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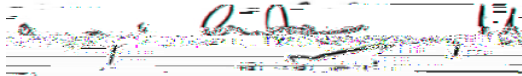
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The Modernize Maryland Oversight Commission was/ W D E O L V K H G Ensure the W X W H W confidentiality, integrity, and availability of information held by the State concerning State residents; and (2) advise the Secretary and State Chief Information Security Officer (the appropriate information technology and cybersecurity investments and upgrades; funding sources for the appropriate information technology and cybersecurity upgrades; and mechanisms for the procurement of the appropriate information technology and cybersecurity upgrades, including ways to increase the efficiency of procurements made for information technology and cybersecurity upgrades.

In this initial report, the Commission unanimously adopted 20 recommendations for the consideration of the Secretary of the Department of Information Technology (DoIT) and the State Chief Information Security Officer. These recommendations concern modernization funding, governance, advice and oversight, planning, management, and IT organization, and procurement. D G R S W Z Q R O H R I V W D W H J R Y H U Q P H Q W \ P L Q G V H W

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this experience has come models for governance, funding, and managing IT modernization that are instructive.

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VWDII RI VWDWHV WKDW KDYH EHHQ HQJDJHG VWDPRGWHUQL]

7KH 0RRLWHD BBLQLVWUDWLRQ LV FRPPLWWHG WR SURYLGLOQ
LQIUVDVWUDXFDXODQBUUWH PRYLQJ TXLFNO\ QRW RQO\ WR P
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7KH 0RGHUQLJH 0DU\ODQG 2YHUV DVKSDOQPRVSDENQJHDV FU
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F\EHUVHF DQGRGHUJQMDVPHVHV RWKHU SXUSRHHV

Legacy systems² hardware and software are systems that are outmoded obsolete.¹¹
Legacy systems impose a variety of other costs on governments and the residents they serve.
These include the tendency to fail under conditions exceeding their design, lack of flexibility to
accommodate changing regulatory requirements, increased maintenance costs, and staffing
challenges.¹² The latter was highlighted during COVID with urgent calls from some states for
COBOL programmers.¹³

⁷ Office of the Governor (8/16/2023). Governor Moore announces major action to rebuild state government and modernize Maryland Department of Information Technology services and operations (Press Release) <https://governor.maryland.gov/news/press/pages/governor-more-announces-major-action-to-rebuild-state-government-and-modernize-maryland-department-of-information-technology.aspx>

⁸ 7KH & RPPZDVLHQWB%LVK%G 6HVVLQ
[KWWSV PJDOHJ PDU\ODQG JRY PJDZHEVLWH /HJLVODWLRQ 'HWDLOV +%](#)
+ % 6HVVDHQWWSV PJDOHJ PDU\ODQG JRY PJDZHEVLWH /HJLVODWLRQ
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Maryland State government owns its share of technical debt, some of which has been exposed in recent years. During COVID, the Maryland Department of Health suffered a major cyber attack that disrupted critical services for an extended period of time.

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) L Q D D²⁰ D G G L W R R G B O Q W J D D H R Q V V D R U Z D R J G D W K H S U R P L V H F
J R Y H U Q F K Q M U W D L Q O \ W U X K L O G H O W U D D Q G B Q F D E M Q D O H R M V
S U R F H V Q H Z \ D V Q E P \ Q H H F H V L D U V X I Q R F W Q W S U R Y H V I S R Q V R U Y H
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F D U H H U V Z R U N L Q J D O R T Q K H S U N Q R U Z F P D W Z F O O Q H K D W L W L V W
G R Q W R I W H Q V H H Z K D W R W K H U W R X F K S R L Q W V W K H U H D U H

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²³ \$ O D Q O G W U K 2 D W ± L Q K H U D Q V F U L S W

²⁴ O D U S D \ P R Q S Q Q H F W D F X W Q K 2 H W U D Q V F U L S W

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FDXWLRQHG DJDLQVW RYHUSDFRQLZLDQDGDGOLRZUEPHURD
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egk'kpi . "o qtgqxtg. "uj qwf "dg o qxg'y kj "lphrc'v'kp'0'Vj g'O ct { rcpf "F gr ctvo gpv'qh'I gpgtci'Ugtxlegu
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vj g'o qpg' "ur g'v'0³

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K r tqxgo gpv'Eqwpek' *RKE + 'vj cv'cr r gctu'v' "dg tgeqpxgk'kpi "chgt "c" { gct'v'j k'wuu'0'Vj g'ej cpi gu'lp"
r qde { "cpf 'EQO CT' 'vj cv'vj g'RKE 'y qtn'kpi "i tqw 'j cu'dggp'f kuwuk'kpi y qtn'v'q' "o wej 'y kj k'p'vj g
gzk'kpi 'hgi cni'ht'co gy qtn'icpf "f q'pqv'qh'ht' "vj g'eqo r tgj gpuk'g'tgxkgy pggf gf "hqt'gh'ge'v'k'g
r tqewtgo gpv'tgh'qto 0'Vj g tgeqo o gpf cvkqp'ku'v'gpi ci g c eqo r tgj gpuk'g'tgxkgy d { "cp'q'wuk'f g"
gpv'v' "v'kf gp'v'h' "dqj 'p'ggf gf "u' vgo u'cpf 'ej cpi gu'lp' r tqegu'gu'v' "t'gf weg'vj g'iqpi "v'o g'k'p'gu'ht
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eqxgt "o qf gtp'k' cvkqp'i qxgtpepeg.'h'w'pf kpi . "r rcp'k'kpi "cpf "o cpci go gpv'cpf "r tqewtgo gpv'0'Vj g
Ego o kuukqp'iq'm'i'hty ctf "v' "eqv'k'p'w'kpi "v' "eqv'k'd'w'g'v' "O ct { rcpf v' "o qf gtp'k' cvkqp'gh'ht'v'k'p"
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O R U H , Q I R U P E D R I X I W R Q W K H 5 H S R U W

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University of Maryland Global Campus
Interim Staff, Modernize Maryland Oversight Commission
Staff, Maryland Cybersecurity Council
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⁶² Rtgu'p'cvkqp d { F c'x'f I tci cp. Ej kgh'Qr g'tev'kpi Q'ht'egt. P CURQ. "qp P qxgo dgt 8. 4245. cv'322'ht'k'p' vj g't'cpuet'k'r v'
⁶³ F cv' r tqx'k'f gf d { 'vj g'cev'kpi Ej kgh'Rtqewtgo gpv'Q'ht'egt cv'FI U'

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VRIWZDUH LQWR SURGXFWLRQ TXLFNHU)RU H[DPSOH '70
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DQG GHSOR\PHQW

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Dgecwug'vj g'K'K'ku'f k'gevn' 'cr r tqr tkcvf 'kpv'vj g F VO D'dwf i gv'cf f k'k'p'cn' qxgtpepeg'y cu' f ggo gf 'pgeguuct { 'v'g'p'w'g vj cv'vj g'hwf u'y gtg'dgkpi 'ur gpv'lw'lekcm' 'cpf 'hqt'vj g'eqttgev' r wtr qugu0I qxgtpepeg'ht 'K'K'ku'j gcf gf 'd{ 'c'o wnk'ci gpe{ 'dqctf . 'y j lej 'ku'rgf 'd{ 'vj g'Ej kgh k'phqto cv'kp'Q'htegt '*EIQ-0

Cu'v'q'r tqegu. 'Ucv'ci gpeku'uggnkpi 'hwf kpi 'htqo 'K'K'ht'q'o qf gtpk' cv'kp'r tqlgeu'r w vqi gj gt'c'dwf i gv'cpf 'r tqr qucn'tgs wgu0Vj g'ci gpe{ 'y kn'vj gp'r tgugpv'ku'r tqr qucn'v'q'vj g' Dqctf 0Vj g'Dqctf 'gxcn'cv'gu'r tqr qucn'qp'c'322'r qkp'v'uecn'wulpi 'vj g'gxcn'cv'kp'etk'gtk f k'uewugf 'cdq'xg0Vj g'Dqctf 'y kn'vj gp'r tkqt'k'k' g vj g'r tqr qucn'cpf 'ugv'ht'vj 'vj gk' tgeqo o gpf cv'k'pu'v'q'vj g'Ucv'g'dwf i gv'0H'qo 'j'gtg. 'vj g'F VO D'f k'gevt'y kn'iq'qm'cv'vj g'Dqctf ai' tgeqo o gpf cv'k'pu. 'cpf 'h'vj g'F k'gevt'eqpewu. 'vj g{ 'y kn'vcng'vj g'tgeqo o gpf cv'k'pu'v'q'vj g' I qxgtpqt'ai'dwf i gv'cpf 'vj g'I qxgtpqt'y kn'cu'guu'vj g'r tqr qucn'0K'vj g'I qxgtpqt'f gek' gu'vj cv' vj g'r tqr qucn'crki p'y kj 'j'gt'r tkqt'k'ku'cpf 'ctg c'i qqf 'k'pxguo gpv'ht'O lej ki cp. 'uj g'y kn'vcng vj g'tgeqo o gpf cv'k'pu'v'q'vj g'Ucv'g'Ngi kur'wtg cu'r ctv'qh'j' gt'cpp'wcn'dwf i gv'r tqegu0Q'peg'vj g' r tqr qucn'ctg'kp'ht'qp'v'q'h'vj g'Ngi kur'wtg. 'vj g'EIQ. 'cpf 'vj g'F gr ctwo gpv'F k'gevt'y kn'r tgugpv' vj g'tgeqo o gpf cv'k'pu'v'q'vj g'Cr r tqr tkcv'kp'u'Eqo o kwgg0Vj g'Eqo o kwgg'y kn'f k'uew'u'vj g' tgeqo o gpf cv'k'pu'w'v'kn'vj g'h'k'p'cn'dwf i gv'ku'cr r tqxgf 'ht'vj g'h'k'uecn' { gct0'

Qpeg'dwf i gv'ctg cr r tqxgf 'cpf 'vj g'hwf kpi 'ku'cewcm' { 'r tqxkf gf 'v'q'vj g'tgs wgu'kpi 'Ucv'g ci gpe{ . 'vj g'Dqctf 'ko r ngo gpv'c'tki qt'qwu'r tqlgev'o cpci go gpv'q'xgtuki j v'r tqegu0T gek' k'p'w' qh'K'K'hwf u'j cxg'v'q'u'wdo k'ur gek'le'tgr qt'u'y j lej 'k'pen'f g'dgp'ghku't'gerk' cv'kp'0Vj ku'o gcpu' tgekr k'p'w'j cxg'v'q'q'w'k'p'g'y j cv'vj g' { 'ctg'g'zr gev'kpi 'v'q'cee'qo r rkuj 'y kj 'vj g'hwf kpi 'cpf 'vj gp' vj g'Dqctf 'y qtm'u'y kj 'vj go 'v'q'o qpk'qt'y j gj gt'vj g' { 'cewcm' 't'gerk' g'vj qug'dgp'ghku'0Vj ku' r tqegu'ecp'vcng'w' 'v'q'vj tgg' { gct'u'r cu'v'vj g'ko r ngo gpv'cv'kp' qh'c'pgy 'u' { u'go 'v'q'gp'w'g'vj cv' dgp'ghku'ctg'dgkpi 't'gerk' gf 'cpf 'vj g'o qpg{ 'ku'dgkpi 'ur gpv'cr r tqr tkcv'gn'0'

Qp'v'qr 'qh'q'xgtuki j v'vj g' Dqctf 'y qtm'u'j cpf 'k'p'j' cpf 'qp'vj g'ko r ngo gpv'cv'kp'qh'o qf gtpk' cv'kp' r tqlgeu'0H'qt'gzco r ng. 'o go dgtu'o c' { 'cewcm' 'tgy tk'g'eqf g'qt'y qtm'ic'q'pi uk'f g'vj g'u' { u'go " k'p'gi tcv'qt 'v'q'dw'kf 'q'w'vj g'p'gy 'u' { u'go 0'

8 W D K & , 2

D O R G H U Q L J D W L R Q H I I R U W V

Wcj 'qr gtcv'gf c' h'gf gtcv'gf 'K'v'o qf gn'w' 'w'p'kn'4228. y j gp'k'egp'v'crk' gf 'cm'q'h'ku'K'v'ugtx'legu' k'pv'c'ul'pi ng'F k'k'k'kp'qh'V'gej p'q'q' { 'Ugt'x'legu'*F VU+0Wcj 'enu'q'egp'v'crk' gf 'cm'q'h'vj g'Ucv'g'ai' f c'c'egp'v'gtu'k'pv'y q'o c'k'p'egp'v'gtu'<q'p'g'o c'k'p'egp'v'gt'cpf 'c'uge'q'p'f ct { 'egp'v'gt'ht' 'h'c'k'q'x'g' 'cpf " p'gy qtm'it'gf w'p'f c'pe { 0V'cng'cy c' { u'ht'qo 'o q'x'k'pi 'ht'qo 'c' h'gf gtcv'gf 'o qf gn'v'q'c' egp'v'crk' gf 'o qf gn' k'pen'f gf 'j' cx'k'pi 'ut'q'pi 'ng'cf g'tuj k'r 'cpf 'k'p'egp'v'x'k' k'pi r gqr ng'y kj 'vj g'dgp'ghku'qh'u'we'j 'c'o q'x'g.' u'we'j 'cu'j' qy 'o we'j 'o q'p'g' { 'k'y kn'uc'x'g'v'czr c' { gtu'0K'ku' gunko cv'gf 'vj cv'Wcj 'uc'x'gf '&42'o kn'k'qp' ht'qo 'egp'v'crk' cv'kp'0'

Wcj ai'F VU'ku'c' h'm'it'ugtx'leg'qti cpk' cv'kp'vj cv'f q'gu'g'x'gt { vj k'pi 'ht'qo 'cr r k'ecv'kp'f g'x'gn'r o gpv' cpf 'u'w' r qt'v'e { dgt'ug'ew'k'v' { =u'cv'g'p'gy qtm'ic'p'f 'Y k'H'e'f c'c'egp'v'gtu'='en'w'f 'j' qu'k'pi =j' gnr 'f' gumi'

8WDK↑V|H|HFXJWLYH EUDQFK DJHQFLHV OLNH LWV +HDOWK
VHUYH 6WDWH XQRV HWKHLV M-DWH /HJLVODWXUH

8WDK KDV LGHQWLILHG IRXU PDLQ PRGHUQL]DWLRQ JRDO
x 'HOLYHU ILUVV FODVV FXVWRPHU VHUYLFH GLJLWDO
x ,PSURYH HPSOR\HH UHWHQWLRQ GULYH
x)LQG WKH EHVW LQYHVWPHQW IRU 8WDK↑V UHVRXUFH
x ,GHQWLI\ DQG H[SORUH HPHUJLQJ LQQRYDWLYH WHFK

8WDK↑V PRGHUQL]DWLRQ H[DSSOLFDFWLRQ H[DSSOLFDFWLRQ
PRYLQJ DSSOLFDWLRQV WR WKH FORXG DQG XSJUDGLQJ
KDV VRIWZDUH UXQQQLQJ LQ ROGHU RXWGDZHOVWISGRLQ
WR PRGHUQL]H LWV DSSOLFDWLRQV 7R RYHUFRRPH WKLV
VWUDWHJ\ ZKHUH LW LV IRFXVLQJ RQ PDNLQJ LWV DSSOL
HQKDQFH DQG WR ORZHU WKH WROHUDWH WSRURZQXWHK
UHVROYLQJ WKLV WHFKQLFDO GHEW

8WDK KDV HPSOR\HG DSSOLFDWLRQV FULFRLQZKLFK DSSOLFDWLRQ
PRGHUQL]DWLRQ HIIRUWV 8WDK KDV EDVHG WKLV PHWKR
IRU WROHUDWH LQYHVW PLJUDWH RU HOLPLQDWH \$FFF
FDWHJRULHV
x 7HFKQLFDO ILWQHVV RU KRZ XS WR GDWH WKH DSSO
PHHWV LWV QHHGV
x %XVLQHVV ILWQHVV RU KRZ ZHOO WKH DSSOLFDWLRQ
x

RFP process, when Utah is contracting for a larger, more complex project with a lot of different vendors involved. Utah also has an approved purchase list, which means that a State agency seeking to purchase something from the approved list does not have to get approval from the CIO, rather they just need to go through their own internal approvals, streamlining the process.

While Utah centralized its IT services, it did not centralize the funds. Funding primarily goes to State agencies and DTS then bills the agencies for its services. DTS has a series of rates, which includes a rate sheet with specific prices for the corresponding services DTS offers. A Rate Board oversees the rate process and approves the set prices. The Board is made up of members from the agencies DTS serves.

Utah has found it difficult to fund innovation under its current funding model because agencies are reluctant to pay for a service that has not been developed yet. Accordingly, for innovation projects DTS is often forced to go directly to the State Legislature to obtain funding.

As to how Utah funds its modernization efforts, the State relies on a few differe

different agencies it serves and starting a conversation about priorities and moving forward in a more holistic manner.

The second high-end priority is optimization. This includes the process of centralizing their IT services, as Connecticut previously had a decentralized form of technology governance. But optimization also includes a focus on what the State is currently doing with technology and how that can be changed to better deliver services. Connecticut realized that the technology was evolving much quicker than its decentralized structure could support. Accordingly, centralization is focused on bringing resources and people with specialized technical skills together to better serve the agencies. Centralization was difficult for Connecticut and the main takeaway was to take the time and effort with the people making the shift to build trust about the process.

The third priority is cybersecurity. Connecticut has made a big push to protect the data that is in its care. Connecticut currently has around \$13 million to raise the level of cybersecurity protection across the State government. The State is focusing on special funding, tools, and skill building, as well as getting a better understanding of what the cyber threat landscape looks like and what Connecticut can do to be more secure in this environment.

The last high-end priority for the State is AI. Connecticut passed an AI related law earlier this year setting out some minimum standards for the State to undertake in the executive branch. Connecticut has also created an AI working group to research ways in which to maximize this technology not only for the government, but also for businesses in Connecticut.

Connecticut handles IT procurement through master contracts. This allows vendors to agree on basic terms at the outset of the business relationship, speeding up the negotiation process for future projects. The contracts are initially for three to four years with an option to extend on top of that. These contracts usually take about three to four months. Connecticut usually gets multiple bids on statements of work, which has allowed the State to respond quicker to emerging trends. Connecticut will also use multi-state collaborative contracts, including NASPO contracts. The State's last resort is the RFP process because it takes an average of eighteen months to complete and by that time, the technology has often changed.

One of the main ways that Connecticut funds its modernization efforts is through a capital program called capital investment. This Program started in 2012 and is currently at about \$65 million. The Program is solely for creating new or transformed capabilities which allows the State to be more flexible and take on projects quicker than if the funds were used for ongoing operations.

The Program is headed by a Committee that is chaired by the Secretary of the Office of Policy and Management in the Budget group and the Commissioner of Administrative Services. The Committee is made up of members from a number of representative agencies. Committee members are tasked with representing the broader community perspective, not just their own agency's interests.

The program is entirely capital funded through the sale of five year short bonds. The debt service comes out of the State's operating budget, but the fund is all capital. The overall amount that is available gets set and approved by the Legislature. The Committee then says how they would like to spend the funds and goes to the Bond Commission, who actually authorizes the sale of the bonds and the release of the funds. The State also relies on federal programs for funding.

Nebraska is approaching modernization by focusing on incremental modernization of Applications, preferably via Commercial off-the-shelf (COTS) technology. Rather than trying to be the first in line chasing new innovation, the State will move cautiously to use solutions that have a history of demonstrated success while also leveraging or expanding the use of existing technologies. The State takes a methodical approach to modernization when it comes to legacy systems which involves source code organization, maintaining available documentation and code comments with easy-to-follow coding conventions. By maintaining current systems, this allows for functionality of old systems with integration of updated ones. In order to modernize, due diligence must be done so that the issues of the current platform do not reappear in the quest to eliminate the problems through new platforms. Code must be maintained and deployed properly throughout its lifecycle. Thus, to avoid the same issues reappearing if they are not resolved before replacement, rather than implementing a "rip and replace" strategy, it was recommended to take a Lean approach which limits back-end changes to legacy systems except for those that are necessary and improve the process. After each phase, a team continues evaluating and implementing further improvements until a fully functional interface with modern technological capabilities is built. Where possible, the State has moved applications to the cloud with minor changes. This strategy shows a hybrid approach, connecting some current on-prem systems with the newly introduced cloud to ensure a smooth conversion to modern technology only after committing the resources and operational oversight needed for stabilization and maintenance of the current systems.

Six key initiatives have been identified by the Nebraska IT Commission to achieve this incremental modernization, all of which promote the effective use of technology within the State of Nebraska, as well as education, economic development, local government, and health care. The first two, State Government IT Strategy and Nebraska Spatial Data Infrastructure (NESDI), address the need to take on an enterprise approach to IT in order to achieve the State's IT priorities of security, availability, and consolidation. The last four, Network Nebraska, Digital Education, Rural Broadband and Community IT Development, and Health, address using technology in education, economic development, and healthcare.

The State Government IT Strategy directs the Nebraska state government to develop and implement a comprehensive strategy for use of information technology. It will utilize a hybrid centralization model combining elements of both the centralized an/ e

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Nebraska Spatial Data Infrastructure (NESDI) is designed to develop and foster an environment and infrastructure that optimizes the efficient use of geospatial technology, data, and services to address a wide variety of business and government challenges within the state that will enhance the economy, safety, environment, and quality of life for Nebraskans.

Network Nebraska interconnects several hundred education entities through a broadband, scalable telecommunications infrastructure that optimizes the quality of service to every public entity in the State of Nebraska, providing aggregated Internet and commercial peering services extending out to the furthest corners of the state. Digital Education involves the coordination and promotion of several major systems and applications statewide to promote the effective and efficient integration of technology into the instructional, learning, and administrative processes and to utilize technology to deliver enhanced digital educational opportunities to students at all levels throughout Nebraska. Rural Broadband and Community IT Development is an initiative to support efforts which accelerate the deployment of broadband services in unserved and underserved rural areas of the state and to address issues related to the adoption and utilization of broadband technologies. eHealth is designed to support the adoption of telehealth and health information exchange technologies in Nebraska and to support the use of health IT to help patients access their health information and better manage their care.

Nebraska is taking a methodic approach by identifying the appropriate strategic partners and vendors to assist with their migration project. Rather than eliminating staff, the goal is to retrain existing positions to understand and enhance their skills by learning the cloud equivalent. This allows for more focus on innovation and improvements to virtual infrastructure and networking instead of purchasing physical infrastructure and setting that up in the data centers. Nebraska's model for procurement was described as "No different

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Director, Alliance for Digital Innovation
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