



ABF Technology Strategy

December 2018

Version:	V1.0
Date:	11 February 2019
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Revision History

Version No	Date	Who	Description
DRAFT 1	03/12/2018	Mark Guthrie	Initial draft
DRAFT 2	06/12/2018	Mark Guthrie	Extensive feedback from Julian Foster
DRAFT 3	11/12/2018	Mark Guthrie	Minor changes with help from Julian Foster
DRAFT 4	27/12/2018	Mark Guthrie	More feedback
DRAFT 5	4/1/2019	Mark Guthrie	Further updates
V1.0	11/2/2019	Mark Guthrie	Final first version

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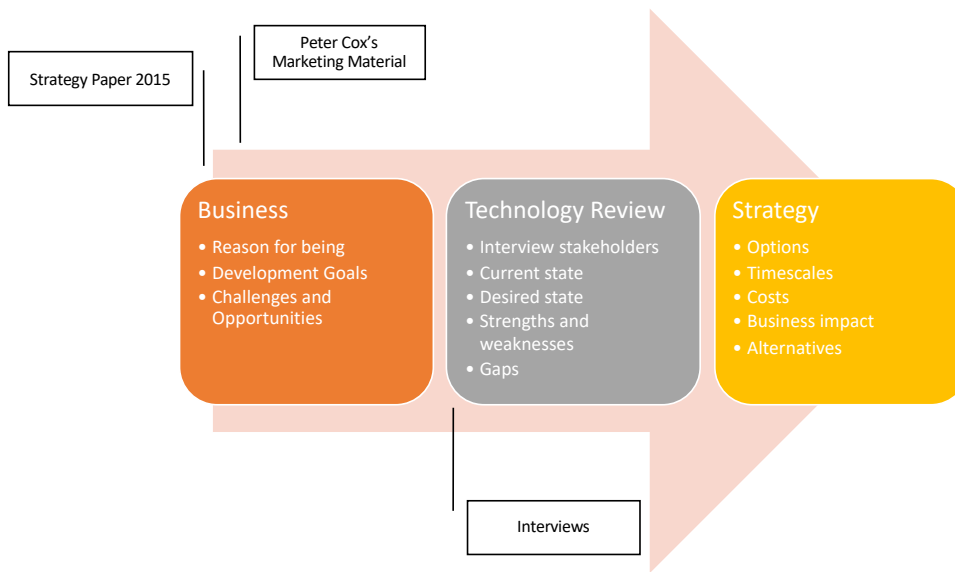
1. Introduction

In October 2018, the Australian Bridge Federation (ABF), appointed this author as the National Technology Officer (NTO) of the ABF. The primary focus of the role is to define and implement a three-year technology strategy to cover 2019-2021. This strategy includes all aspects of the game of bridge in Australia including:

- Identifying the key technology risks facing bridge in Australia
- Developing a three-year strategy and roadmap to mitigate those risks
- Working with the ABF's National Coordinators in the areas of teaching, marketing, directing and organising our major tournaments and developing youth bridge to address their emerging technology needs relating to key areas such as:
 - Website and App development
 - Email distribution and database management
 - An online bridge presence for playing, marketing, learning and teaching
 - Social media
 - Scoring systems
 - Club and event management including entries and payment systems
- Ensuring the ABF has sufficient control over the ABF's critical software IP and hardware systems either directly or through licence agreements
- Working with interested parties including the private sector, and international bridge authorities to develop a cooperative approach to addressing technology risks.

1.1 Approach

Not all areas of the role can be tackled at once. This initial strategy paper aims to take a high-level view of the total landscape, to allow an opinion to be formed on which areas should be addressed and in which order. A risk-based approach has been taken to target the areas of most concern first. Bridge in Australia is a large and complex beast with many technology solutions in place. In order to ensure we have momentum on this, it was agreed that this initial strategy document would be produced by the end of 2018 (within three months). Given the number of bridge players in Australia (around 35,000) and the high percentage of those with opinions on almost anything, added to the fact that technology can be a contentious area, it is almost certain that this document is incomplete and has errors and omissions. The intention has not been to aim for perfection, but to establish a straw man strategy that can be further refined. The figure below shows the approach taken to form this.



1.2 Contributors

An initial list of people to interview was formed and reviewed at the ABF meeting in October 2018. Although far from exhaustive, this list was intended to give enough input to allow the author to define a strategy that could be reviewed more widely. In addition to this list, the ABF Newsletter of August 2018 included an article on the creation of the NTO role and encouraged people to make contact if they had views that they wished to express, some of whom did.

The following people have had input to this strategy to varying degrees.

- Peter Cox
- Julian Foster
- John Smith
- Peter Smith
- Matthew McManus
- Kim Frazer
- John McIlrath
- Roy Nixon
- Jane Rasmussen
- Pauline Gumby
- Peter Busch
- Geoff Schaller
- Ben Thompson
- Paul Lavings
- Laurie Kelso
- Ian Lisle
- Hugh Grosvenor
- David Morgan
- Rex Whitford
- Bill Jacobs
- Mike Prescott
- Ian McKinnon
- Traian Chira

- Stephen Fischer
- Andrew Robertson (Worldwide)
- Neil Zaltsman (Worldwide)
- Kren Neilson (Bridge+More)
- Nigel Guthrie (UK)
- Nicolas Hammond (USA)
- Paul Marston
- Nevena Djurovic

1.3 Scope

It is important to understand that the ABF has a number of roles to perform. Some of these are “hard”, well defined roles such as the management of Masterpoints and the organisation of ABF events, and others are “soft”, less formal roles such as the general promotion of bridge in Australia. Many of the ABFs responsibilities are also the responsibilities of the state organisations and also the clubs, and this is particularly true of technology, which also includes many individuals not necessarily connected to any of the management layers of Australian bridge.

Currently the ABF owns no technology of note beyond its websites and the Masterpoints and PQP systems. However, the scope of this review is all encompassing. The ABF is the only organisation in Australia capable of transforming bridge technology, and this initiative could have a massive impact on bridge, not only in Australia, but across the world.

For that reason, this strategy puts no boundaries on the scope, only on the time available to produce it, and looks to include anything that seems relevant to the discussion.

There have been lengthy discussions on introducing a rating system. This is largely a business discussion and not a technology discussion. Should a rating system be introduced then the ABF have the option of using Paul Marston’s system, the EBU system or building from scratch. None of what is presented here precludes either option, although rating systems are out of the scope of this version of the document.

2. Management Summary

2.1 Systems

The majority of the technology solutions produced in Australian bridge are labours of love, developed by bridge players in order to address a problem for which there was no readily available solution. One consequence of this is that there is a lot of overlap, with regional systems being developed that could have been covered at a national level. There is a great opportunity for the ABF to solve this problem by providing a standard, supported solution that covers all states.

This is not to say that the solutions already developed are not fit for purpose, many are in fact world class, it is more a reflection that the motivation for developing them, even for the ones fronted by legal companies, was rarely for profit.

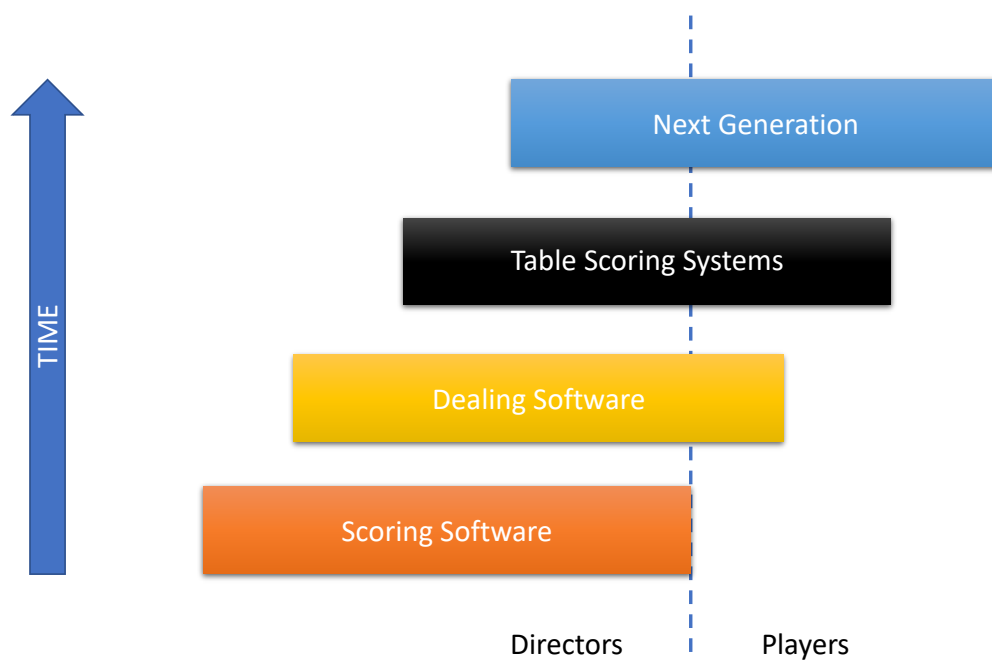
For the most part the solutions have been developed by individuals and sit on older technologies.

This exposes us to risk:

- Single person dependencies.
- Old, harder to support technologies.
- No clear strategic direction for the products.
- A high expectation from bridge players that these will continue to work.

2.2 Attitude

There is a general aversion to technology amongst bridge players. Interestingly, the people who tell me that they would give up bridge if there were no physical cards, and that they sit East-West to avoid having to “do the Bridgemate”, also show me pictures of their grandchildren through Facebook on their smartphones and use email to arrange which congresses to play in. It is clear that if we were to return to dealing cards at the tables, having paper travellers and waiting a week for the results, there would be an outcry, so while we need to progress with technology in bridge, we also need to do so at a pace that our members are comfortable with, but not too comfortable. This presents us with some interesting challenges, as technology is one of the ways to attract younger players to the game as well.



If we look at the evolution of technology in bridge, we see that as it moves forward, we have increasing impacts on players as we remove the burden from directors (not that directors are not also significantly impacted by technology change). The first scoring programs saved the directors time but had no direct impact on players. Dealing software meant that players could get hand records when the session was complete and didn't need to spend time dealing cards. With the introduction of table top scoring technology such as Bridgemates, players now needed to actually use technology at the table but got almost immediate scoring as a result. The next technologies will be more invasive but are not yet ready for mass consumption.

2.3 Risks

Our main risks are obvious and well understood. We rely on a very small number of people for the technology that is essential for the game of bridge in Australia. The average player, including this author three months ago, has no idea of what is involved in running the game nor in the technologies that make it happen. We have been fortunate indeed to have so many people give their time to develop and maintain software that supports our game, but we need to now accept that a central investment is required if we are to stabilise this and build for the future.

Given the above, one risk with this approach is that the knowledge of how to build good bridge software is in the minds of the people who have got us thus far and it will take time to create our new systems and will need input from the current experts. If we get any of them offside through this initiative then we not only risk building poor replacements for the current systems, we also risk losing support for what we have now. None of the people whose current systems make bridge work have anything else in mind than the continued success of the game, but we need to ensure their involvement in the design of the next generation solutions or we not only do them a disservice, we risk failure on a large scale.

Risks are expanded on more in the body of the document.

2.4 Key Recommendations

The following are the key recommendations for the ABF Technology Strategy:

1. The ABF should **build their own technology** covering the entire technology stack with the exception of hardware and should provide this technology to clubs **for free**. This software should be Open Source.
2. The ABF should ensure that the **current developers of technology** are fully involved in the transition and that their contributions are properly acknowledged.
3. The ABF should establish a **helpdesk function for clubs** that covers not only technology problems, but other common club issues such as director rulings and movements.
4. The ABF should identify a **suitable IT partner** to build this technology and implement a program of works to **gradually** move all functionality into their new systems.
5. A **cautious approach** to this migration should be taken to **minimise risk**.
6. Priority should be placed on building an accurate, secure and self-managed **database of ABF member details**.
7. The ABF should provide an **electronic messaging service for congress players** to notify them of the draw and results automatically.
8. The ABF should cautiously explore **new technologies** such as tablets and on-table dealing systems.
9. The ABF should develop a strategy around **online bridge** that encompasses the player experiences that this offers.
10. **An IT Steering Committee** should be formed to oversee the direction of technology and ensure appropriate controls are in place.

2.5 International Considerations

International bridge is a difficult enough endeavour without throwing technology into the mix. Even agreeing on what conventions are allowed already causes high levels of anxiety. Bridge around the world has different challenges and even different ways of organising events, so it is proposed that we focus initially on solving our own problems, but try to ensure that we do not preclude building solutions that can be used elsewhere down the track. Once we get to the point of having stable and usable solutions, it may be worth having discussions with other organisations around technology and cost sharing.

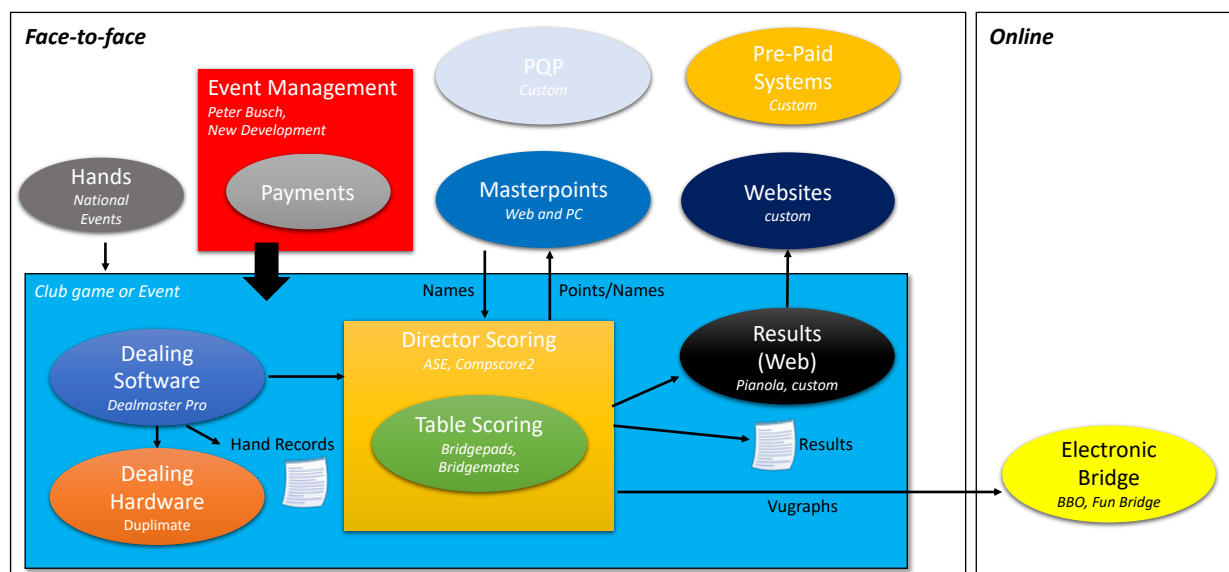
It is not clear that any solution elsewhere could be adopted in Australia to avoid us the effort of producing our own, and anecdotal evidence points to us already having some of the best technology available anywhere. However, it is possible that something like the system built by Nicolas Hammond for the ACBL could be used as a starting point.

3. Current State

This section is known to be incomplete and can be added to as we identify what is missing, however the purpose of this document is to broadly understand the current state and to focus on the way forward, not to provide a perfect view of what is currently in use. Apologies to anyone who's systems are not credited here, it is ignorance or lack of time and not malice that has omitted them.

3.1 Overview

The following diagram shows the technology components currently in use.



The blue box at the bottom shows the technology used for a single club session or a single congress event. At the centre of this is the scoring software which typically connects real time to the table scoring system to collect results and advise of movements. Prior to the event, boards are dealt using a combination of Dealing Software and Dealing Hardware. For major events, the hands are generated electronically by the ABF for security reasons.

Real time or final results are distributed via the web or by paper notices or projectors and for finals of major events, BBO is used for Vugraph presentations.

The Masterpoints system is used to record the points that members have won in events and also as a database of active and inactive members. This is maintained by clubs rather than the members themselves and does not require email addresses to be captured. The lack of email addresses is a major issue for ABF marketing campaigns.

The Playoff Qualifying Points (PQPs) system holds data on players who are eligible to enter the playoffs and earn the right to represent Australia in international events.

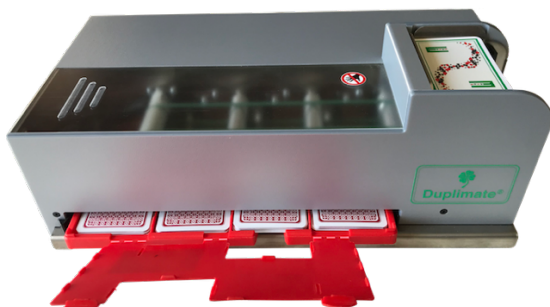
Some larger clubs use a pre-paid system to avoid cash at the tables.

Online bridge is not a major part of the current landscape, although plans are in place to have ABF events held on BBO and Fun Bridge. Step Bridge is also another platform in this space.

The following sections look at these different components in more detail.

3.2 Dealing Hardware

Dealing hardware is used to sort the cards into a defined order and place the cards in boards.



3.2.1 Duplimate

Jannersten make the Duplimate range of card dealers (currently on MkV) as well as the Bridgesorter and hand held HandyDup device, which is for home use. The main difference between the MkV and the Bridgesorter is that the MkV requires cards with barcodes while the Bridgesorter does not. This doesn't seem to be a particular problem as clubs obviously need to buy cards in large volumes and can easily get cards with barcodes on them. Both devices take the same boards. Duplimates are made by Jannersten Förlag in Sweden who also make bidding boxes and boards. Duplimates are distributed in Australia by Ian Lisle.

3.2.2 PlayBridgeDealer 4

PlayBridgeDealer 4 (Dealer 4) is an alternative to Duplimate that uses the same boards for the same purpose. It does not require cards with barcodes.

3.3 Dealing Software

The dealing hardware requires software to drive it. The software is provided along with the hardware devices, however, it is also possible to use other software to generate the hands and only use the dealing software to do the actual dealing part.

Dealer 4 comes with its own software for dealing. Duplimate comes with the BOS (Bridge Organising Software) package which includes DealMaster Pro.

3.3.1 DealMaster Pro

DealMaster Pro is the leading product and works with both Dealer 4 and Duplimate.

3.3.2 BigDeal

BigDeal was developed by Hans van Straveren to address concerns about the true randomness of generated hands. It can be used with DealMaster Pro. The software is Open Source.

3.3.3 Square Deal

[Square Deal](#), also by Hans van Straveren, builds on BigDeal but adds controls to not only ensure hands are random, but to provide a mechanism for the dealer of the hands to prove that they were not tampered with. Laurie Kelso has recommended that we look at Square Deal to replace our current processes for large events.

3.4 Director Scoring - Commercial

There are many scoring programs in use. Scoring programs not only do the scoring, but also handle movements, identify potentially incorrect scores and interface to, or come with, results publishing

systems. In addition, they interface with the Masterpoints Centre to allow uploading of masterpoints.

The scoring programs represent the largest investment in code that we have in Australia and also the biggest collection of single person dependencies (despite many of them operating through companies). Almost all of the current system run on Microsoft Windows.

3.4.1 *Compscore2 (Altosoft)*

Compscore2 is the most widely used software for scoring in Australia. It was developed by Peter Busch when Bridgemates first came out here and the original developer of Compscore did not wish to add support for them to the program. Written in VB6, it is a comprehensive system.

3.4.2 *ASE Scorer (Application Software Engineering)*

Written by Ian McKinnon, ASE is an older system that still enjoys good support around Australia.

3.4.3 *Scorebridge (Scorebridge)*

Scorebridge is a UK system that is used by some clubs in Australia.

3.4.4 *BridgeMaster (Software Objectives)*

BridgeMaster is Geoff Schaller's system for scoring.

3.5 *Director Scoring – Non-Commercial*

As well as the systems above, there are other systems in use, the most notable being the system that Matthew McManus uses to direct congresses. This system has been developed by Matthew in Excel 2003 and also interfaces to an ASP .NET system that Pauline Gumby has developed to put the results onto the web.

A number of other systems exist such as Rex Whitford's web-based VB system ("Rex's Scoring System").

3.6 *Double Dummy Analysis*

Hand records usually include analysis of how many tricks each side can make double dummy. This is calculated by using something like Deep Finesse.

3.7 *Table Scoring*

By having the players enter the contracts and scores electronically at the table, it is possible to very quickly calculate results, and if relevant for the event, produce the draw for the next round. These devices have been around for quite a long time and are now ubiquitous at clubs in Australia.

3.7.1 **Bridgemates**



The dominant device for table scoring in Australia (and the world) is the Bridgemate from Bridge Systems BV in Holland. There are approximately 6,000 Bridgemates in Australia and they are used at most congresses and larger clubs. Bridge Systems BV also have a software version that runs on a tablet or smartphone. The majority of devices are Bridgemate II, but some Bridgemate Pro devices are still in use (and still for sale). There hasn't been a hardware change to the Bridgemate II since 2009 but the machines are practically indestructible and apart from screen or keypad replacements, they need very little maintenance.

Bridgemates connect to scoring systems via a controller that wirelessly connects to the devices and connects to a PC through a USB cable.

3.7.2 **Bridgepads**



Bridgepads are an alternative product from America that are used by some Australian clubs. They also connect wirelessly to the scoring software.

3.7.3 **Software Solutions**

There are a number of systems that are provided as software to run on a tablet rather than a hardware solution. This may be the next generation of table scoring when the current generation of hardware solutions finally breaks but since Bridgemates are the equivalent of Nokia phones in their indestructibility, I wouldn't hold your breath.

Jannersten of Duplimate fame, also sell [Bridgetab](#) which is a software table scoring system.

[ArcScorer](#) is a UK system that works on standard tablet devices.

[BridgePal](#) is a freeware solution for Android.

3.8 **Masterpoints**

The Masterpoints Centre is a website (<http://www.abfmasterpoints.com.au>) developed by Peter Busch to manage masterpoints. It allows unauthenticated users to look up members' masterpoint history as well as look at a number of reports (Top 100 masterpoint scorers of all time, McCutcheon, etc). Each club has a Masterpoints Secretary who can access the administration parts of the website which allow member management (adding new members, moving members' home club, adding alternates who play at a club but are members elsewhere and marking members a

deceased) as well as masterpoint management. All activities can be done as a bulk file upload or through entry screens.

The site also has the ability to download the masterpoints database and comes with some Windows tools for manipulating the data. Member email addresses can be captured through an optional field but are not included in any of the downloadable data for unauthenticated users.

The system is well designed and appears to be easy to use with good online documentation.

3.9 Playoff Qualifying Points (PQPs)

PQPs are largely unknown to mere mortals, but atop Mount Olympus they are awarded for doing well in large national events and are required for players to be able to enter the playoffs and have a chance to represent Australia. The PQP system is fairly low volume with a low rate of change and the largely manual systems seem to work fine.

3.10 Prepaid

Some clubs operate a pre-paid system which allows members to pay into their account using credit cards and to draw down on that each time they play, avoiding cash at the tables. Matthew McManus has developed a system to support this although there may be other solutions out there as well.

3.11 Websites

There are a number of website systems in use in Australia. Many of the solutions are custom built but some are packages that provide a website and a results service. Bridgewebs is a UK system that allows clubs to easily build a website and to publish results from ScoreBridge, Compscore2 and others. It is a very reasonably priced option for smaller clubs although the interface is quite dated.

Pianola is a fairly modern site that provides a results service with other features available such as membership databases, website creation and Pianola Plus which provides analysis to help players to improve. Anecdotal feedback suggests that novice players really like Pianola Plus while more experienced players are less enamoured.

3.12 ABF Websites

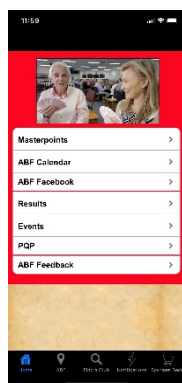
The ABF has three websites.

<http://www.abf.com.au> is the main website built in WordPress.

<http://www.abfevents.com.au> holds event and result information.

<http://www.abfmasterpoints.com.au> is the ABF Masterpoints Centre.

3.13 Mobile App



The ABF has a mobile app that provides information from the website in an easy to use format.

3.14 End User Computing

There are no standard offerings or recommendations provided to directors or scorers around what technology they should use to run a bridge club or an event. For this they require:

- Windows PC (one per concurrent event)
- Table scoring hardware, also connected to the PC
- Printer or multifunction device
- Projector and screen (or TV)
- Connectivity from PC to projector/TV
- Access to the internet

Printer drivers, toner cartridges, networking, Windows updates, distance from the project to the screen as well as having to bring all of this equipment with you, make the end user computing requirements very onerous for a director. One of the major fears for a tournament director is a failure of one of these components.

Networking is a particular concern as it can require more technical skills to troubleshoot. Simple things like the distance from the Bridgemates to the server can cause major headaches.

3.15 Small Business Operations – Running a Club

There are a number of things related to running a bridge club that present challenges. Some of these are standard small business issues such as premises, payroll, insurance and accounting which the ABF has no more value to add to than anyone else. There are however, some things that are specific to bridge, where the ABF could potentially provide some support. For example:

- Membership lists
- Membership renewals
- Websites
- Compliance with regulations such as data breach policies
- Sponsorship
- Marketing
- Volume based discounts

4. Future State

4.1 Recommendations

If you give someone a blank piece of paper and ask them what they want, you will generally get back a blank piece of paper. If you give them a proposal, then you either get that back with some tweaks or you get some clear direction. Either way you are better off. So here goes...

4.1.1 Software Ownership

We have broadly four options here:

- **Do nothing and leave it to the free market.** This has largely been the strategy until now and has been quite successful, however this is unlikely to work going forward (and if it was still the strategy there would be no need for a National Technology Officer).
- **Use existing software.** If commercial software or software developed by other federations was able to do this then we could use it. The English Bridge Union (EBU) have adopted Jeff Smith's Pairs Scorer and Teams Scorer software to become EBUScore and offer it for free to affiliated clubs. We could explore the option of using Peter Busch's Compscore2 software or another package, however this would only buy time and not get us to where we want to be as it was developed a while ago in older technology (VB6). It may be worth looking at EBUScore, however there are major differences in how bridge is played around the world and large time zone issues to overcome. It seems like we would be moving from single person dependencies (with an 's') in Australia to a single person dependency (no 's') in the UK, but there may be options worth exploring here. Nicolas Hammond developed a system to replace ACBLScore (ACBLScore+ - <http://acblscoreplus.com>). There would be work required to adapt this for the Australian market, but it could be used as the basis for our system either by purchasing the software or engaging Nicolas to help us.
- **Pay for development.** We could engage a software company to build the technology that we need and to support it. This option has some merit but moves us again from "friendly" single person dependencies to a "commercial" single company dependency.
- **Pay for development but own the code.** You always put the option you like most last. In this model we would pay for development but maintain ownership of the code. This gives us the most flexibility and ensures that the intellectual property (IP) belongs to the ABF.

Recommendation

The ABF should operate as a software company that outsources its development, support, hosting and operations, but still maintains ownership of its code.

4.1.2 Licencing Model

If we choose to own the software, there are a number of ways that we can licence it. We could choose to keep it as proprietary code that belongs to the ABF and can only be used by others if we

agree to it, or we could choose to make it Open Source using one of the many available Open Source licences such as Apache License 2.0, GNU General Public License (GPL) or Common Development and Distribution License. There is little advantage in making this a proprietary system as we are unlikely to ever want to sell it to anyone as we will have enough to do looking after our own users. There is however some advantage in making it Open Source. This would allow anyone to use it for free and to add new features to it. They can either do this by making changes to the code which we would then need to approve before they became part of the core system, or by taking a copy of our code and extending it. Open Source licences have a concept called “copyleft” which is the opposite of copyright. If we chose a licence model that has strong copyleft then it would require any additions to our system to also be made Open Source, giving us the ability to use any system that is derived from ours for free.

Recommendation

The ABF should choose an appropriate Open Source licence and make the software available for anyone to use.

Full credit to Ian McKinnon for this suggestion.

4.1.3 Charging Model

Developing and running software is relatively expensive. The ABF will incur costs as part of this and needs a financial model to recover it. There are a few options to consider:

- **A usage-based fee charged per club.** A flat fee for a club to use the ABF software.
 - **Pros:** Easy to administer
 - **Cons:** Small clubs subsidise larger clubs. Little incentive to move across from existing systems.
- **A usage-based fee charged per user.** A per user fee charged back to clubs on the number of active users or tables run.
 - **Pros:** Fairer charge model
 - **Cons:** Overhead to calculate. May not encourage conversion to the new system.
- **A usage-based fee charged per member.** A per member fee charged back to clubs on the number of registered members.
 - **Pros:** Easy to administer.
 - **Cons:** Penalises clubs with lower table numbers and inactive members. May not encourage conversion to the new system.
- **Build into the base ABF costs.** If you have been keeping up, you will know that this is going to be the recommendation.
 - **Pros:** Zero administration cost. Encourages clubs to move. Enhances the value of the ABF to clubs.
 - **Cons:** Increases ABF costs, but hopefully not significantly.

Recommendation

The ABF should provide its software for free to affiliated clubs.

This recommendation is not entirely clear cut, as while we want to keep the billing processes as simple as possible, we also need to ensure that clubs do not end up financially supporting other clubs. For example, it may be that big clubs or small clubs derive more advantage from the software that is produced, and the other type of club is disproportionately charged for this.

4.1.4 Helpdesk

This has been mentioned several times in feedback during the interview process. As we effectively operate a model that is not commercial, most of the support calls around scoring systems go to the developer to look after. A lot of these are repetitive and often not related to software bugs but just to understanding of how to use the software. A large number are related to Bridgemates and not the software at all. Smaller clubs have nobody to help the director, regardless of the problem and it would be useful to provide a function that could support directors with any issue that comes up, whether it be software, rulings, movements or anything else.

Recommendation

The ABF should set up a helpdesk function operated by directors who could cover support calls relating to any of the common issues encountered in a bridge club. For software issues, this function would stand between the users and the IT company providing support, to translate and filter out common problems. This should be a paid position with the on-call function rotated around experienced directors.

4.1.5 Notifications

One feature that would be very useful would be a method of notifying members of things through their smartphones. This could be used during congresses to advise players of the draw as well as a number of other uses.

Recommendation

The ABF should build a mobile app (or extend the current app) to enable cheap communication to members about draws and other information. The app should allow opt-in and opt-out options and should use ABF number or email address to identify the member.

4.1.6 Member Database

The biggest missing component is an accurate member database with email addresses. This is essential for marketing purposes as well as general communication. The Masterpoint Centre has a lot of the required information but the email address is currently an optional field. There are a number of barriers to overcome to achieve this:

- **Technology** – we need to either extend the Masterpoint Centre to include compulsory email addresses and the ability to securely login and set preferences or we need to build a new member database system to sit alongside the Masterpoint Centre.

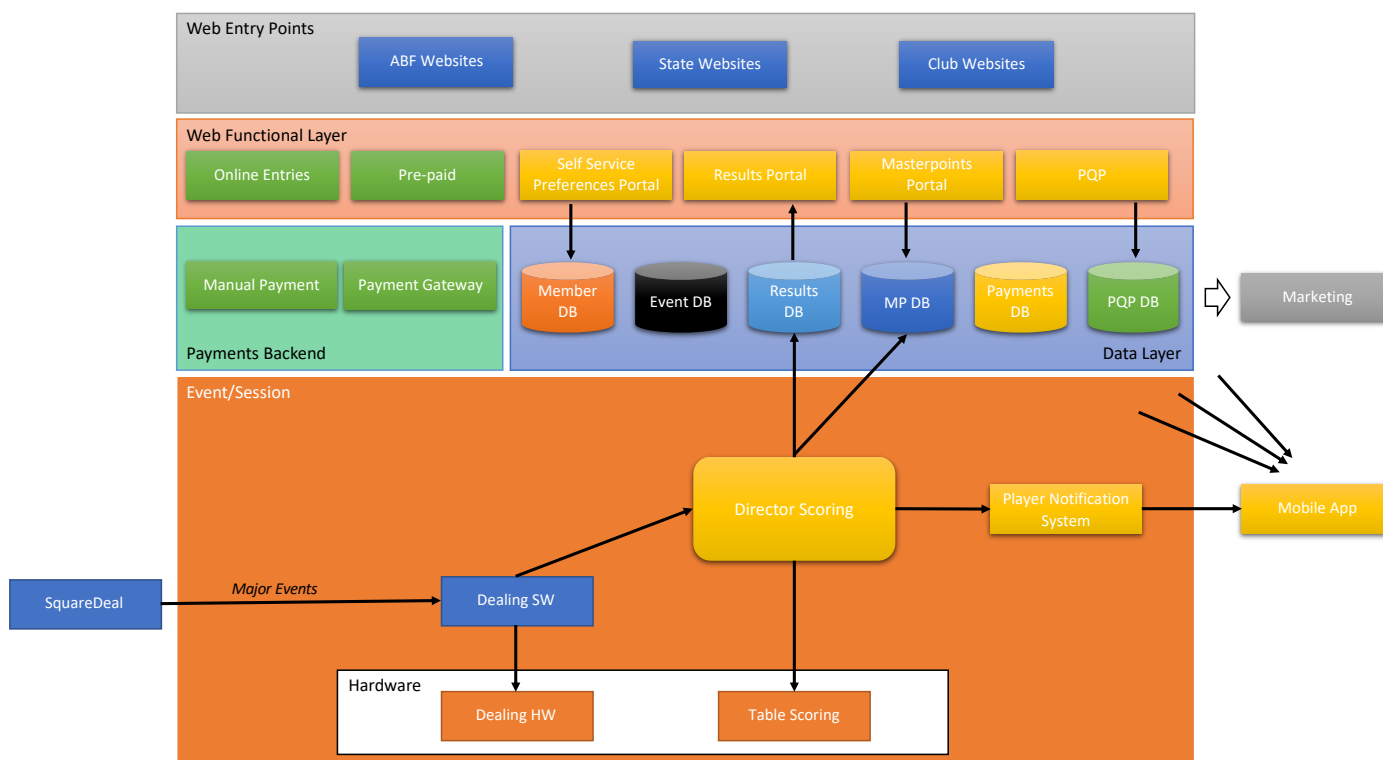
- **Security** – we need to convince our members that the data is secure and will not be accessible by unauthorised people.
- **Data Capture** – we need to populate the database. This could be done either by requesting the clubs to fill this information in or by getting the members to do it directly.
- **Incentive** – if we choose to get the members to directly register then we need to offer them some kind of incentive to do this.

Recommendation

The ABF should build a new member database alongside the Masterpoint Centre that holds player information and preferences. The Masterpoint Centre should be extended to do monthly emails of masterpoint activity to members who choose this option. The ABF newsletter should also be emailed to members when it comes out. Email address should be a mandatory field for new members.

4.2 End State

A possible end state for ABF developed technology is shown in the diagram below.



4.2.1 Web Entry Points

Access to the systems will be from the internet with links from the ABF, State and Club websites. Branding of the systems should be supported such that, for example, following the link from the SABA website to a results page would show a SABA branded page (with “Powered by the ABF” in the footer) and the option to navigate up (to ABF and other state results) or down (to South Australian Club results).

4.2.2 Web Functional Layer

This layer provides all of the functionality for the members. It should be made available through the web and through a smartphone application.

4.2.2.1 ONLINE ENTRIES

This application allows people to enter events online. It connects to the backend accounting system which supports maintaining an account online with a balance and the ability to top up through either a payment gateway or a manual card payment within a club. This works across all events using ABF technology, so a single account can be used for congress and multiple club events. The player database is central to this as it holds preferences and mappings of ABF numbers to names.

4.2.2.2 PRE-PAID

The pre-paid portal allows members to top up their accounts (across congresses and club games) using the payment gateway, or direct card payments within a club. These balances are available to spend anywhere that ABF technology is used.

4.2.2.3 SELF SERVICE PREFERENCE PORTAL

This portal is the standard “account” portal on most websites and is available from any page that the member is logged into. This allows the member to change any of their settings such as password, email address, phone number (used for two factor authentication) and marketing preferences. If we can find a way to allow automatic top up of pre-paid balances without holding credit cards, then this would also be a setting here. Additionally, we could offer notification of events that they have previously played in and automatic entry with preferred partners.

4.2.2.4 RESULTS PORTAL

The results portal would consist of club and congress formats with the option to show more trending and average information for regular players. Initially it would make sense to use existing systems for this and to build the “ABF” version later in the rollout plans.

4.2.2.5 MASTERPOINTS PORTAL

Similar to the current system but with more traceable information. In the absence of a ranking system (note: this has been left out of the scope of this document), the masterpoint portal would offer the option for regular email updates (set through the self-service preference portal) and the ability to “follow” other members to track your success versus your friends (or otherwise) in general, and in events that you have both played in.

4.2.2.6 PQP PORTAL

Probably the last one to develop given the low numbers of people required to track, the PQP portal manages Playoff Qualifying Points.

4.2.3 *Payments Backend*

The payments backend is the components of the solution that make up the whole online entries and payments system that are not front facing.

4.2.3.1 MANUAL ENTRIES

By allowing clubs to accept manual (credit card or possibly cash) payments into the system, we reduce the burden on club and congress events. Once confirmed, these payments need to be registered in the system by a director or other club administrator and this is the system that they use to do this.

4.2.3.2 PAYMENT GATEWAY

The ABF and all state and club organisations should avoid handling credit card details directly as the requirements to manage the safe storage of these details are now too onerous for small organisations. To avoid this a payment gateway should be used. Currently eWay is the incumbent solution, we should look at which platform is most cost effective and efficient.

4.2.4 *Data Layer*

From an IT point of view, this is where the magic happens.

Don't read this if you still believe that IT is magic

Without breaking the magic code too much, obviously the data layer consists of a single database with a number of tables. The business logic and security is also contained here so that the Web Functional Layer can be mainly representation only. All of the activities that can be performed will be exposed through a standard API such as REST with a messaging format, probably Json. These should be built and tested before the UIs.

Abracadabra – nothing to see here.

4.2.4.1 MEMBER DATABASE

Holds all of the data and logic relating to player information. This is the key table for marketing as it also holds preferences and opt out, opt in data.

e.g.

Column	Purpose
ABF Number (key)	Main identifier
First Name	
Last Name	
Email Address	
Registered for Mobile App?	Y/N
Marketing Preferences	To be expanded on

The member database is largely focused on the ABF requirements, as currently the ABF does not have a member database, however the solution should also be usable by clubs who could benefit from a system that integrates with the other components of the ABF technology suite and assists them with membership management and membership renewals.

4.2.4.2 EVENT DATABASE

Current and historic information on which events a player has/is entered in.

Column	Purpose
ABF Number (key)	Main identifier
Event id	Unique id for event
Team mates	Who they played with
Payment status	TBA

4.2.4.3 RESULTS DATABASE

The results database holds a comprehensive list of results and will need to be multiple database tables for different formats of event (pairs, teams etc). This needs a lot more work to define this and it is a central component in the system, however, we already have solutions for results display which are very good, so this can be a later development.

4.2.4.4 MASTERPOINTS DATABASE

Again, we have a working solution in place for this, so it will likely be a much later development, however the interface to the player database will need to be addressed early.

4.2.4.5 PAYMENTS DATABASE

This holds details of each players account balance and payment history.

4.2.4.6 PQP DATABASE

Information about Playoff Qualifying Points. The author's only chance of getting one is to have update access to this database.

4.2.5 Event/Session

If you have managed to read down this far, you have not only done well, you have reached the core of the system. This is the software and hardware that is used constantly throughout a club event or a congress.

4.2.5.1 DIRECTOR SCORING

The centre piece of the technology suite is the director scoring system. This handles movements, input of scores, output of results and upload of Masterpoints. The current generation of systems that fulfil this function are complex pieces of software which have evolved over time. In order to be successful with developing a new system here, we need to simplify this as much as possible. Here are some options:

- Only support a limited number of movements (expand later if required)
- Only support electronic table scoring, no manual input except to override
- Take a phased approach and have an initial version that works for specific use cases
- Use the current experts to design it

4.2.5.2 PLAYER NOTIFICATION

The player notification system is a mobile app that can be used at congresses to notify players of the results and the next draw. In the initial thinking this was going to be delivered through SMS to avoid people having to download an app to their smartphone, however SMS costs mount up quickly and the registration process and ability to capture email addresses adds to the value here as we try to develop a proper player database. As notifications are not difficult to do, this can be quite a simple app and can be integrated with existing scoring programs until such time as the new ABF director scoring system is in place.¹

For safety reasons, it is not recommended that final results be notified in this way as many players will be driving home at this time and email or website results are a safer option.

There are other possibilities for the using the player notification app once it is installed such as:

- Reminders of start time for events already entered
- Notice of low balance in the pre-paid system

¹ Note that since this document was last updated a solution using SMS much more cheaply has been identified and this will be trialed at the Gold Coast Congress in February 2019.

- Alerting directors to possibly incorrect scores at large events
- Notifying caddies of fast tables that will need boards and telling them which boards to take²

4.2.5.3 DEALING SOFTWARE

As is.

4.2.5.4 DEALING HARDWARE

As is.

4.2.5.5 TABLE SCORING

As is but look for possible new options.

4.2.5.6 SQUAREDEAL

Look to replace the existing processes and tools for major events with SquareDeal or BigDeal.

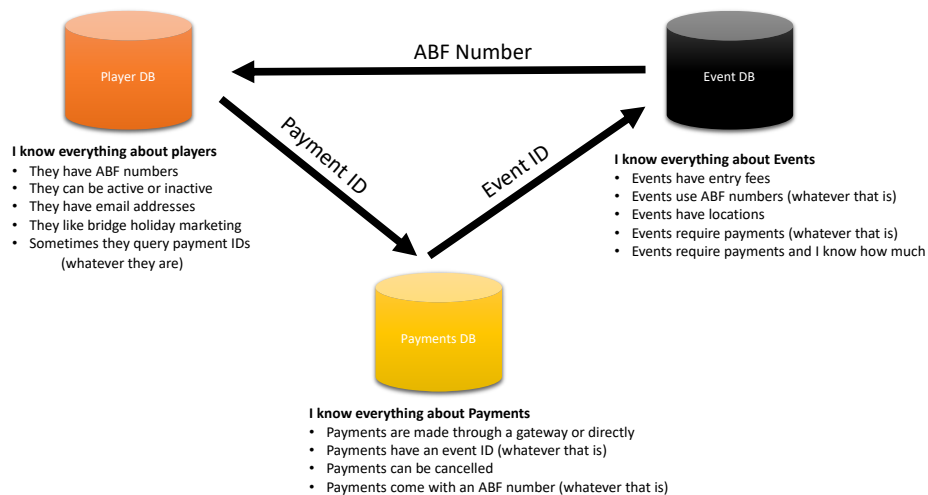
4.3 Technical Architecture

The technical architecture of the new ABF systems matters much less than the functional design and the choice of partners, however here are some principles:

- **Cloud First** – the Windows based systems that we currently run were great choices when they were built, but now we should use a cloud model, primarily for easy of upgrades and supportability. There was some feedback in the information gathering stage that slow internet is an issue for some country clubs, however they are likely to be later in the rollout and hopefully the NBN will have addressed this problem by then. Interaction with table scoring systems will likely require a small component to be installed on a PC.
- **Security First** – We need to build secure applications and to budget for independent penetration testing to be performed. We won't get the trust of our members if we cannot guarantee security.
- **Single Technology Stack** - it doesn't really matter that much what languages or frameworks we use to build our systems in as long as we try to stick with as few choices as possible to make it maintainable. Any of the top 10 or so development languages would be fine.
- **Modern Tools, but not too modern** – Even if we don't mind what the technology stack is, we need to build on current, highly supported versions of the technology but not speculative bleeding edge technologies.
- **Service Based Architecture** – which is a fancy way of saying that we should build the backend to be independent of the frontend, so we can re-use functions across the system. If we build the backend with exposed services through something like REST and Json (*IT current trends for how we access things and what format we get the data in*), then we have much more flexibility and a better architecture.
- **Disaster Recovery** – fully designed and tested for all components.

² These ideas are from Matthew McManus and John McIlrath.

- **Languages** – support for other languages should we ever choose to make this available overseas.
- **Clear Modular Design** – if we can keep the functionality well defined then the system will be much more supportable. This should be up the top, as it is the most important consideration. For example, the code that lives in the player database knows everything about players. It knows about marketing preferences, it knows about email addresses, it knows about whether a player is active or inactive, but the only thing that it knows about events, is that there is a thing called an event and there is code that looks after events. Similarly, the code that lives in the event database understands start times and entry fees and partnerships, but doesn't know anything about players beyond the fact they have an ABF number. It doesn't know anything about payments beyond the fact that it has to give a due balance and an ABF number to the code that looks after the payments database. This is an IT principle known as encapsulation. This is enforced by Object Orientated Programming languages such as Java or C#, however, while this is supported at a low level by the language used, it is still easy to build systems that do not enforce this at the overall design level.



4.4 Electronic Bridge

Wow, it feels like we have been in section 4 for a very long time.

If you remember back to the current state picture, we had all of our main technologies on the left and centre with online bridge on the right and largely disconnected. All of the discussion in this section has been on club and congress bridge, there has been no mention of online at all.

Electronic bridge is a vague term to refer to both online bridge and face-to-face bridge that uses more technology than is in use currently.

There are massive benefits to using more technology in bridge, either online or in person, however, before listing the benefits, here is the one negative:

1. BRIDGE PLAYERS WANT TO PLAY WITH CARDS

Based on a straw poll of twenty to thirty congress plays, almost all of them would give up bridge if we didn't have cards at the table.

Anyway, back to the positives:

1. Less colds – less germs passed around a room through touching cards
2. Full disclosure – the technology can disclose not only your system, but your previous behaviours
3. No leads out of turn
4. No revokes
5. No calls out of turn
6. No insufficient bids
7. No need to count your cards
8. No need to arrange your cards
9. No need to shuffle your cards at the end of the hand
10. More time for bridge – 35 boards per session rather than 27
11. Automatic alerts (no announcements or alerts required, no UI to partner)
12. Claim checking – system tells you that the claim is valid or invalid
13. Style as well as system alerted
14. Easy partner finder
15. Basic analysis of results by computer – “You need to improve your NT defence”.
16. Advanced analysis of play by experts – ability to see your system and your bids and play
17. How did they make that? Finally, question answered (and it wasn't two revokes)
18. Robot system wars – enter your system against other peoples. Robots play 10,000 hands to see which system is best
19. Play from home/overseas – if you can't get to the club, you can still play
20. BIT detection – notified by the technology, no arguments about it
21. Remote director for small clubs
22. No need to deal boards
23. No boards thrown into coffee cups at congresses
24. No waiting for boards
25. No caddies
26. Cheat detection – systemic analysis to identify problems
27. Barometer movements – instant results
28. National events with the same hands across cities
29. No need to transport boards for congresses
30. And finally... “WHAT TABLE NUMBER ARE YOU? Partner, is that lower or higher than us? Which way do the boards go? Do players get older or younger?”

There are a number of interesting technologies in this space.

4.4.1 Face-to-Face

This section relates to bridge as played in clubs, with people sitting at tables, but not necessarily with physical cards.

4.4.1.1 ABF BUILD

The technology to play bridge is actually much simpler than the technology to score it, so we could build our own. The robots would be a little tricky, but just clicking on a card and having it appear on another 3 devices is quite easy. However, if the views of the members in the straw poll are any

reflection, we have no chance of getting this off the ground and we already have enough work in the previous areas for many years, which is more important.

4.4.1.2 LOVE BRIDGE

Well, don't we all?

Love Bridge is a Hungarian tablet system that is getting some traction at the moment.

<https://lovebridge.com/>

4.4.1.3 BRIDGE+MORE

Bridge+More is basically a dealing machine per table that can also capture bidding through a tablet and the order of the cards played. This would give most of the value of electronic bridge (doesn't capture tempo information for bidding or play), but still uses physical cards.

4.4.1.4 RFID

If we want to stick with physical cards, then Radio Frequency Identification (RFID) playing cards could be the answer. Sensors can detect the location of the card and record the play. The cards are currently quite expensive (\$100 per pack), so we would probably need poker to adopt this technology to bring the cost down before it would make sense for us.

4.4.1.5 CAMERAS

Cameras (and RFID) have already been tried in bridge but this technology is advancing quickly. It could be possible to still play with cards but to have an overhead camera, or a number of cameras detect the play.

4.4.1.6 BIDDING ONLY SOLUTIONS

All of the above try to cover the whole game. It would be possible to develop a "Bridgemate+" style solution that got rid of bidding slips and bidding boxes and replaced them with a tablet or a number of tablets at the table. This would allow us to capture tempo, avoid irregularities in the bidding and many other things. This could be coupled with one of the solutions above or used on its own to improve the game. This seems like an easier transition for most players than a move to fully electronic bridge but would have much of the benefits. With access to the hands and some analysis, this would still allow things like the software not only announcing your system, but your deviations.

4.4.2 Online Bridge

This section relates to bridge played on computers, generally with the players in different locations.

Currently the ABF has no strategy or technology relating to online bridge. It is clear that online bridge will be a large factor in the future of the game and currently lacks competition and direction. There is a very large opportunity for the ABF to get involved in this area and to make a difference on a world scale if it desires to do so.

Recommendation

It is beyond the scope of this version of this document to cover this adequately. It is recommended that there be further investigation of this that is either incorporated into this document, or defined in a document of its own.

5. General Technology Trends

Bridge technology is not exempt from general technology trends. It is worth looking at the main trends and seeing how they impact bridge today.

There are four main trends in bridge today:



Digital



Cloud Computing



Big Data



IoT

5.1 Digital

Digital can be interpreted in many ways however the easiest way is to consider it as the evolution from companies having an online presence. Originally this meant a static marketing website and some branding that covered things like email signatures, but now this covers the total perception of the company as either a technology leader or loser. Mobile applications, social media, online interactions and many other things including internal innovation all play in the digital space. Fundamentally, digital is about customer engagement and persuading your customers through the engagement that you “get” technology.

5.2 Cloud Computing

A number of large companies (Amazon, Google and Microsoft being leading examples) realised that the systems that had built for internally hosting their systems could be used by their customers as another income stream. The cloud is nothing more than using someone else’s infrastructure to run your applications rather than having to go through the hassle of building your own, however the liberation from tightly controlled data centre environments has led to a much more innovative way of running infrastructure, and the scalability offered means that applications can be built to expand when they need more capacity and reduce when they need less, leading to better economies of scale.

5.3 Big Data

Purportedly, 90% of the data ever created is currently less than 12 months old. Big Data is all about how you take useful information from a sea of data.

5.4 Internet of Things

The Internet of Things (IoT) is all about how the internet is evolving from people sitting in front of web browsers and email clients to any kind of device being connected and sending and receiving data. For example, smart speakers, fridges, cars or watches.

5.5 Current Bridge

Currently bridge has none of the above (except for the odd user of Dropbox which is cloud based). It is surprising that as technology engulfs the rest of our lives, it leaves bridge almost untouched.

5.6 Future Bridge

If we are able to find a way to embrace technology within bridge then it opens up all of the above. This is going beyond the proposal presented here which basically modernises our current technology, and into the arena of somehow capturing all of the events at the (virtual) bridge table electronically. Which would include:

- Every bid with tempo
- Every card played with tempo
- Every explanation

The solution would almost certainly be **Cloud** based and would involve connected devices (**IoT**). It would be accessible to all current and prospective customers electronically, with high levels of alerting and engagement (**Digital**) and would open up a whole array of opportunities for **Big Data** type analysis.

6. Transition Plan

6.1 Partners

The choice of a strategic partner for this work is more important than the technology choices, provided modern, supportable technologies are used and a web-based approach is taken. One of the views expressed by many has been that the partner chosen should be a bridge player. It is the author's view that this is completely out of line with what happens in the rest of the IT industry and is not required. By insisting on using a bridge player we dramatically reduce the pool of possible partners and skew the demographic away from the types of organisations that would make the best partners.

The problem that we are trying to solve by using bridge players is this:

“How will a non-bridge player understand when a director calls up and says ‘I am running a three quarter Howell with 5 tables and a pair has turned up late, how can I accommodate them?’”

Firstly, this is the same issue for an IT person working in any other industry, Foreign Exchange, Medicine and Accounting are all far harder to understand than bridge, but they do not restrict their choices of IT providers to Traders, Doctors or Chartered Accountants.

Secondly, if we implement a help desk function as part of the ABF service for clubs, the bulk of these problems will be addressed without needing to go to an IT person.

6.1.1 Key Requirements

We need to choose a partner who is:

- Small enough to care about our business
- Large enough to be able to support us
- Understands that they are at all times replaceable and that we own the systems, not them
- Has clear and transparent costings
- Can support us during our core times 8am AEST to 11pm AWST Monday to Sunday
- Understands that our biggest events often take place at the weekend
- Has a vision in terms of the technology, that matches ours

6.1.2 Alternatives

Finding a partner seems the most obvious option however there are alternatives.

- Employ developers to work directly for us
- Engage developers directly for pieces of work

6.2 Plan

6.2.1 Order of Execution

There are a number of ways to approach breaking this down into a plan.

- **Do something easy first** – build the core technologies and get familiar with the partner before taking on something more challenging
- **Do something critical first** – pick a central component such as the director scoring to go first
- **Do something missing first** – build something that we don't yet have as the first choice
- **Do something risky first** – pick our current highest risk issue to resolve as the first thing that we do

Recommendation – Do Something Missing First

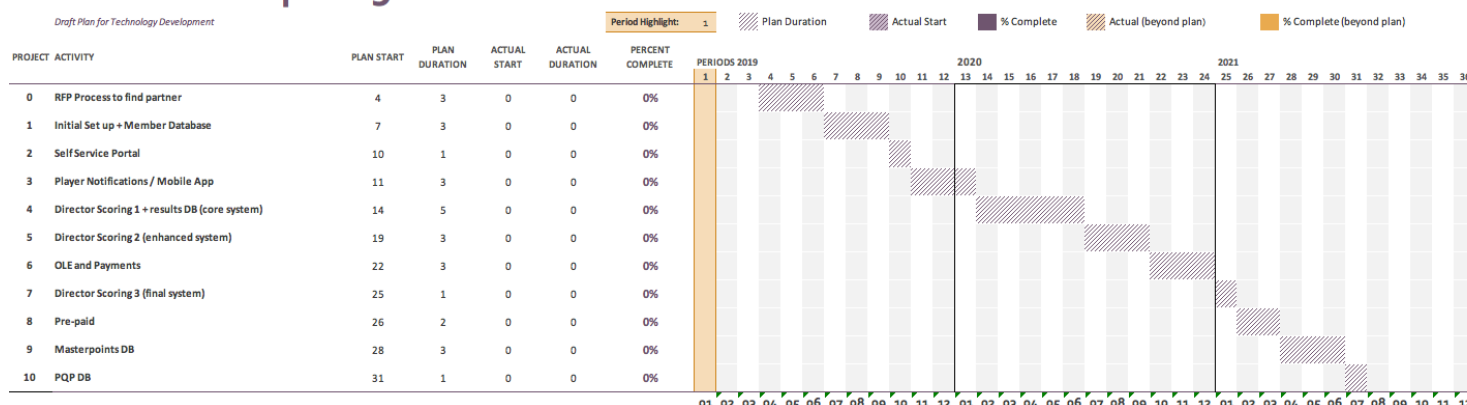
Start with the member database, as this is the largest missing component and the biggest cause of pain.

6.2.2 Possible Plan

There is a lot of work required to get us to the point of having a plan which we could execute from, and too many unknowns at this stage, however it is worth having an idea of what that plan may end up looking like, even at this early stage. The following picture shows a possible plan for this work.

ABF Roadmap 2019 - 2021

Draft Plan for Technology Development



This plan is very rough and only presented to give an idea of what the final plan might look like.

Assumptions:

- We would want to maintain an even pace so that costs are consistent. One thing at a time.
- The member database is the priority
- A Business Analyst / Project Manager / Tester would be available throughout to ensure the smooth running of this

6.2.3 Possible Costs

If we assume that the cost of a developer plus oversight is in the range of \$500-\$1,000 per day then we have the following range of costs.

Component	Days Effort	Low Cost (\$500/day)	Medium Cost (\$750/day)	High Cost (\$1,000/day)
Member Database + initial set up	60	30,000	45,000	60,000
Self Service Portal	20	10,000	15,000	20,000
Player Notifications	60	30,000	45,000	60,000
Director Scoring and Results	100	50,000	75,000	100,000
Director Scoring Phase 2	60	30,000	45,000	60,000
Online Entries	60	30,000	45,000	60,000
Director Scoring Phase 3	20	10,000	15,000	20,000
Pre-paid	40	20,000	30,000	40,000
Masterpoints DB	60	30,000	45,000	60,000
PQP DB	20	10,000	15,000	20,000
Total	520	260,000	390,000	520,000

These costs (and project plan) require much more work and are again presented to give an indication of the scale of what we are looking to do. Both the scope and the rate of development cost are unknown at this stage. It should be noted that the daily cost of a developer is not the only factor and cheaper is not necessarily better, nor even cheaper if the more expensive developer is more efficient.

Development costs are only part of the picture, the following table gives an idea of what the total costs could be, again to give an idea of scale.

Indicative Cost				
Item	2019	2020	2021	2022
Development	\$150,000	\$200,000	\$120,000	\$ -
Hosting	\$3,000	\$5,000	\$5,000	\$5,000
Support	\$10,000	\$20,000	\$20,000	\$20,000
Project Management	\$20,000	\$20,000	\$20,000	\$ -
Total	\$183,000	\$245,000	\$165,000	\$25,000

As well as the associated costs, there are also revenue opportunities if we decide to sell or licence our technology for use overseas. This would provide income that could be used to support other activities. While we are not setting out with this as a primary objective, it would make sense to build the systems to support this, in particular supporting multiple languages easily.

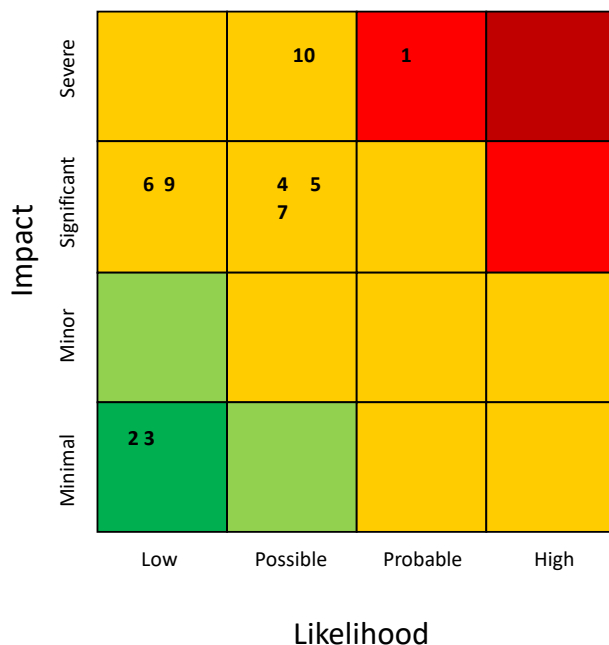
6.2.4 Considerations

We won't be able to build a whole system at once which means we would need to have the current software providers change their systems to interface with what we build as we go along. We are not

looking to replace all of the current systems, only to provide a fully supported ABF alternative, so we will still rely heavily on the good will of those who have got us this far.

7. Risk Assessment

There are a number of areas of risk to consider that relate to technology. The following table lists those that have been considered so far, although the final list is likely to be longer.



Risk	Description	Impact	Likelihood	Mitigation
1. Unsupported scoring software	The scoring software that is used currently is no longer supported and an alternative has to be found	Severe	Probable (<i>High, but not for a few years</i>)	Develop new software before this becomes an issue (within 5 years)
2. Data loss	Personal information is hacked	Significant	Low	Not currently an issue, as we hold very little personal information, however this may become a problem later
3. Payment gateway breach	A failure with technology causes credit card details to be exposed	Significant	Low	The gateways are supported by others and we hold no credit card details
4. Innovation drives existing players away	A resistance to change causes falling membership numbers	Significant	Possible	Manage change carefully and with member involvement

Risk	Description	Impact	Likelihood	Mitigation
5. Lack of innovation drives existing players away	A failure to move with the times cause players to leave	Significant	Possible	Investigate new technologies and look for better ways to do things
6. Lack of innovation fails to attract new players	The lack of technology in bridge turns off new players	Significant	Low	People do not generally take up bridge because of the technology, but especially for teaching technology, if we can make it a good experience, they are more likely to continue to play
7. Technology projects fail to deliver	Projects are run, but fail to deliver what they should	Severe	Possible	Have robust management of projects and choose partners wisely
8. Dealing hardware manufacturers go out of business	We find ourselves unable to replace equipment	Severe	Minor	There are multiple manufacturers
9. Players move to online bridge and away from clubs	Membership drops as people move to playing more online	Significant	Low	This seems unlikely and at least they would still be playing bridge. Moving into using online bridge as a channel for the ABF will mitigate this
10. Clubs move away from the ABF	Clubs chose to reduce cost by not being members of the ABF	Severe	Possible	Ensure the ABF stays viable for clubs by offering better technology

8. Governance

If the ABF is to become a software house, then it needs a proper governance process to ensure that value is achieved from the investment and also that risk is appropriately managed. The ABF previously had a Technology Committee which was responsible for the technology direction. Without partners to drive this, the committee had a very difficult job to do.

In the new model there are paid staff and external companies to drive the execution but there still needs to be a governance function that ensures that the direction that they are going is the right direction for the ABF. There is significant value in appointing a Steering Committee to oversee this and requiring regular review of progress, cost, risk and direction.

Recommendation – Appoint a Technology Steering Committee

This should consist of existing software providers, tournament organisers, directors and other interested parties and should meet at least quarterly to review progress.