specifically the Regional Operations Security Manager owns the Security Lockdown event.

For an in-depth view of Datacenter Classifications (A, B, C, D, etc.), visit the Online Services Security website.

1.15 Network Live

Network Live is the final milestone in the NID network deployment. The NID team will declare an official Network Live. This is one of the major dependencies for Colo Ready.

1.16 Colo Ready

A Colocation is deemed Ready when "A Colocation Tranche has Power, Space, Cooling, Network from T1 and above, Security, and GDCO connectivity in place to deploy sellable capacity all the way to Live".

The Colo Ready Definition consists of the following criteria:

1. HACs installed (in dc ready)
2. Standard Middle of Row (MoR) Racks required for FFR installed.
3. Colo Telecom Pathways installed with Fiber from IDF to MoR
4. T1 Fiber (MoR to Server) installed and tested
5. Electrical systems complete and commissioned downstream of PDUs
6. Install whips/bus plugs
7. Corp Net installed and operational
8. NW Live
9. Security Lockdown

2 Build milestone definitions

Key Milestones

2.1 Signals

Data Center Supply, Strategy and Planning (DSSP) issues a signal to Execute Leases/RNGs/AZNGs and any other required signals for E2E execution.

Investigate Signals are sent to investigate Lease options. These are normally sent to begin site selection and lease due diligence before a final location is chosen. An investigation signal leads later to an Execute signal.

2.1 Site Due Diligence Complete

Datacenter Engineering (DCE) is responsible for Site Due Diligence. After an 8-week period, DCE will present a Go/No-Go decision point to determine whether MSFT should procure the land option provided by the Land team. The overall Site Due Diligence period is 12 weeks and with the Go/No-Go meeting occurring 8 weeks through the process.

2.2 Close on Property Complete

The necessary documents have been signed to transfer property ownership to Microsoft. Work on the site can start.

2.3 Charter Approved

This milestone supports the phased gate process. The date corresponds to the approval of the project charter by the CapEx Council and is approved at Stage Gate 1 closure.

2.4 PER – Project Expenditure Requisition

2.4.1 PER #1

Capital request which generally includes the following: land due diligence and purchase cost, power and fiber cost, pre-construction services, long lead equipment (LLE) prepositioning, and design cost up to 30% in some cases. PERs can vary with project needs.

2.4.2 PER #2

Capital request funding for completion of design and construction. This also funds LLE if it was not a standard equipment package that was prepositioned. If the signal is preposition, this will fund capital required up to building shell and core. PERs can vary with project needs.

2.4.3 PER #3

Funding to completion; capital request funding to complete project or true up to

Guaranteed Max Price (GMP). There can be a PER #4 in certain cases, based on the needs of the project. PERs can vary with project needs.

2.5 Design Complete

DCE is responsible for the entirety of the Design scope, from the start of the design to the issuance of the construction package (IFC), for the data center build. DCE will normally hire an Architect/Engineering Firm (A/E) to complete the building design. The IFC package is used to bid the projects to General Contractors (GCs).

2.6 CTB Complete (Clear to Build)

This is the official handoff from the GNDS team for an official Network Plan to the NID team for execution. In general, this takes a few months to complete a full network plan.

2.7 Shell Ready (Troy to check with Amit on an updated definition)

This milestone supports the phased gate process. For build to colo ready projects, the date corresponds to the Weather Tight date. For build to cold shell projects, the definition is pending.

2.8 LLE ROJ – Long Lead Equipment – Received on Jobsite

Work owned by the Long Lead Equipment Procurement team (DISC – Services). Each task in this scope represents the procurement process from development of the RFP through first delivery to the job site.

Gens	Generators

(XXXXX) - UTS	Universal Transfer Switch
(XXXXX) - LVS	Low Voltage Switchgear
(XXXXX) - TXFM	Transformer
(XXXXX) - MVS	Medium Voltage Switchgear
(XXXXX) - AHU	Air Handling Unit
(XXXXX) - BAS	Building Automation System
(XXXXX) - ATS	Automatic Transfer Switch
(XXXXX) - UPS	Uninterruptable Power Supply
(XXXXX) - STS	Static Transfer Switch
(XXXXX) – EPMS	Electrical Power Management System
(XXXXX) - PDU	Power Distribution Unit

2.8 Cx. Level 3 Complete (Green Tag Complete)

This milestone, also referred to as Green Tag, signifies the Level 3 Startup was completed, all issues resolved, retesting completed, startup data analyzed, and startup reports completed and uploaded. The milestone begins when all the equipment in the area is Green Tagged. Once all the equipment in a room is Green Tagged, the room is then Green Tagged. Once all rooms in an area are Green Tagged, then the area is Green Tagged. Once the area is Green Tagged, it is ready for Level 4 Functional Performance Testing (FPT). Typically, if the Level 3 Complete was completed successfully, Green Tag should occur one or two days after Level 3 Complete. However, if many issues were discovered and additional retesting is required, the length of time between L3 Complete and Green Tag will increase. Integration and DCD must closely track and analyze the duration between Level 3 Complete and Green Tag.

2.9 Ready for Network Install (RNI)

Ready for Network Install (RNI) is a milestone that signals that a facility is complete with required infrastructure for all network distribution frames, including mechanical and electrical systems and Fiber Infrastructure to support Dark Fiber Splicing. The milestone is intended to provide all the necessary infrastructure to begin Rack/Stack/Patch of Network devices.

The RNI Definition consists of the following main scope items (IDF | RNG | AZNG):

A. Power Requirements: For builds, RNI is achieved 5 days after Level 4 Cx starts, however IST is needed to ensure permanent power to start configuration. For Leases, permanent power is achieved at RFS.

B. Overhead Cabling Pathways: Wire Mesh Cable Trays & Fiber Runners installed
C. Network Racks: NW Racks should be in place and bolted with Fiber Splice Housings, Splice Trays & Trunk Cables installed.
D. Grounding and Bonding: Earth Grounding and bonding of all metallic components per DCE by project.
E. Aisle Containment: Cold and Hot Aisle containment and all components included.
F. Security Requirements: Security measures include an Access List and a segregation fence if in Colo space.
G. Cleanliness: Spaces are to be clean of any debris and dust in order to deploy network devices.
H. Temporary Storage: Required to ensure storage is available for high value assets.
I. Campus/Bulk Fiber Connections: All Service connections that are on campus or within the building are required by RNI. Outside plant fiber (or metro fiber) is not an RNI requirement and is completed by CIA/NFOS teams.

RNI Milestone Checklist - taken from the DCI Document SharePoint

While Fiber Infrastructure Ready (FIR)* is not tracked separately, all the scope of FIR is included in the RNI completion. Below are supporting documentation:

1. Fiber Infrastructure Readiness Checklist
2. Fiber Infrastructure Ready Design Elements

Build Schedule Timeline

RNI should be achieved 5 calendar days after Level 4 Commissioning begins. At this time, Rack/Stack/Patch of Network devices can begin. Network configurations cannot begin until IST is achieved.

2.10 DC Ready

Cx. Level 5 Complete/Integrated Systems Test (IST)

This milestone, also referred to as White Tag, signifies that Level 5 IST testing was completed, all issues resolved, retesting completed, test data analyzed, and test reports completed and uploaded. The area is not ready for the next step until it has been White Tagged. Typically, if the Level 5 IST was successfully completed, White Tag should occur one or two days after IST complete. However, if many issues were discovered and additional testing is required, the length of time between Level 5 IST complete and White Tag could increase. Analyzing the duration between IST complete and White tag should be closely tracked.

This milestone also equates DC Ready for Builds. DC READY
1. Mechanical System complete & Commissioned

---

2. Electrical System complete & Commissioned
3. RFS/IST Date confirmed

4. RNG Bulk Fiber extended from PoE to IDF
5. Fiber to RNG terminated and tested (when bulk fiber only)

2.11 Fiber Delivery Complete

Milestone representing all Fiber delivery is completed including Fusion Splicing and Fiber Characterization (this is usually done by a third-party contractor such as CommScope (formally Arris). This unblocks the potential to start Optical configurations of the ADVA or MOLEX gear by the NID team.

2.12 OOB Circuit Delivery Complete

Once the ITIM team completes FIR, and the OOB Circuit is delivered and cross connect installed, this milestone dictates that we have full OOB connectivity in to the IDF to start NW configurations.

2.13 CorpNet Live

Corpnet switches have been racked, stacked, and configured. MSIT has approved Corpnet configuration to the site. To begin Security Commissioning, Base configuration on at least a single leg of CorpNet must be available. Fully redundant CorpNet is required prior to Colo Ready.

2.14 Security Lockdown/Turnover to Operations

The date that DC Operations accepts the facility from DCI, which includes work completed by Construction and Microsoft Integration teams. Commissioning, including Integrated Systems Testing (IST) and punchlist, is completed, reviewed, and recorded. Critical utilities, including power, water supply, and network connectivity will meet DC Operations' needs for the minimum initial phase requirements. All operational issues have been resolved. Non-operational issues are documented and agreed to with formal DC Operations Acceptance. Any outstanding non-operational issues will be addressed by the GC or other DCD Vendors after the Turnover to Operations date. Security lockdown should coincide with turnover to Operations.

2.16 Network Live

Network Live is the final milestone in the NID network deployment. The NID team will declare an official Network Live. This is one of the major dependencies for Colo Ready.

2.17 Colo Ready

A Colocation is deemed Ready when “A Colocation Tranche has Power, Space, Cooling, Network from T1 and above, Security, and GDCO connectivity in place to deploy sellable capacity all the way to Live”.

The Colo Ready Definition consists of the following criteria:

1. HACs installed (in dc ready)
2. Standard Middle of Row (MoR) Racks required for FFR installed.
3. Colo Telecom Pathways installed with Fiber from IDF to MoR
4. T1 Fiber (MoR to Server) installed and tested
5. Electrical systems complete and commissioned downstream of PDUs
6. Install whips/bus plugs
7. Corp Net installed and operational
8. NW Live
9. Security Lockdown

Glossary

Please refer to the glossary at the link: Glossary.docx