Intelligent solutions for quality testing

A Behind-the-Scenes Look Into the Technology Driving the Testing Industry

Castle Worldwide

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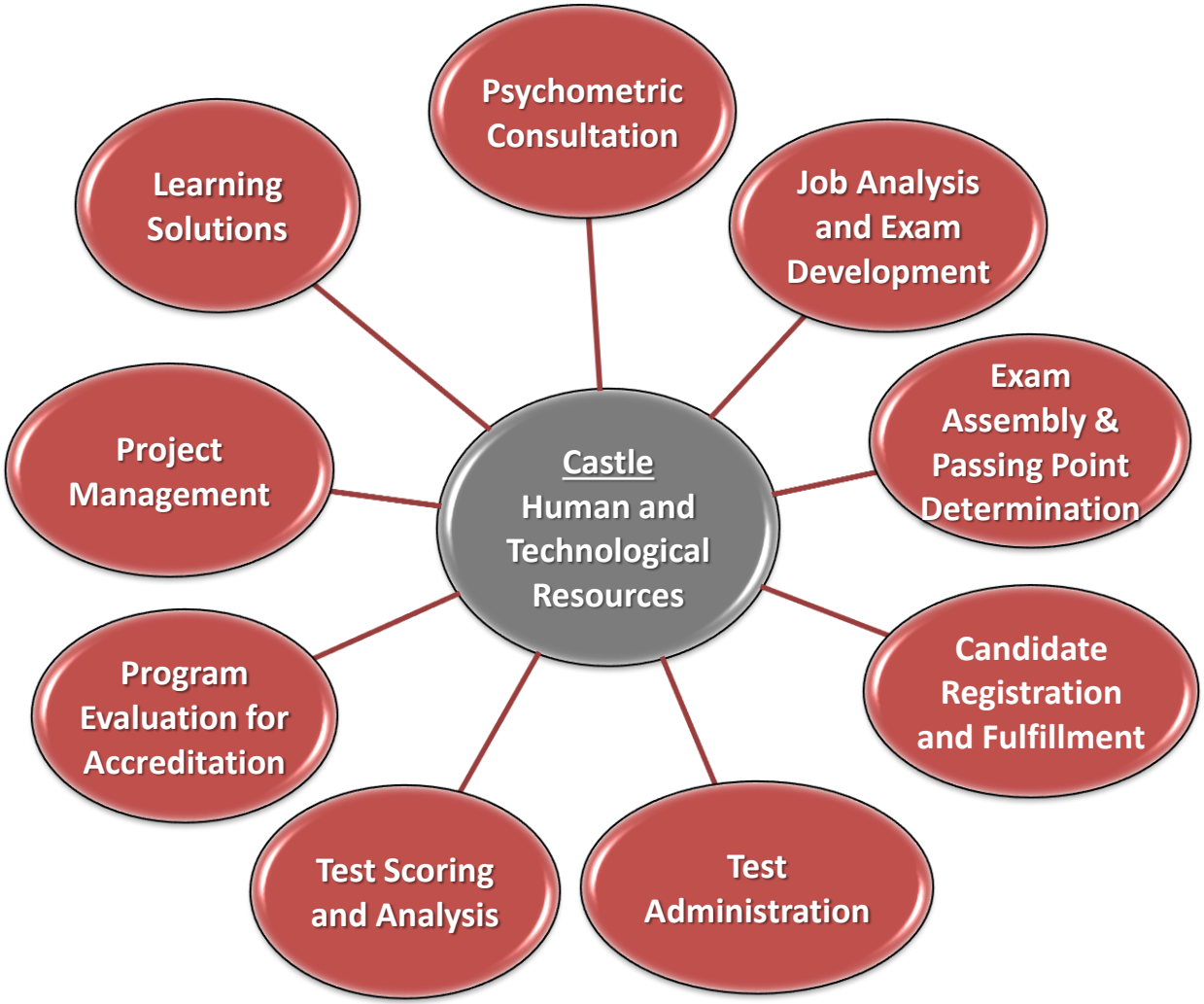
Who is Castle Worldwide, Inc.?

- Founded in 1987 in Raleigh/Durham area of North Carolina
- Full-service testing company, specializing in high-stakes certification and licensure examinations
- Highly trained and dedicated staff members in psychometrics, information technology, test delivery, customer support, project management, and financial management

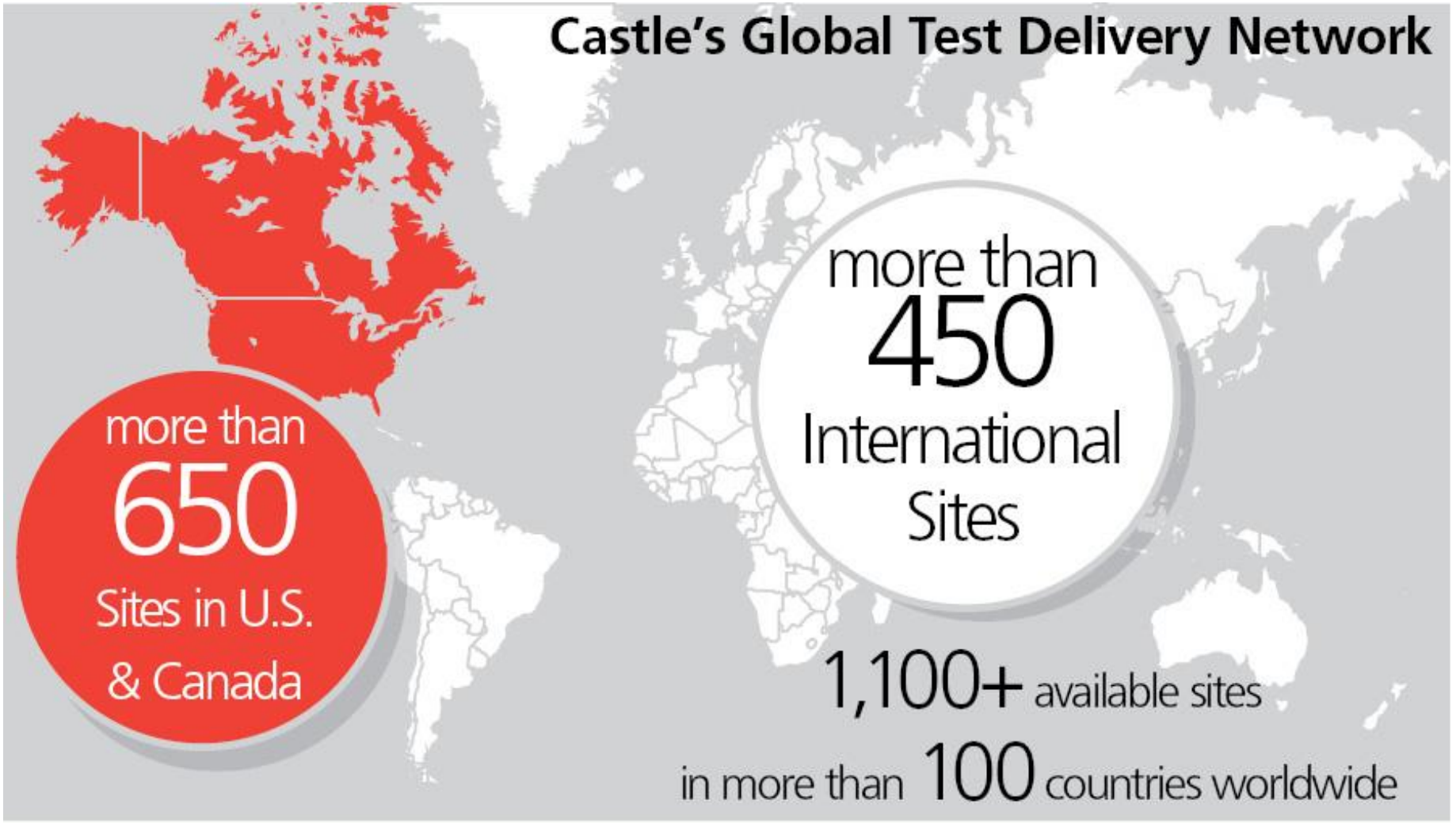
Quality Assurance

Psychometric Quality • Best Practices • Security

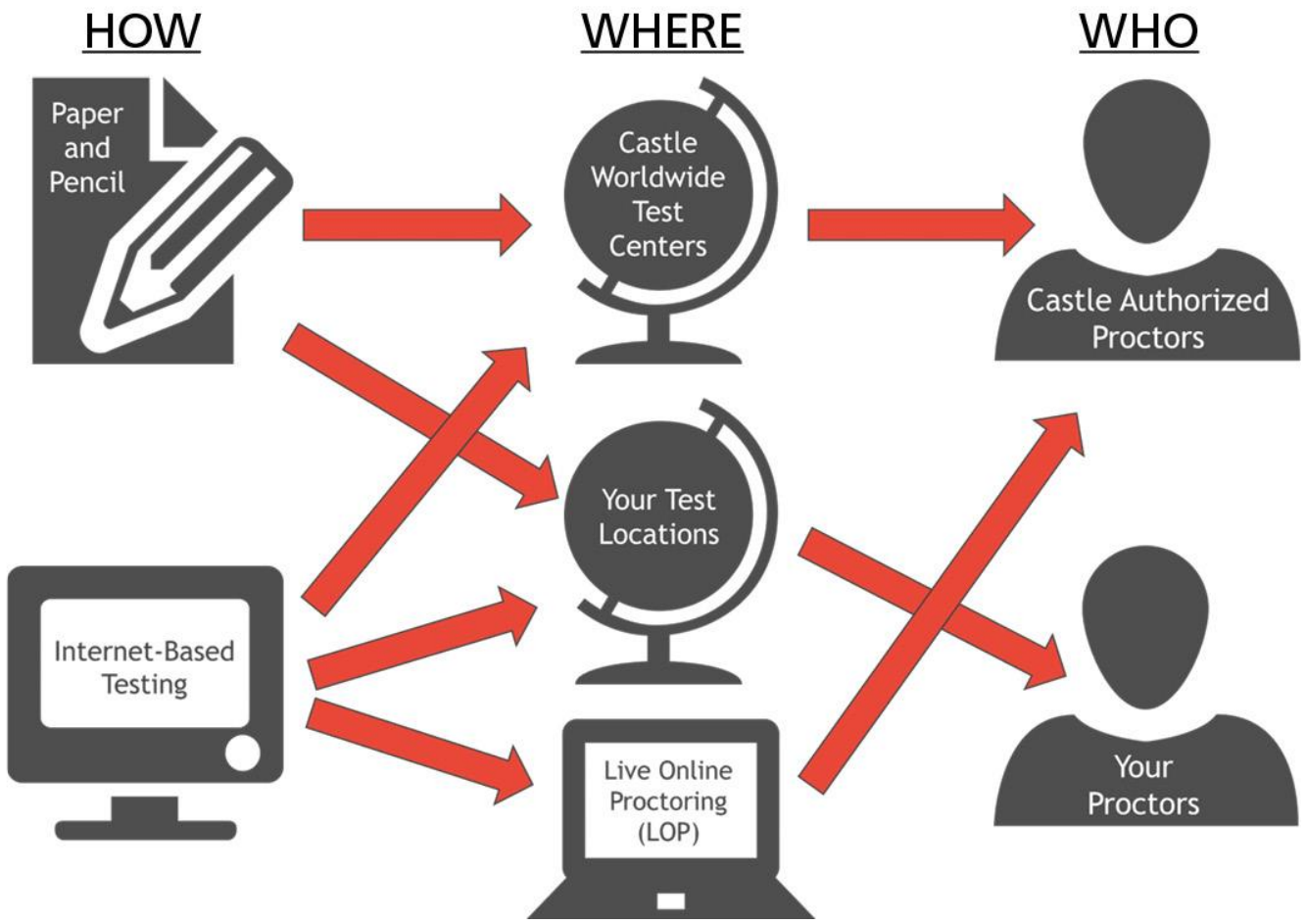
What are Castle's Core Services?



Castle's Global Test Delivery Network



More Options Regarding How and Where You Test



How to be a successful technology provider?

- Innovation – “Bring something worthwhile to the table”
- Reliability – “Don’t become the problem”
- Security – “Don’t put others at risk”
- User Experience – “Don’t let the technology get in the way”
- Performance – “Whatever you do, do it quickly”
- Adaptability – “Not all needs are exactly the same”

A few notes on the industry landscape…

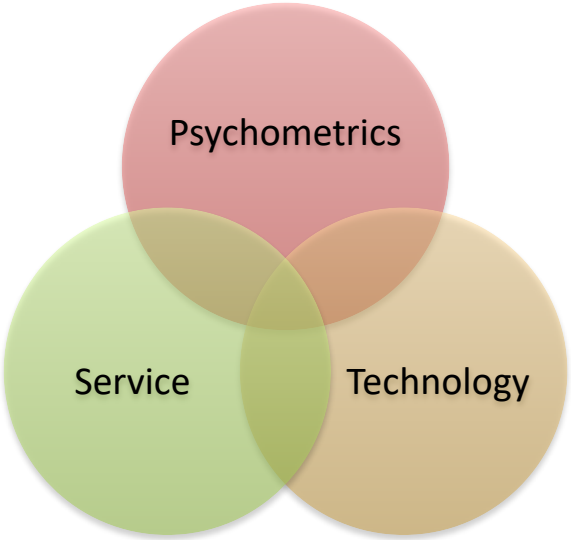
1. Testers are from a variety of diverse industries (that have nothing to do with testing)
2. There are no fixed demographics when it comes to testing population as a whole
3. Industry is generally risk-averse
4. Industry is growing in the number of service offerings
5. A common growth path is international services

How to navigate the testing technological landscape?

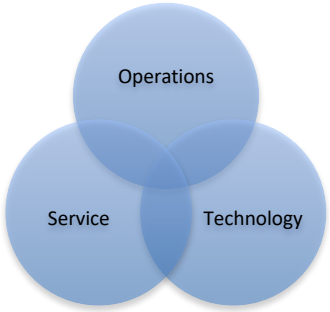
Castle’s 30 years of experience in the credentialing field has informed some basic principles…

How to navigate the testing technological landscape?

- Understand what makes this industry unique



Testing Industry



Typical Service Industry

How to navigate the testing technological landscape?

➢ Risk-based approach to security

- Security risk must be considered and applied within the initial structure of an architecture
- Shift risk to areas that you have the greatest control (e.g. server-based models)
- Use monitoring / metrics to provide clarity of analysis and not more noise
- Search for insights that provide focus:
  “Worry less about what’s coming in. Worry more about what’s going out.”

How to navigate the testing technological landscape?

➢ Understand and involve stakeholders

- Testing is a complex activity that combines systems and <u>people</u>
- <u>People</u> do not represent the “greatest weakness” but rather “greatest defender”
  (e.g. security is full of black swans; technology is not great dealing with problems never before encountered)
- Proper stakeholder representation ensures holistic solutions and analysis
- Stakeholder behaviors evolve (e.g. yesterday’s 15min smoke break is now a 15min Facebook break)

How to navigate the testing technological landscape?

- Look outside of the testing industry for metrics and innovation
  - Other industries have higher standards with regard to most technological services
    (e.g. uptime / availability, performance, security)
  - Embrace research in tangential fields

How to navigate the testing technological landscape?

➢ Employ data-driven decision making

- Provides consistent (but not unbiased) decision making (i.e. consider source)
- Model your decision making (e.g. simulation to what-if scenarios)… and be sure to include all stakeholders
- Consume what you collect, collect what you need to consume
- Data is derived from a variety of sources (e.g. server logs, proctor reports, databases, 3rd party data providers, ISPs, software logs)

How to navigate the testing technological landscape?

➢ Roadmap approach to product development

- Testing industry is traditionally resistant to major change. Incremental improvements with opportunity to collect feedback and gain acceptance has proven to be preferred.

- The roadmap ahead should inform decisions just as much as the roadmap achieved

How to navigate the testing technological landscape?

➢ Top talent = Top technology

- Practice what we preach (e.g. certify technologists, certify proctors)
- Recruit and retain top talent
- Build inroads into academia / research organizations

How to navigate the testing technological landscape?

➢ Embrace Standards

- Standards *usually* represent depth of thought
- Standards provide the basis for interoperability
- In many cases, 3rd party audit and controls can be engaged

How to navigate the testing technological landscape?

➢ Contribute to the testing community

- Attacks on the integrity of the industry affect us all
- Perspective is often the data point that provides context to technological mysteries
- Don’t just adapt… collaborate (i.e. the technology improves if the creator understands the problem space)

How to navigate the testing technological landscape?

- The job is never done.

- Commercial off-the-shelf (COTS) rarely works
- Technology moves quickly in both evolutionary speed AND number of service areas available

Case Studies:

Castle PASS® – Castle's secure internet-based testing (IBT) engine built for reliability and performance

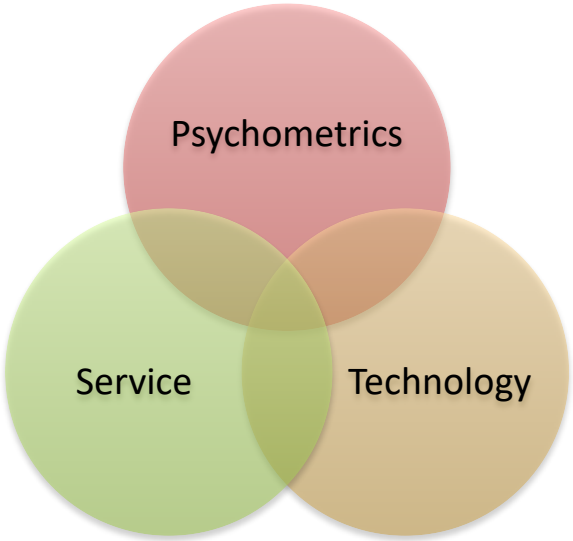
Castle ADE® – 30 Years of Castle Psychometric experience in software form

Castle Connect™ – Castle's highly configurable credentialing management system (CMS)

(Anticipating your question) What's Next?

- Principles of artificial intelligence: machine learning, expert systems, etc.
- Improved collaboration
- Reduced cost to develop more sophisticated item types

- Test anywhere, anytime on a variety of devices
- Prevalence of sophisticated authentication authorities



Testing Industry

- Data mining and analysis
- Prevalence of technology
- New sensors available to test developers (e.g. motion, video, GPS)
- Quantum computing

Questions?
Comments?