Enterprise Blockchain Solution Lifecycle

From “*what is blockchain?*” to your first production release

BLOCKCHAIN TRAINING ALLIANCE

Introduction

- Who am I?
  - Kris Bennett, #BlockchainBeardGuy
  - Chief Learning Officer, Blockchain Training Alliance
- What is Blockchain Training Alliance?
  - Blockchain Training and Certification
    - Partnered with Pearson VUE testing centers
    - Exclusive Blockchain content provider
  - Workshops and Consulting Services
    - Help making your ideas a reality
- Join my network on LinkedIn:
  - https://www.linkedin.com/in/kbennett2000/
- For more about Blockchain Training Alliance go to:
  - https://blockchaintrainingalliance.com

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What Phase Are You In?

- Phase 1 – What is Blockchain?
- Phase 2 – Use Case Identification & Prioritization
- Phase 3 – Proof-of-Concept Construction
- Phase 4 – Minimum Viable Product Development

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Phase 1

What is Blockchain?

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Phase 1 – What is Blockchain?

- A Phase 1 organization is:
  - Working on understanding the business impact Blockchain, IoT, AI, Big Data, and other emerging technologies.
  - Aware these technologies will have a big impact but do not yet have a detailed plan to address those impacts.
- Key Participants at this phase are:
  - Senior Leadership
  - Business Analysts
  - Product / Program Managers
  - Department / Office Heads

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Phase 1 – What is Blockchain?

- Typical questions include:
  - What is blockchain?
  - Why is it significant?
  - What impact will it have on my business and my industry?
  - How can blockchain help me deliver more value to my customers?
  - What is my high-level blockchain plan? (Ignore It / Plan for It / Take Action)
  - How does blockchain affect my short-term / medium-term / long-term business objectives?

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Phase 1 – What is Blockchain?

- Objectives in this phase should be:
  - Tech 101
  - Identifying Trends and Patterns in the Marketplace
  - Review of External Use Cases and Real-World Implementations
  - Organizational SWOT analysis
  - Stakeholder Interviews
  - Personalized Go-Forward Recommendations, Guidance, and Best Practices
  - Go-Forward Planning

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Phase 1 – What is Blockchain?

- Tech 101
  - Understanding what Blockchain is, the different options available, and the benefits and drawbacks associated with the technology.
  - What do things like blockchain, IoT, AI, VR/AR, Big Data, and 5G mean?
  - When can I expect to see the impact of each of these technologies?
  - What changes will these technologies bring about in the marketplace?
- Identifying Trends and Patterns in the Marketplace
  - What are the current trends and patterns in the marketplace that are helping to drive interest in and adoption of this technology.
  - How are these technologies disrupting businesses currently?
  - What kind of change can we expect in the future?
  - How are organizations planning for the coming changes?
  - Who will be the winners and losers?
- Review of External Use Cases and Real-World Implementations
  - Understanding how the technology is being used in the marketplace and what benefits successful implementers are deriving from it.
  - An overview of who's using emerging technologies, what they're doing with it, and the value they're getting.
  - Problems that can be addressed by emerging technologies.
  - Where emerging technologies are NOT a good fit.

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Phase 1 – What is Blockchain?

- Organizational SWOT analysis
  - Understanding how **organizational strengths** could be **enhanced** by new technology.
  - Understanding how **organizational weaknesses** could be **addressed** by new technology.
  - Understanding **how market opportunities** could be **capitalized on** by new technology.
  - Understanding how **market threats** could be **mitigated** by new technology.
  - It's critical for the larger group to be aligned on these items going forward.
- Stakeholder Interviews
  - 60 – 90 minute stakeholder interviews
    - Senior Leadership
    - Product / Program Managers
    - Leadership from all major departments / divisions / offices
  - Focused on gauging understanding of three essential areas:
    - Understanding of Current Business Processes and Associated Flexibility
    - Understanding the Alignment of Technology Objectives to Business Objectives
    - Measuring Process Insight, Visibility, and Communications

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Phase 1 – What is Blockchain?

- Go-Forward Recommendations, Guidance, and Best Practices
  - Have you talked with other organizations or leaders:
    - In your area?
    - In your industry / vertical?
    - In supporting verticals?
    - In entirely different verticals?
- Go-Forward Planning
  - Does it make sense to pursue this technology further at this time?
  - If so, why?
  - If not, why not? When should this decision be revisited? How should it be considered then?

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Phase 2

Use Case Identification and Prioritization

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Phase 2 – Use Case Identification & Prioritization

- Typical Questions Include:
  - What potential use cases exist in the world around me?
  - How does each one align with short-term / medium-term / long-term business objectives?
  - How do I evaluate and prioritize potential use cases?
  - How do I translate business requirements into technical requirements so I can architect a blockchain proof-of-concept?
  - How do I iteratively develop a PoC?
  - How do I know when to end a PoC?
  - How do I know if it makes sense to graduate a PoC to a Minimum Viable Product (MVP)?

Phase 2 – Use Case Identification & Prioritization

- Phase 2 Objectives:
  - Identify and document potential use cases
  - Prioritize use case development
  - Develop solution Guiding Principles in alignment with Business Objectives
  - Define and document solution parameters
  - Gather and document high-level solution requirements down the functional level
    - Define & Document Personas
    - Define & Document User Stories based on Personas
    - Define & Document Functional Requirements extracted from User Stories
  - Defining and documenting platform and technology choices
    - Solution Platform Mapping exercises
  - Define and document technical solution architecture
    - Define & Document Technical Requirements based on Functional Requirements
  - Develop Product Backlog

Phase 2 – Use Case Identification & Prioritization

- How Do You Answer These 4 Questions? (y/n)
  1. Do I have one or more assets I want to track?
  2. Do I care about the evolution / lifecycle of an asset?
  3. Is the evolution / lifecycle of an asset governed by rules and well-defined processes?
  4. Am I the single voice of truth for questions about an asset?

Phase 2 – Use Case Identification & Prioritization

- Let's Review – Signs of a good use case:
  - Do I have one or more assets I want to track?
    - **YES**
  - Do I care about the evolution / lifecycle of an asset?
    - **YES**
  - Is the evolution / lifecycle of an asset governed by rules and well-defined processes?
    - **YES**
  - Am I the single voice of truth for questions about an asset?
    - **NO**

Phase 2 – Use Case Identification & Prioritization

- Do I have one or more assets I want to track?
  - There's something I care about that I want to track.
  - This thing can be physical or virtual.
  - Bitcoin, digital music, food products, intellectual property, and usage of a service platform are all valid examples of an asset.
- If **YES**, a shared immutable ledger of events affecting the assets you care about is likely of value.
- If **NO**, you're likely trying to solve a business problem better suited to tools *other* than blockchain.

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Phase 2 – Use Case Identification & Prioritization

- Do I care about the evolution / lifecycle of an asset?
  - It is not enough for me to know the current state of an asset.
  - It is important for me to be able to see the history of an asset and how it has evolved over time.
- If **YES**, the permanent append-only ledger providing full version history of all assets and their related properties will likely be of significant value.
- If **NO**, a database is likely a suitable data storage component.

Phase 2 – Use Case Identification & Prioritization

- Is the evolution / lifecycle of an asset governed by rules and well-defined processes?
  - An asset in my business does not evolve randomly.
  - An asset in my business evolves over time according to rules and well-defined processes.
- If **YES**, Smart Contracts and the ability to automate business processes according to clearly defined rules will likely add significant value.
- If **NO**, you're likely just looking to *capture* data rather than *act* on it. Technologies such as IPFS or no-SQL database platforms might provide greater value.

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Phase 2 – Use Case Identification & Prioritization

- Am I the single voice of truth for questions about an asset?
  - In most cases, as an asset evolves over time it passes through many hands.
  - This means I am most likely one of many custodians of an asset during certain parts of a larger, collectively-shared process.
- If **NO**, a centralized system acting as a single source of truth is likely not an ideal fit. A decentralized authoritative system which is shared and collectively managed by all members of a business network is likely a much better fit.
- If **YES**, a database or other centralized authoritative system is likely acceptable as your organization is *already* the single voice of authority for questions around this particular asset.

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Phase 2 – Use Case Identification & Prioritization

- More Blockchain Use Cases ‘Symptoms’:
  - Large Business Network?
    - This is a solution which will be used across organizational boundaries, not just at my organization.
  - Need for multiple ledgers?
    - Keeping ALL the data on one single ledger won’t work.
    - We need multiple ledgers we can control access to.
  - Public Verification?
    - I need to be verifiable to a relatively large or public audience of stakeholders outside my organization.
  - Coin / Token?
    - I have a business idea or model which will benefit from the use of a digital coin or token.

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Phase 2 – Use Case Identification & Prioritization

- More Blockchain Use Cases ‘Symptoms’:
  - Audit / Review?
    - This process is subject to audit or later review by external stakeholders, regulators, etc.
  - Can’t be solved with a database?
    - I have a problem which cannot be solved by a database due to technical limitations.
  - Non-technical (human) problems / barriers?
    - I have a problem that can’t be solved with conventional technology due to non-technical reasons.
  - Systems integration?
    - I am trying to integrate disparate line of business (LoB) systems, oftentimes across organizational boundaries.
    - I need a reliable way to persist state across LoB applications.

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Phase 2 – Use Case Identification & Prioritization

- Once you've identified 1-3 good use cases:
  - Document each potential use case
  - Prioritize use case development
    - Which delivers the most business value?
    - Which creates the most business pain?
    - Which would be the simplest problem to solve?
  - Develop solution Guiding Principles in alignment with Business Objectives
    - What are the "North Stars" that we will use to maintain alignment with the initial vision and proper direction ?
  - Define and document solution parameters
    - What solution decision points are out of our control?
      - Laws, regulations, dependencies, etc.

Phase 2 – Use Case Identification & Prioritization

- Once you've identified 1-3 good use cases:
  - Gather and document high-level solution requirements down the functional level
    - Define & Document Personas
      - For each user role, describe the current state.
    - Define & Document User Stories based on Personas
      - For each user role, describe the idealized future state.
    - Define & Document Functional Requirements extracted from User Stories
      - Define everything the solution ***should*** do, worry about ***how*** to do it later.
  - Defining and documenting platform and technology choices
    - Solution Platform Mapping exercises
      - What platforms are we considering, and why?
      - What platforms have we ruled out, and why?
  - Define and document technical solution architecture
    - Define & Document Technical Requirements based on Functional Requirements
      - ***How*** are we going to implement each Functional Requirement?
  - Develop Product Backlog
    - Prioritized list of features and functions.
    - Priority should be decided by non-technical stakeholder audience.

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Phase 3

Proof-of-Concept Construction

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Phase 3 – PoC Construction

- A good PoC is just like a movie set…
  - **ONLY** build enough to tell a convincing story.
  - You are **NOT** building anything that will go in your production release!

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Phase 3 – PoC Construction

- Phase 3 Objectives should include:
  - What is our PoC team composition?
    - Build it and they will come…
    - *…or…*
    - …a group effort right from the start.
  - Definition and alignment by stakeholders on PoC boundaries.
    - What will this PoC do?
      - What will it *actually* do?
      - What will it *pretend* to do?
    - What will this PoC *NOT* do?

Phase 3 – PoC Construction

- Phase 3 Objectives should include:
  - Solution Design Documentation
    - Proposed outline on next slide….
  - Development of Sprint Plan from Product Backlog
  - Creation of environments for:
    - Development – Required
    - Test – Required
    - Q/A – Optional
    - Staging – Optional
  - Agile release process:
    - Development → Delivery → Feedback → Development
  - Definition of PoC Exit Criteria
    - How do we know when to stop PoC development?

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Phase 3 – PoC Construction

- A good Solution Design Document should include:
  - Executive Overview
  - Problem Statement
  - SMART Goals and the Definition of “Success”
  - Solution Guiding Principles
  - Solution Design and Architecture
    - Platform Selection and Concerns
    - Network Considerations
    - Solution Design
      - Assets
      - Participants
      - Transactions
      - Queries
      - Events
    - Additional Requirements
  - General Timeline of Events
  - Potential Risks
  - Data Dictionary
    - Asset and Participant Properties
    - Enumerations
    - Transaction Definitions

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Phase 3 – PoC Construction

- Phase 3 Considerations:
  - Technical Considerations
    - Available skillsets vs required skillsets
      - Will the work be performed in-house, outsourced, or a combination?
        - What are the responsibilities and deliverables of each vendor / participant?
    - Technical Training or Education required?
    - How will architects and developers be supported?
    - Are we involving Operations at this phase?
      - This should be a dev/ops project, not a dev project!

Phase 3 – PoC Construction

- Phase 3 Considerations:
  - Project Management Considerations
    - How will new releases be demoed / trialed?
    - How will feedback be collected?
    - How will feedback be integrated into the Product Backlog?
      - What defines feedback that will NOT be integrated in the backlog?
    - How will sprints be defined from the Product Backlog?
      - Sprint duration?
      - Skillsets per sprint?
    - How will sprints be managed?
      - Post-Mortem process?
    - What is the official Change Management process?
      - Are all team members up to speed?
    - Have we reached PoC Exit Criteria?
      - Should Exit Criteria be revisited?

Phase 3 – PoC Construction

- Design Sanity Checks:
  - Can I communicate the value of this solution to ***any*** customer or user without using the word "*blockchain*"?
  - Can I describe a clear difference in customer experience before and after the implementation of this solution?
    - If yes, then I've likely justified the costs of this solution.
    - If design and development activities cannot be directly related to an enhanced and demonstrably improved customer experience, how are costs justified?

Phase 4

Minimum Viable Product Development

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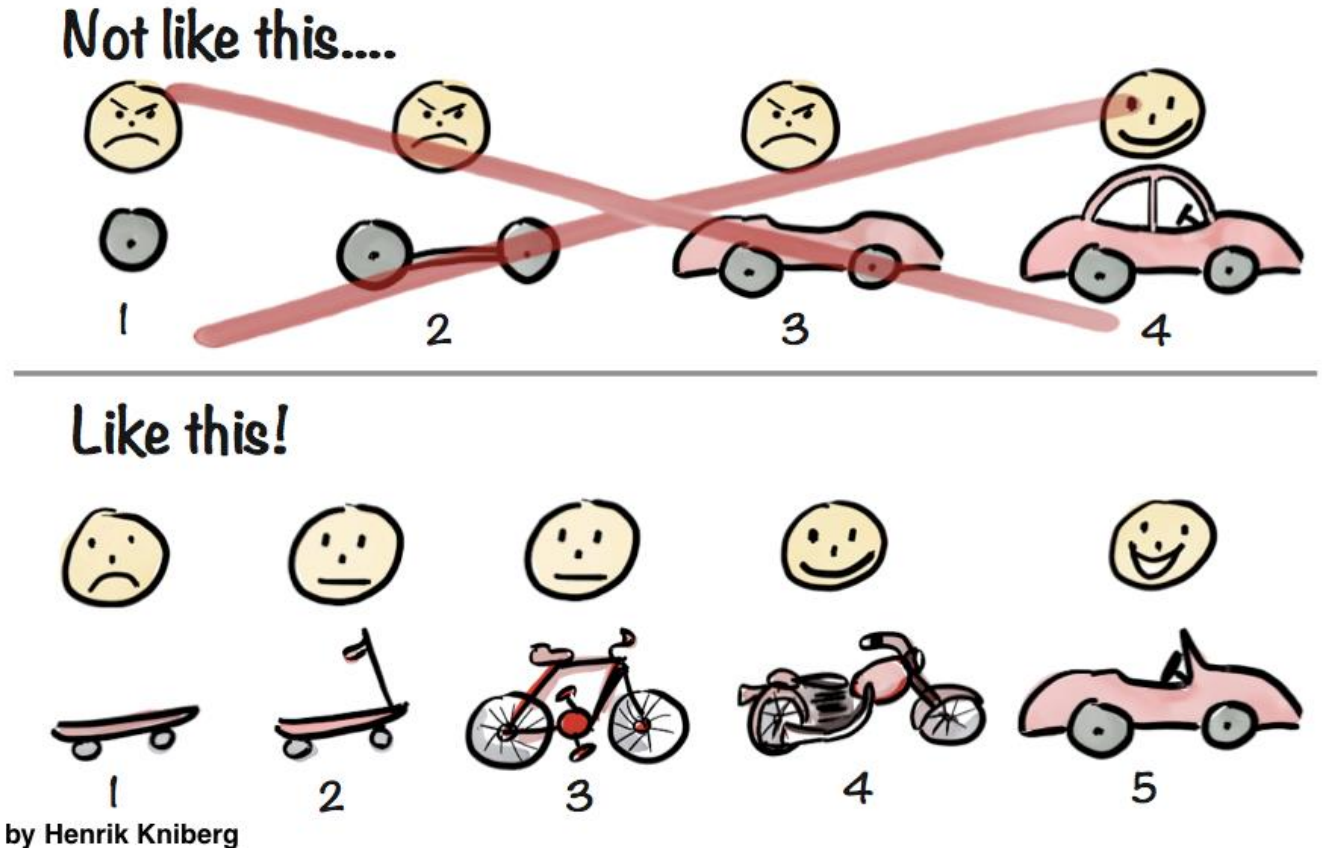
Phase 4 – MVP Development

- MVP = Minimum Viable Product
- An MVP should:
  - Be a complete and usable product at every release.
  - Deliver something of business value at each release.
  - Incrementally add more value with each release.



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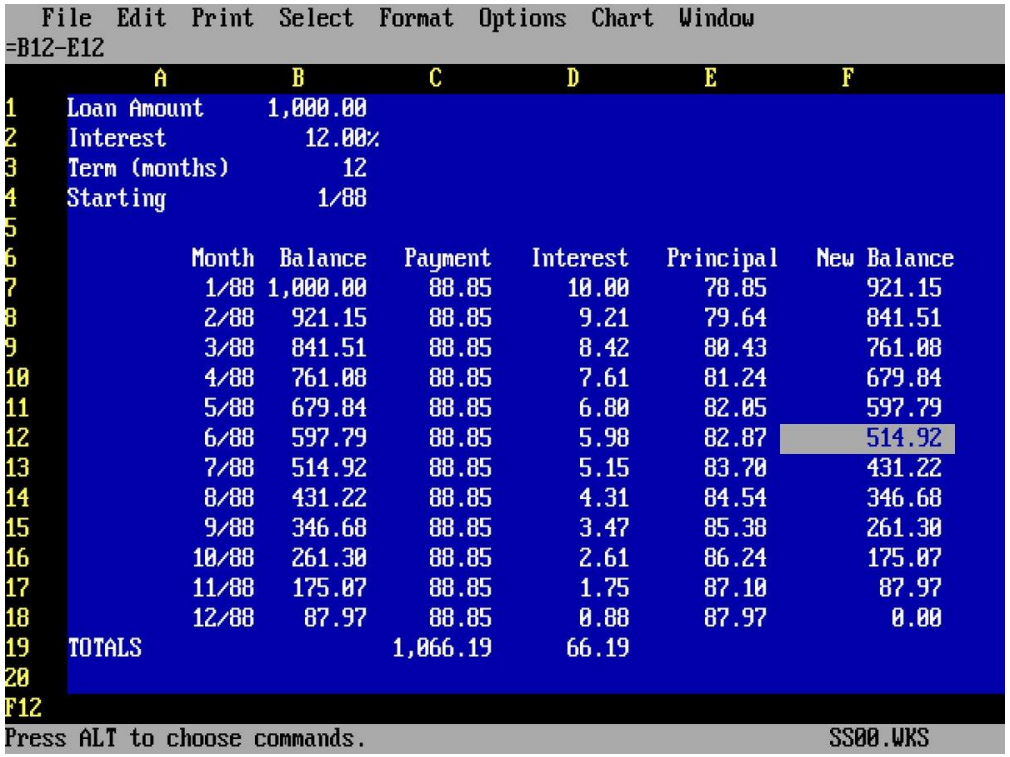
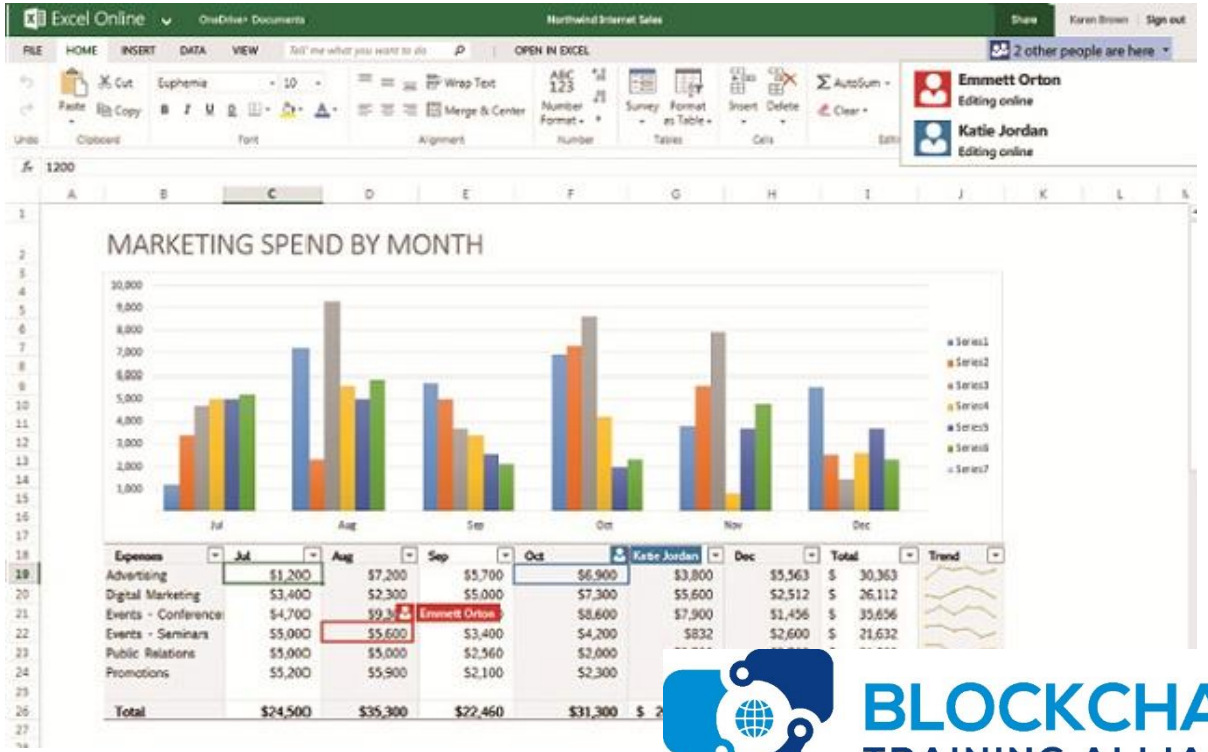
Phase 4 – MVP Development

- The Evolution of Microsoft Excel (1992 to 2019)
  - Each version was ***COMPLETE*** and ***USEABLE***
  - Each version delivered business value





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Phase 4 – MVP Development

- Phase 4 Considerations:
  - In general, the addition of blockchain into the solutions development process does not substantially change much.
    - Time-tested principles for successful development and delivery should be adhered to.
    - When developing on platforms where ***Smart Contracts are stored on-chain***, be careful of your release cadence!
      - How are old releases managed?
      - How are new releases communicated to the rest of the application stack?
  - Change Management Process
    - Critical to define BEFOREHAND!
      - Especially when taking consortium approach!
    - What happens when conflicting changes are submitted?
      - What is the official Change Acceptance process?

Phase 4 – MVP Development

- Phase 4 Considerations:
  - New Product Release Process
    - How are changes, upgrades, new versions, and new releases managed?
    - How are these activities communicated to customers, users, product owners, and stakeholders
    - Is there a release sign-off process?
    - What QA processes and checks are required for release?
    - How are releases rolled back?
    - Are old releases still supported?
    - How are permanent old releases managed?

Phase 4 – MVP Development

- Phase 4 Considerations:
  - New Platform Release Process
    - When a platform component has a major version release, how will this be handled?
      - Immediate upgrade, evaluation process, upgrade schedule, etc?
    - What about minor releases?
    - What is the official process for dealing with breaking upgrades?
      - How are rollbacks performed?
  - Team Communications
    - How are team members alerted to changes or updates?
    - How do team members communicate with each other?
    - Where do team members go for help?
      - Technical help
      - Project Management help
      - Other help

Phase 4 – MVP Development

- Phase 4 Considerations:
  - Network and Infrastructure Considerations
    - How are network nodes going to be hosted?
      - Internet, public network
      - On-Premises
        - Directly Managed
        - Managed via Toolset
      - Cloud Provider via Virtual Private Network
        - Bring cloud infrastructure behind your firewall
      - Cloud Provider in the Cloud
    - How is identity managed across your organization?
      - LDAP, Active Directory, Forms Authentication, OAuth, etc.
    - How do you currently manage certificates and key pairs?
    - ***MOST IMPORTANTLY:***
      - How do your business network partners and solution participants answer all these questions?
      - A chain is only as strong as its weakest link!

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Phase 4 – MVP Development

- Phase 4 Considerations:
  - Consortium Management
    - How do members:
      - Join?
      - Leave?
      - Re-join?
      - Change role?
    - Are there (or should there be) auditable standards for each member?
    - How do group members communicate with each other?
      - Communications platforms
      - Meeting schedule and cadence
      - Included audiences per topic
    - How are changes in feature set, implementation, or solution scope handled by the group?
      - Do all members vote?
      - Is there only one vote?
      - Do all members get an equal vote?

Other Considerations

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Other Considerations

- Ethereum is a not a *product*, it is a *protocol*.
- Protocols can be run on any compliant network, regardless of size.
- HTTP is also a protocol.
  - HTTP used publicly gives us the *internet*.
  - HTTP used behind a firewall gives us an *intranet*.
- Do you have a use case for an *intranet blockchain*?
- Learn more at:
  - https://entethalliance.org/

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Other Considerations

- Persisting state across business objects located in different systems has been a very hard problem to solve.
- This is compounded when systems cross organizational boundaries.
- Conventional technology has not been well-suited to address this.
- Learn more:
  - https://www.coindesk.com/yes-you-may-need-a-blockchain

Other Considerations

- Blockchain aims to solves problems which haven't been easily addressed using databases or conventional technology.
- Blockchains excel at persistence, robustness, and data integrity.
- Databases excel at rapidly storing and querying data.
- A good solution uses each component to its maximum benefit.
  - Let the database store the data, and let blockchain tell the story of what happened to that data.
- Learn more:
  - https://medium.com/@mycoralhealth/why-blockchains-dont-suck-and-the-perils-of-distributed-databases-1a522cc7cfe1
  - …and…
  - https://medium.com/@chainfrog/5-reasons-that-blockchain-is-not-just-a-slow-database-55fe9d913578

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